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2015-16 Graduate Bulletin

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Graduate Catalog

At the University of Dayton, we encourage our students to ask thought-provoking questions. And then we strive to answer them — together — through a framework of scholarship, research and practice.

As a leading Catholic, Marianist university, we value discovery, community, leadership and service. That's the core of our identity. It's the difference between an education and a transformation.

Whether you're looking to advance your career or to create a better world, you'll be encouraged to ask the big questions and then work to discover the answers—all with the support and guidance of top faculty and researchers.

In the graduate academic information section, you can continue your search for knowledge — and locate specifics on various academic areas and the programs and courses they offer.

General Information

There is more to your academic experiences than just the classes you take. The University is known for its innovative approach to blurring the lines between learning and living to create a vibrant, engaging community dedicated to moving the world forward.

Whether you are looking to learn more about admission, student services, student costs and finances or other facets of life that support your academic career, you will find the answers here.

The University of Dayton

In the summer of 1849, Father Leo Meyer and Brother Charles Schultz, the first Marianist missionaries to America, journeyed from Alsace in France to Cincinnati, Ohio, where they intended to establish a base for the order in this country. They arrived, however, during a cholera epidemic, so Bishop John Purcell of Cincinnati soon sent Father Meyer to Dayton to minister to the sick of Emmanuel Parish. Here he met John Stuart, whose little daughter died of cholera the year before. Mr. Stuart wanted to sell his Dayton property and return with his wife to Europe. On March 19, 1850, the feast of St. Joseph, Father Meyer purchased Dewberry Farm from him and renamed it Nazareth. Mr. Stuart accepted a medal of St. Joseph and a promise of \$12,000 at 6% interest in return for 125 acres, including vineyards, orchards, a mansion and various farm buildings. Meanwhile, more Marianists arrived, and Nazareth became the first permanent foundation of the Society of Mary in the Western Hemisphere.

The University of Dayton had its earliest beginnings on July 1, 1850, when St. Mary's School for Boys, a frame building that not long before had housed farm hands, opened its door to fourteen primary students from Dayton. In September, the classes moved to the mansion, and the first boarding students arrived. Father Meyer served as administrator, Brother Maximin Zehler taught, Brother Schultz cooked, and Brother Andrew Edel worked as farmer-gardener.

Five years later the school burned to the ground, but within a year classes resumed. By 1860, when Brother Zehler became president, enrollment approached one hundred. The Civil War had little direct effect on the school because most of the students were too young to serve. St. Mary's grew as college preparatory courses were started in 1861. Then came a novitiate and a normal school for Marianist candidates. An old history refers to the period of 1860-75 as "the brick-and-mortar years." The Chapel of the Immaculate Conception was completed in 1869. In 1870, visitors marveled at new St. Mary Hall, the largest building in Dayton, and called it "Zehler's Folly." The new "college department" moved into it in 1871. (St. Mary Hall is now listed in the National Register of Historic Places.)

In 1882, the institution was incorporated and empowered to confer collegiate degrees under the laws of the State of Ohio. In 1883, another devastating fire visited the campus, but this time some of the buildings were saved. The statue now known as Our Lady of the Pines was erected in gratitude, and the following year St. Joseph Hall was built, symbolizing the renewed confidence of the Dayton Marianists. In a more famous emergency, the school was spared by water as it had not been by fire. Because of its hillside location, it survived the Great Flood of 1913 untouched and was able to give shelter to 600 refugees.

St. Mary's had reorganized in 1902 into four departments—classical, scientific, academic and preparatory. In 1905, it added the Commercial Department, which would become the Department of Commerce and

Finance in 1921, the Division of Business Organization in 1924 and ultimately the School of Business Administration. Four engineering departments, appearing from 1909 to 1920, were to become the Engineering Division. In 1915, the Marianist training program (novitiate and normal school) was moved to Mount St. John's.

Known at various times as St. Mary's School, St. Mary's Institute and St. Mary's College, the school assumed its present identity in 1920, when it was incorporated as the University of Dayton. The same year, the elementary division was closed, the Division of Education was organized, and the University started its tradition of evening and Saturday classes to serve adults in the surrounding community. In 1922, the College of Law opened, also with evening classes. Other graduate programs followed, to augment the professional degree programs which distinguished the University from many of Ohio's other independent institutions of higher learning. In 1923, the first summer session was held; its classes, like those of the law college, were open to women as well as men.

The 1930s, with the Great Depression, were in many ways a time of retrenchment for the University of Dayton as for most other American schools. The Dayton Marianists had survived cholera, smallpox and influenza, wars, fire and flood and (in 1924) a Ku-Klux-Klan cross-burning on the campus. In 1935, even as the University turned its preparatory school functions over to Chaminade High School and graduated what was to be its last class in law for almost forty years, it inaugurated a college for women, with sisters of Notre Dame in charge of twenty-seven entering female students. Two years later, the college for women closed; all divisions opened to women, and the University became fully coeducational.

Enrollment had passed a thousand when World War II broke out. By 1950, with the return of the veterans, it reached more than 3,500. In 1967, it topped 10,000. But then, with the expansion of a community college and the establishment of a state university nearby, enrollment declined, and the resulting retrenchment was exacerbated by rising inflation and the energy crisis. Nor did the social turbulence and activism of the late 1960s and early 1970s bypass the University of Dayton. Some students and faculty protested against the Vietnam War, compulsory ROTC, and defense-related research activities. They campaigned also for changes in the curriculum, seeking more opportunities for meeting personal needs and goals. In response, the University gave greater responsibility to students for their own academic decisions, and it initiated interdisciplinary programs, self-directed learning and various experimental courses and methods. Meanwhile, the profile of the student body changed. The 1960s saw significant increases in female and minority students. In the 1970s, there was a shift to a largely residential student body, and at the same time, many more "nontraditional" (older) students matriculated. By the mid-1970s, total enrollment steadied at more than 10,000, with about 6,000 full-time undergraduates.

The University held its first general public fund-raising campaign in order to erect Wohlleben Hall in 1958 and Sherman Hall in 1960. Both campus and off-campus residences, residence halls, apartments and houses were added and improved as such emergency accommodations as surplus Army barracks and an adapted Army hospital (renamed the West Campus) were phased out.

Long-range planning has helped integrate new buildings and old and made the campus more livable by increasing its beauty as well as its efficiency. In 1986, old and new combined in the design of the Anderson Center between Rike Hall and Miriam Hall. When fire ravaged St. Joseph Hall in 1987, the University was able to rebuild and restore it without harming the architectural integrity of that historic corner of campus. Keeping pace with the needs of the University, the Jesse Philips

Humanities Center opened in 1993, and Joseph E. Keller Hall was built for the School of Law in 1997. In addition, the University has renovated Miriam Hall, converted its child care center into an early childhood demonstration school called the Bombeck Family Learning Center and completed the first phases of a modern Science Center. In 2002, the University of Dayton Arena underwent a modernization, placing it among the best venues for basketball in the country. The Donohoe Basketball Center, a major addition to the UD Arena giving UD a premier basketball facility for both playing and training, was dedicated in 1998.

As the University of Dayton entered the 21st century, it built modern student facilities, including ArtStreet and Marianist Hall (2004) and RecPlex (2006).

The edifices are not the only changes on campus. In 1960, the University reorganized academically and administratively. Administrative changes saw the formation of the College of Arts and Sciences from what had been two separate units. Other divisions became the Schools of Business Administration, Education and Engineering. In 1970, the University charter was amended and lay members now joined the Marianists on the Board of Trustees. In 1974, the School of Law reopened.

Academically, the University has continued to expand and enrich its offerings and support services, especially since mid-century. Graduate studies, abandoned during World War II, resumed in 1960, with the School of Education leading the way. In 1969, the Department of Biology inaugurated the first doctoral program since 1928. The School of Engineering introduced two doctoral programs in 1973, and in 1992, the first doctoral degrees in educational leadership were awarded. In 1997, the Board of Trustees approved a doctoral program in theology with a focus on the Catholic experience in the United States. It was the first such doctoral program on a Catholic campus nationally.

In 1975, the Marian Library, which had grown to international renown since its inception in 1943, founded the International Marian Research Institute (IMRI), which was incorporated in 1984 as a branch of the Marianum in Rome. IMRI is empowered to confer licentiate and doctoral degrees in theology, with a specialization in Mariology. The Marian Library now holds the world's largest collection of print materials on Mary, the mother of Jesus.

For all undergraduates, a general education plan was adopted in 1983 to foster integration of the liberal arts in a professional education. In 1990, the Academic Senate approved a revision of the general education requirements that called for an integrated base of four humanities courses complemented by clusters of other courses, requiring various disciplines to focus on a single theme. The Academic Senate revised and renamed the general education requirements again in 2010 to emphasize seven mission-related student learning outcomes: scholarship, faith traditions, diversity, community, practical wisdom, critical evaluation of our times, and vocation. The Common Academic Program (CAP), taken by all undergraduates, integrates all aspects of students' University experiences beginning with courses in the Humanities Commons and culminating in a Capstone experience. The University has always maintained a tradition of innovation. In 1874, St. Mary's Institute's new Play House gymnasium was the only one of its kind in Ohio, and it is probable that the first organized basketball game in the state took place there. A system of elective studies was inaugurated in 1901. In 1924, the University was the first school to be granted a charter by the National Aeronautical Association. It was one of the first in the nation to offer a course in biophysics (1935). In 1948, it was a pioneer in student evenings of professors, and in 1952, it invited persons over 60 to attend its evening classes as guests. Its graduate program in laser optics was one of the earliest in the country. It was one of the first educational institutions to

adopt electronic data-processing equipment and to offer degrees in computer science. In 1999, the University of Dayton was the first in the nation to offer an undergraduate degree program in human rights. The University is currently developing partnerships with top universities in China, including Nanjing University, one of that nation's leading research institutions.

More than just a breeding ground for academic excellence, the University also responds to the needs of society and the region.

Sponsored research at the University began in 1949 with a few faculty members and student assistants doing part-time research for industry and government agencies. In 1956, the University of Dayton Research Institute (UDRI) was formed to consolidate the administration of the growing research activities. Annual research volume has increased from \$3,821 in 1949, to more than \$85 million today. The University of Dayton ranks second in the nation in funding for materials research.

Named for Brother Raymond L. Fitz, S.M., the University's longest-serving president, the Fitz Center for Leadership in Community, founded in 2002, connects students and faculty to the community through service learning, social justice and ongoing involvement.

Among the University's other community collaborations is the Dayton Early College Academy, a public high school founded in partnership with the Dayton Public Schools. DECA, whose first class graduated in 2007, is the only charter school in the country operated by a Catholic university.

The University long-range plans include incorporating nearly 50 acres purchased from NCR in 2005. The land, lying between the academic core of campus and the Arena Sports Complex, increased the size of campus by nearly a quarter.

From its humble roots as a private boarding school for boys, the University of Dayton today ranks among the best Catholic universities in the country. It is the largest independent university in Ohio and draws students from around the country and the world.

Academic Calendar 2015-2016

The University of Dayton operates under an early semester, split third-term calendar. The academic year begins with the fifteen-week fall term, which ends before Christmas. The spring term, also fifteen weeks, begins in January and ends early in May. The third, or summer term, is split into two complete sessions of six weeks each.

Students may enroll for the traditional fall and spring semesters and have a four-month summer vacation; or they may add half terms or full terms to enrich their programs or speed the completion of their degree requirements. The University issues diplomas at the end of each term and holds ceremonies in May and December. Students who must earn their own money can have extra time for employment in spring and summer; or they may enroll for the third term and work during the fall or the spring term, when the employment market is not crowded with other college students.

Fall 2015

Date	Description
Mon, Aug 3	Degrees conferred--no ceremony
Tue, Aug 18	New Graduate Assistant Orientation
Thu, Aug 20	New Faculty Orientation
Sat, Aug 22	Incoming First Year students move into UD Housing
Sat-Tue, Aug 22-25	New Student Orientation

Sun, Aug 23	Upperclass students move into UD Housing
Tue, Aug 25	New Student Convocation
Tue, Aug 25	Last day to complete registration
Wed, Aug 26	Classes begin at 8:00 a.m.
Tue, Sep 1	Last day for late registration, change of grading options and schedules
Mon, Sep 7	Labor Day--no classes
Tue, Sep 8	Last day to change Second Session and full Summer Term grades
Fri, Sep 11	Faculty Meeting at 3:30 p.m.
Wed, Sep 16	Last day to drop classes without record
Fri, Sep 18	Academic Senate Meeting at 3:30 p.m. (KU Ballroom)
Fri-Sun, Sep 18-20	Family Weekend
Wed, Oct 7	Mid-Term Break begins after last class
Mon, Oct 12	Classes resume at 8:00 a.m.
Thu, Oct 15	Last day for Graduate and Doctoral students to apply for December 2015 graduation
Fri, Oct 16	Academic Senate Meeting at 3:30 p.m. (KU Ballroom)
Wed, Oct 21	First-Year students' midterm progress grades due by 4:00 p.m.
Sun, Nov 1	Last day for Undergraduate students to apply for May 2016 graduation
Fri, Nov 13	Academic Senate Meeting at 3:30 p.m.
Mon, Nov 16	Last day to drop classes with record of W
Tue, Nov 24	Thanksgiving recess begins after last class
Sat, Nov 28	Saturday classes meet
Mon, Nov 30	Classes resume at 8:00 a.m.
Tue, Dec 8	Feast of the Immaculate Conception/Christmas on Campus-- no classes
Fri, Dec 11	Last day of classes
Fri, Dec 11	Academic Senate Meeting at 3:30 p.m. (KU Ballroom)
Sat, Dec 12	Study Day
Sun, Dec 13	Study Day
Mon-Fri, Dec 14-18	Exams--Fall Term ends after final examinations
Fri, Dec 18	University Housing closes for Christmas Break at 6:00 p.m.
Sat, Dec 19	Diploma Exercises at 9:45 a.m.
Tue, Dec 22	Grades due by 9:00 a.m.
Wed, Dec 23	End of term processing officially complete
Mon, Jan 25	Last day to change Fall Term grades

Christmas Break

Date	Description
Sun, Dec 20	Christmas Break begins
Mon, Jan 18	Christmas Break ends

Spring 2016

Date	Description
Fri, Jan 15	Last day to complete registration
Sun, Jan 17	University Housing reopens for Spring Term at 8:00 a.m.
Tue, Jan 19	Classes begin at 8:00 a.m.

Fri, Jan 22	Academic Senate Meeting at 3:30 p.m. (KU Ballroom)
Mon, Jan 25	Last day for late registration, change of grading options and schedules
Mon, Jan 25	Last day to change Fall Term grades
Mon, Feb 1	Last day for Graduate and Doctoral students to apply for May 2016 graduation
Mon, Feb 8	Last day to drop classes without record
Fri, Feb 12	Faculty Meeting/Academic Senate Meeting at 3:30 p.m.
Fri, Feb 19	Academic Senate Meeting at 3:30 p.m. (KU Ballroom)
Wed, Feb 24	Spring Break begins after last class
Thu, Feb 25	Thursday only Graduate classes meet
Mon, Feb 29	Classes resume at 8:00 a.m.
Fri, Mar 11	Academic Senate Meeting at 3:30 p.m.
Tue, Mar 15	Last day for Undergraduate students to apply for August 2016 graduation
Wed, Mar 16	First-Year students' midterm progress grades due by 4:00 p.m.
Wed, Mar 23	Easter Recess begins after last class
Mon, Mar 28	Easter Monday--no day classes-- classes resume at 4:30 p.m.
Fri, Apr 1	Last day for Undergraduate students to apply for December 2016 graduation
Mon, Apr 11	Last day to drop classes with record of W
Fri, Apr 15	Academic Senate Meeting at 3:30 p.m. (KU Ballroom)
Wed, Apr 20	Bro. Joseph W. Stander Symposium-Alternate Day of Learning
Fri, Apr 29	Last day of classes
Sat, Apr 30	Study Day
Sun, May 1	Study Day
Mon-Fri, May 2-May 6	Exams--Spring Term ends after final examinations
Fri, May 6	University Housing closes for Spring Term at 6:00 p.m.
Sat, May 7	Doctoral/Graduate Commencement Exercises at 12:45 p.m.
Sun, May 8	Undergraduate Commencement Exercises at 9:45 a.m.
Tue, May 10	Grades due by 9:00 a.m.
Thu, May 12	End of term processing officially complete
Fri, May 13	Last day to change Spring Term grades

Summer 2016-- First Session

Date	Description
Fri, May 13	Last day to complete registration
Sat, May 14	Saturday classes begin
Mon, May 16	Classes begin at 8:00 a.m.
Tue, May 17	Last day for late Summer Term- First Session registration, change of grading options and schedules
Thu, May 19	Last day for late full Summer Term registration, change of grading options and schedules
Wed, May 25	Last day to drop without record from First Session classes
Mon, May 30	Memorial Day--no classes

Mon, Jun 6	Last day to drop without record from full Summer Term classes
Mon, Jun 13	Last day to drop with record of W from First Session classes
Mon, Jun 13	Last day to change Spring Term grades
Fri-Sat, Jun 24-25	Exams--full Summer Term classes do not meet First Session ends after final examinations
Tue, Jun 28	Grades due by 9:00 a.m.
Thu, June 30	End of term processing officially complete
Fri, Jul 1	Last day for Graduate and Doctoral students to apply for August 2016 graduation
Thu, Jul 28	Last day to change First Session grades

Summer 2016--Second Session

Date	Description
Fri, Jun 24	Last day to complete registration
Sat, Jun 25	Saturday classes begin
Mon, Jun 27	Second Session classes begin
Tue, Jun 28	Last day for late Summer Term-Second Session registration, change of grading options and schedules
Fri, Jul 1	Last day for Graduate and Doctoral students to apply for August 2016 graduation
Mon, Jul 4	Independence Day--no classes
Thu, Jul 7	Last day to drop without record from Second Session classes Term classes
Mon, Jul 18	Last day to drop with record of W from Second Session and full Summer Term classes
Thu, Jul 28	Last day to change First Session grades
Fri-Sat, August 5-6	Exams--Second Session and full Summer Term end after final examinations
Mon, Aug 8	Degrees conferred--no ceremony
Tue, Aug 9	Grades due by 9:00 a.m.
Thu, Aug 11	End of term processing officially complete
Mon, Sep 12	Last day to change Second Session and full Summer Term grades

Accreditation

The University of Dayton is accredited by the Higher Learning Commission of the North Central Association of Colleges and Schools. <http://www.ncahlc.com/HLC> phone: (312) 263-0456

The University of Dayton is also officially accredited by the following agencies:

- Accreditation Council for Education, Nutrition and Dietetics (ACEND) for the didactic program in dietetics
- American Bar Association (ABA) for the School of Law
- Association to Advance Collegiate Schools of Business (AACSB International) for the baccalaureate, accounting and Master of Business Administration programs of the School of Business Administration
- Accreditation review Commission on Education for the Physician Assistant (ARC-PA)
- Commission on Accreditation in Physical Therapy Education (CAPTE)
- Council for Accreditation of Counseling and Related Educational Programs (CACREP)

- Engineering Accreditation Commission of ABET, <http://www.abet.org>, for programs in chemical engineering, civil engineering, computer engineering, electrical engineering and mechanical engineering
- Engineering Technology Accreditation Commission of ABET, <http://www.abet.org>, for programs in electronic and computer engineering technology, industrial engineering technology, manufacturing engineering technology and mechanical engineering technology
- Masters in Psychology Accreditation Council (MPAC) for the Master of Arts program in Clinical Psychology
- National Association of Schools of Art and Design (NASAD)
- National Association of Schools of Music (NASM)
- National Association of Schools of Public Affairs and Administration (NASPAA)
- National Council for Accreditation of Teacher Education (NCATE)

The University has the approval of the following:

- American Chemical Society
- American Music Therapy Association
- Association of American Law Schools
- Counselor, Social Worker and Marriage and Family Therapist Board
- Ohio Board of Regents
- State of Ohio Department of Education

Degrees and Credentials Offered

The University of Dayton offers the following baccalaureate, professional, and graduate degrees:

- Bachelor of Arts
- Bachelor of Chemical Engineering
- Bachelor of Civil Engineering
- Bachelor of Electrical Engineering
- Bachelor of Fine Arts
- Bachelor of General Studies
- Bachelor of Mechanical Engineering
- Bachelor of Music
- Bachelor of Science
- Bachelor of Science in Business Administration
- Bachelor of Science in Computer Engineering
- Bachelor of Science in Education
- Bachelor of Science in Engineering Technology
- Master of Arts
- Master of Business Administration
- Master of Computer Science
- Master of Financial Mathematics
- Master of Laws
- Master of Mathematics Education
- Master of Physician Assistant Practice
- Master of Public Administration
- Master of Science
- Master of Science in Aerospace Engineering
- Master of Science in Applied Mathematics
- Master of Science in Chemical Engineering
- Master of Science in Civil Engineering
- Master of Science in Computer Engineering

- Master of Science in Education
- Master of Science in Electrical Engineering
- Master of Science in Electro-Optics
- Master of Science in Engineering
- Master of Science in Engineering Management
- Master of Science in Engineering Mechanics
- Master of Science in Management Science
- Master of Science in Materials Engineering
- Master of Science in Mechanical Engineering
- Master of Science in Renewable and Clean Energy
- Master in the Study of Law
- Educational Specialist
- Juris Doctor
- Doctor of Engineering
- Doctor of Philosophy in Biology
- Doctor of Philosophy in Educational Leadership
- Doctor of Philosophy in Electro-Optics
- Doctor of Philosophy in Engineering
- Doctor of Philosophy in Theology
- Doctor of Physical Therapy

The University also offers the following certificates, endorsements and licensures:

- Business Systems Analysis and Design Certificate
- Business Analytics Certificate
- Business Intelligence Certificate
- Catholic Education Certificate
- Catholic School Administration Certificate
- Church Music Certificate
- Cyber-Security Certificate
- Design of Experiments Certificate
- Dyslexia Certificate
- Early Childhood Leadership and Advocacy Certificate
- Early Childhood Intervention Specialist Certificate
- Geographic Information Systems Certificate
- Non-Profit and Community Leadership Certificate
- Pastoral Care Certificate
- Pastoral Counseling for Enhancement Certificate
- Project Management Certificate
- Six Sigma Certificate
- Systems Engineering Certificate
- Teaching English to Speakers of Other Languages Certificate
- Technology-Enhanced Learning Certificate
- Urban Teacher Certificate
- Computer Technology Endorsement
- Early Childhood Generalist Endorsement
- Middle Childhood Generalist Endorsement
- Prekindergarten Special Needs Endorsement
- Reading Endorsement
- Teacher Leader Endorsement
- Teaching English to Speakers of Other Languages Endorsement
- Adolescence to Young Adult Education Licensure
- Curriculum, Instruction and Professional Development Licensure
- Early Childhood Education Licensure
- Early Childhood Intervention Specialist Licensure
- Intervention Specialist Mild/Moderate Licensure
- Middle Childhood Education Licensure
- Multi-Age Education Licensure
- Principal Licensure
- Superintendent Licensure

Institutional Memberships

The University holds institutional membership in the following:

- American Association of Colleges for Teacher Education
- American Association of Collegiate Registrars and Admissions Officers
- American Association of University Women
- American College Personnel Association
- American Council on Education
- American Society for Engineering Education
- Association of American Colleges and Universities
- Association of American Law Schools
- Association of Catholic Colleges and Universities
- Association of College and University Housing Officers
- Association of Governing Boards of Universities and Colleges
- Association of Independent Colleges and Universities of Ohio
- Association to Advance Collegiate Schools of Business
- College and University Professional Association for Human Resources
- College Board
- Cooperative Education and Internship Association
- Council for Advancement and Support of Education
- Council of Graduate Schools
- Dayton Area Chamber of Commerce
- Dayton Art Institute (sponsoring)
- Institute of International Education
- National Association of College and University Food Services
- National Association of Independent Colleges and Universities
- National Association of Student Personnel Administrators
- National Catholic Education Association
- North Central Association of Colleges and Schools Higher Learning Commission*
- Ohio Academy of Science
- Ohio Association of Colleges for Teacher Education
- Ohio Association of Private Colleges for Teacher Education
- Ohio Campus Compact
- Ohio Continuing Higher Education Association
- Southwestern Ohio Council for Higher Education

* North Central Association
30 N. LaSalle Street, Suite 2400, Chicago, IL 60602
(800) 621-7440
<http://ncahigherlearningcommission.org>

Libraries

The University Libraries are comprised of:

- Roesch Library
- The Marian Library
- The University Archives and Special Collections
- The International Marian Research Institute

Roesch Library houses books, journals, videos, DVDs, CDs, government documents and microforms for both graduate and undergraduate students. Roesch Library is open 114 hours a week throughout much of the academic year and 24 hours per day during finals. Reference assistance is provided in a variety of forms including in person, email, IM, telephone and private consultations. Roesch Library subscribes to over 280 databases on a variety of subjects and provides access to more than 69,000 journals in print and electronic formats. Its book (print and electronic) and microform collections include over 1.4 million volumes.

The Libraries also provide comfortable study areas, photocopiers and individual and group study rooms. Roesch Library has 20 computer workstations located on the first floor and 37 computer workstations located on the second floor. All workstations provide access to the campus network, OhioLINK resources and the Internet. These computers run Microsoft Office applications, SPSS, and audio and video editing software. Group Project Space, also located on the second floor, has ten workstations equipped with double monitors that allow for group collaboration. All floors have data ports and wireless network access that allow students to access campus and information networks through notebook computers.

The Libraries are members of OhioLINK, a cooperative venture of university and college libraries and the Ohio Board of Regents. OhioLINK partners have created a common information network providing rapid access to and delivery of over 49 million items available at college and university libraries across the state. All of the libraries affiliated with OhioLINK provide on-site borrowing privileges to students and faculty associated with the University. Access to the Libraries' Web page, databases, and online catalog (<http://www.udayton.edu/libraries>).

The Marian Library (seventh floor of the Roesch Library) is recognized as the world's largest collection of published materials on the Virgin Mary. Its comprehensive collection embraces the works treating the Virgin Mary as found in Scripture, tradition, doctrine, history, art, popular culture, spirituality, and devotion. The multi-language collection includes over 95,000 books (6,000 printed before 1800), 200 periodicals, a clipping file of over 60,000 items, a Marian stamp collection, a Christmas creche collection, statues, medals, postcards, and works of art.

Publications include:

- Marian Studies (papers given at the annual meeting of the Mariological Society of America)
- Marian Library Studies (original research on Marian topics)
- The twice-yearly Marian Library Newsletter

United with the Marian Library is the International Marian Research Institute (IMRI), affiliated with the Pontifical Theological Faculty Marianum in Rome. IMRI offers courses in Marian studies as well as pontifical academic degrees (Licentiate and doctorate) in theology with specialization in Mariology. The Marian Library's collections can be accessed via the University Libraries' online catalog. Hours, an explanatory video, and information on current art exhibits can be found on the Mary Page (<http://campus.udayton.edu/mary>).

The University of Dayton School of Law Library is located in Joseph E. Keller Hall. Its collection contains over 190,000 volumes and over 676,000 physical units of microforms. The open-stack arrangement

of the Law Library permits easy access to all materials. For additional information visit the webpage (<http://community.udayton.edu/law/library>).

The Brother Louis J. Faerber, S.M., Curriculum Materials Center (CMC) houses the SOEHS's specialized education collections and is located in Fitz Hall. Its collection includes:

- Professional education books and journals
- Children and young adult literature
- Elementary and secondary textbooks
- Standardized assessments
- Teaching aids (games and manipulatives)
- DVDs
- CDs
- Charts
- Material kits
- Other resources

The CMC also houses research projects, theses and dissertations completed for the SOEHS's respective graduate programs. A copier, four networked computer workstations, the Ellison Press, Accu-Cut Machine and an assortment of letter and shape dies are available for student use.

Mission

The University of Dayton is a comprehensive Catholic university, a diverse community committed, in the Marianist tradition, to educating the whole person and to linking learning and scholarship with leadership and service.

The University of Dayton is a comprehensive university committed to offering a broad range of programs in liberal arts, the sciences and the professions at the undergraduate level, to providing selected programs on the graduate level to meet the needs of the community and region, to sponsoring timely continuing education programs. As comprehensive, the University views learning and scholarship as a shared task of discovering, integrating, applying and communicating knowledge at the intersections of liberal and professional education, across the disciplines and through combining theory with practice.

As Catholic, the University commits itself to a distinctive vision of learning and scholarship that includes: a common search for truth based on the belief that truth can be more fully known and is ultimately one; a respect for the dignity of each human person created in the image and likeness of God; and an appreciation that God is manifested sacramentally through creation and the ordinary things in life. Ultimately, a Catholic vision of the intellectual life is based upon the acceptance of the revelation of God in Jesus Christ as it has been received and handed on by the Church. This challenge calls for integration of the human and the divine, reason and faith, and promotes true understanding through a person's head and heart. The University welcomes persons of all faiths and persuasions to participate in open and reflective dialogue concerning truth and the ultimate meaning of life.

Founded in the Marianist tradition, the University is committed to a vision of a distinctive educational community. As Marianist, the University focuses on educating the whole person in and through a community that supports and challenges all who become a part of it. The University forms an educational community thriving on collaboration by people from diverse backgrounds with different skills who come together for common purposes. The University as Marianist challenges all its members to become servant-leaders who connect scholarship and learning with leadership and service.

This university community-comprehensive, Catholic and Marianist-exists not for itself, but to render service. The University creates an environment in which its members, working in a scholarly manner, are free to evaluate the strengths and weaknesses of their own work and the work of others. In partnership, through the Research Institute, Campus Ministry, as well as numerous student organizations, the University works with others to improve the human community.

Related University Services

Besides the regular day sessions, the University conducts special as well as regular evening and summer sessions and offers short-term workshops, institutes and conferences. All credited courses, whenever offered or in whatever form, conform to the same standards and are governed by the same policies and regulations prevailing during the regular day sessions.

As part of a comprehensive strategy for adult education through Graduate, Professional and Continuing Education, Special Programs and Continuing Education especially serves the part-time students of the Dayton community to make the University and its course offerings, both credit and noncredit, more easily available to them. Similarly, the Office of International Student and Scholar Services and the Intensive English Program, located in the Center for International Programs, serves students, faculty, staff and visiting scholars from other countries who are studying or working at the University.

To foster interdisciplinary efforts, the Office of the Provost can administer courses designated UDI (University of Dayton Interdisciplinary) to accommodate interschool offerings and experimental programs.

Southwestern Ohio Council for Higher Education (SOCHE)

Students at the University of Dayton may register for courses for credit at Southwestern Ohio Council for Higher Education institutions (see below for a complete list) at the University of Dayton's rate per credit hour. Students will pay any applicable lab or related fees at the host institution. This policy applies only if the course is not available at the University of Dayton, space in the course is available, and pertains only to regular sessions of the academic year. The student also is required to have advisor's permission, must satisfy all course prerequisites and must meet the host institution's admissions requirements. For more information go to www.soche.org. (<http://www.soche.org>)

The consortium of 22 colleges and universities was established to promote inter-institutional cooperation and community service. SOCHE holds regular conferences for faculty and staff, serves as a clearinghouse for the exchange of information and promotes projects of educational research and experimentation. Many cooperation programs exist in:

- Teaching
- Research
- Publishing
- College finance and administration
- Other areas

Consortium member schools include:

- Air Force Institute of Technology
- Antioch College
- Antioch University Midwest
- Cedarville University

- Central Michigan University
- Central State University
- Clark State Community College
- Edison State Community College
- Kettering College of Medical Arts
- The Kettering Foundation
- Miami-Jacobs College
- Miami University-Middletown
- Miami University Regionals
- Sinclair Community College
- Southern State Community College
- United Theological Seminary
- Union Institute & University
- University of Dayton
- Urbana University
- Wilberforce University
- Wilmington College
- Wittenberg University
- Wright State University

Statement of Purpose

Approved by the Board of Trustees, May 14, 1969.

The University of Dayton, by tradition, by legal charter and by resolute intent, is a church-related institution of higher learning. As such, it seeks, in an environment of academic freedom, to foster principles and values consonant with Catholicism and with the living traditions of the Society of Mary. Operating in a pluralistic environment, it deliberately chooses the Christian world-view as its distinctive orientation in carrying out what it regards as four essential tasks: teaching, research, serving as a critic of society and rendering public service.

The University of Dayton has as its primary task to teach—that is, to transmit the heritage of the past, to direct attention to the achievements of the present and to alert students to the changes and challenges of the future. It regards teaching, however, as more than the mere imparting of knowledge; it attempts to develop in its students the ability to integrate knowledge gained from a variety of disciplines into a meaningful and viable synthesis.

The University of Dayton holds that there is harmony and unity between rationally discovered and divinely revealed truths. Accordingly, it commits its entire academic community to the pursuit of such truths. It provides a milieu favorable to scholarly research in all academic disciplines, while giving priority to studies which deal with problems of a fundamentally human and Christian concern. It upholds the principle of responsible freedom of inquiry, offers appropriate assistance to its scholars and endeavors to provide the proper media for the dissemination of their discoveries.

The University of Dayton exercises its role as critic of society by creating an environment in which faculty and students are free to evaluate, in a scholarly manner, the strengths and weaknesses found in human institutions. While, as an organization, it remains politically neutral, objective and dispassionate, it encourages its members to judge for themselves how these institutions are performing their proper tasks; to expose deficiencies in their structure and operation; to propose and actively promote improvements when these are deemed necessary.

The University of Dayton recognizes its responsibility to support, with means appropriate to its purposes, the legitimate goals and aspirations of the civic community and to cooperate with other agencies in striving to attain them. It assists in promoting the intellectual and cultural enrichment of the community; it makes available not only the resources of knowledge that it possesses, but also the skills and techniques used in the accumulation and dissemination of knowledge; and, above all, it strives to inspire persons with a sense of community and to encourage men and women of vision who can and will participate effectively in the quest for a more perfect human society.

Academic Information-Graduate

The academic requirements and regulations described in this section are those of the University which, unless otherwise noted, take precedence over all others and apply to all graduate students. The student is expected to assume full responsibility for knowing and following all pertinent regulations and procedures of the Graduate School as set forth in this Catalog and for meeting the standards and requirements expressed herein.

To view the full list of degrees that The University of Dayton presently awards, click here (p. 7).

Academic Honor Code

The Academic Honor Code

I. Introduction

As a Marianist, Catholic university committed to the education of the whole person, The University of Dayton expects all members of the academic community to strive for excellence in scholarship and in character. As stated in the University's Student Handbook, "The University of Dayton expects its faculty and administration to be instrumental in creating an environment in which its students can develop personal integrity."

To uphold this tradition, the University community has established an academic honor code for all of its students, except Law students who are governed by The University of Dayton School of Law Honor Code. Students are expected to be aware of and abide by the honor codes.

II. The Honor Pledge

The University of Dayton Academic Honor Code: A Commitment to Academic Integrity

I understand that as a student of the University of Dayton, I am a member of our academic and social community,
I recognize the importance of my education and the value of experiencing life in such an integrated community,
I believe that the value of my education and degree is critically dependent upon the academic integrity of the University community, and so

In order to maintain our academic integrity, I pledge to:

- Complete all assignments and examinations according to the guidelines provided to me by my instructors,*
- Avoid plagiarism and any other form of misrepresenting someone else's work as my own,
- Adhere to the Standards of Conduct as outlined in the Academic Honor Code.

In doing this, I hold myself and my community to a higher standard of excellence, and set an example for my peers to follow.

Instructors shall make known, within the course syllabus, the expectations for completing assignments and examinations at the beginning of each semester. Instructors shall discuss these expectations with students in a manner appropriate for each course.

* The term instructor may refer to any faculty or staff member

III. Standards of Conduct

Regardless of motive, student conduct that is academically dishonest, evidences lack of academic integrity or trustworthiness, or unfairly impinges upon the intellectual rights and privileges of others is prohibited. A non-exhaustive list of prohibited conduct includes:

A. Cheating on Exams or Other Assignments

Cheating on examinations consists of willfully copying or attempting to consult a notebook, textbook, or any other source of information not authorized by the instructor; willfully aiding, receiving aid, or attempting to aid or receive aid from another student during an examination; obtaining or attempting to obtain copies of any part of an examination (without permission of the instructor) before it is given; having another person take the exam; or any act which violates or attempts to violate the stated conditions of an examination. Cheating on an assignment consists of willfully copying or attempting to copy all or part of another student's assignment or having someone else complete the assignment when class assignments are such that students are expected to complete the assignment on their own. It is the responsibility of the student to consult with the instructor concerning what constitutes permissible collaboration and what materials are allowed to be consulted.

B. Committing Plagiarism or Using False Citations

Plagiarism consists of quoting or copying directly from any source of material without appropriately citing the source and identifying the quoted material; knowingly citing an incorrect or fabricated source; or using ideas (i.e. material other than information that is common knowledge) from any source of material without citing the source and identifying the borrowed material. Students are responsible for educating themselves as to the proper mode of attributing credit in any course or field. Instructors may use various methods to assess the originality of students' work, such as plagiarism detection software.

C. Submitting Work for Multiple Purposes

Students are not permitted to submit their own or other's work (in identical or similar form) for multiple purposes without the prior and explicit approval in writing of all instructors to whom the work will be submitted. This includes work first produced in connection with classes at the University of Dayton as well as other institutions attended by the student or at places of employment.

D. Submitting False Data or Deceptive Information

The submission of false data is a form of academic fraud. False data is that which has been fabricated, altered, or contrived in such a way as to be deliberately misleading or to fit expected results. Deception is defined as any dishonest attempt to avoid taking examinations or submitting assignments at the scheduled times by means such as a forged medical certification of absence. Deception also includes falsifying class attendance records or failing to reveal that someone falsified your attendance. Extenuating circumstances such as a personal illness, death in the family, etc. must be negotiated with the instructor.

E. Falsifying Academic Documentation or Grade Alteration

Any attempt to forge or alter academic documentation (including transcripts, letters of recommendation, certificates of enrollment or good standing, and registration forms) concerning oneself or others

also constitutes academic fraud. Grade alteration consists of an act which dishonestly modifies a grade obtained for a class assignment, examination, or for the course itself.

F. Abuse of Library Privileges or Shared Electronic Media

All attempts to deprive others of equal access to any library materials constitute a violation of academic integrity. This includes the sequestering of library materials for the use of an individual or group; a willful or repeated failure to respond to recall notices; and the removal or attempt to remove library materials from any University library without authorization. Defacing, theft, or destruction of books, articles or any other library materials that serve to deprive others of equal access to these materials also constitute a violation of academic integrity. Malicious actions that deprive others of equal access to shared electronic media used for academic purposes constitute a violation of the Honor Code. This includes efforts that result in the damage or sabotage of campus computer systems.

G. Encouragement or Tolerance of Academic Dishonesty

The quality of campus and community life is dependent upon the commitment of each member of the University to a shared set of behavioral standards and values. Adhering to the Academic Honor Code is not limited to direct actions, but also includes any behavior that supports, encourages, or tolerates academic dishonesty.

IV. Student Status with Respect to the Academic Honor Code

A. All University of Dayton students, except for Law students who are governed by The University of Dayton School of Law Honor Code, are subject to the Standards of Conduct and procedures of the Academic Honor Code. Note: the following procedures, in Sections IV through VI, apply to the *academic* honor code and not to “standards of behavior” that are outlined in the University of Dayton Student Handbook.

B. Appropriate consequences for individual academic honor code violations are determined by the course instructor. Normally the maximum consequence identified by the instructor is an F in the course with no provision for a student to receive a W. However, the instructor may identify a lesser consequence when appropriate. The dean of the student's unit may also identify additional consequences. In some circumstances, such as multiple or egregious violations, these additional consequences may include dismissal from the University (see Section V.B).

C. The course instructor will investigate and determine appropriate action for all suspected violations of the academic honor code independent of the time frame in which the suspected violation is identified. Violations identified after a student has withdrawn from or completed the course, after the student leaves the university, or after the student has graduated, will be investigated and appropriate consequences identified and implemented according to the procedure identified for all academic honor code violations. Such consequences may result in the change of a grade or the revocation of a degree or certificate.

V. Procedure When an Honor Code Violation is Suspected

A. Instructors are required to investigate all suspected violations of academic dishonesty and report all those confirmed to have occurred using the following procedure.

- **Initial Notification:** Within 10 business days of becoming aware of a possible honor code violation, the instructor will notify the student of the incident via university e-mail and, if possible, in person. The instructor will disclose to the student the requirement of attending a “student meeting” to maintain access to the appeal process.

- **Honor Code Violation Incident Report:** The instructor will prepare the Honor Code Violation Incident Report describing the incident and the identified consequences in advance of the student meeting. If a student meeting occurs, the report will be shared with the student during the meeting. The student will sign the report in acknowledgement of the report. The student's signature on the report does not represent his/her acceptance of responsibility for the incident, nor does it limit the student's access to the appeal process described in Section VI.
- **Student Meeting:** The instructor will make a reasonable effort to meet with the student within 5 business days of the initial notification to discuss the situation. If the instructor determines that no honor code violation has occurred, then no further action is taken, and the incident report is discarded. If the instructor determines a violation has occurred, he/she will identify and discuss with the student an appropriate consequence. If the instructor's reasonable efforts fail to result in a student meeting, the instructor will proceed as though a violation did occur.
- Within five business days of the student meeting, or within five business days of the initial notification in the absence of a student meeting, the instructor will forward the Incident Report to the office of the student's dean and send a copy to the chair/program director of the department/program in which the incident took place.

B. Dean's offices are required to review and maintain records of all received Incident Report Forms for academic honor code violations.

- **Incident Review:** The student's dean's office will review the incident report and any previous violations of the honor code by the student. Appropriate additional consequences, if any, will be identified. In some circumstances, such as multiple or egregious violations, these additional consequences may include dismissal from the University.
- **Filing Date:** Within five days of receipt of the incident report, the dean's office will notify the student of the filing, any additional consequences, and the details of the appeal process.
- **Maintaining Incident Reports:** The student's dean's office(s) will maintain a copy of the incident report as part of the student's academic record. Should the student transfer between units, the student's entire academic record, including the incident report will be transferred between the units involved. Disclosure of the existence and content of the report to any internal or external party shall be controlled by the respective dean's office and governed by applicable University policy on disclosure of student academic records.

VI. Appeal Procedures

A student may appeal the filing of an Honor Code Violation Incident Report and/or any consequences identified by the instructor. The absence of the initiation of, or continuation of, an appeal within identified time frames will be interpreted as the student's acceptance of responsibility for the Academic Honor Code violation and acceptance of the identified consequences. The student must adhere to the steps and timelines of the appeal procedure.

A. The student's first level of appeal is with the instructor during the student meeting. If the student fails to participate in a student meeting within five business days of the initial notification, no further appeal will be available.

B. If the student meeting results in the filing of an incident report, the student may appeal the action and/or the identified consequences to the chair/program director of the department of the course in which the incident occurred within 10 business days of the Filing Date. (Note: in the event that the department chair/program director, or any other faculty

member participating in the appeal process, is also the instructor of the course in question, appropriate arrangements should be made to replace that person during the appeal process.)

- The student must submit a written account of the incident details and an explanation of their reasons for an appeal. The student may include written statements from any person relevant to the incident.
- The chair/program director will use reasonable means, including meeting with the instructor and student, to reach an appeal decision within thirty calendar days of the student's written appeal.
- The chair/program director will communicate her/his decision to the student in writing, and send a copy of the decision to the instructor and the student's dean's office.

C. The student or instructor may appeal, in writing, the decision of the chair/program director within ten business days of receiving the written decision.

- The chair/program director will form a department academic misconduct review committee composed of at least two full-time faculty (preferably tenured faculty) and one student. Undergraduates should serve on department misconduct review committees in cases of suspected undergraduate violations, and graduate students should serve in cases of suspected graduate student violations. Students should also note that "department grade appeals" committees should not be used in cases in which grades have been lowered because of academic misconduct.
- The chair/program director will provide a copy of the incident report to the department academic misconduct review committee, and the committee will use reasonable means, including meeting with the instructor and student, to reach an appeal decision.
- The department misconduct review committee will make known its decisions and the reasons for its decision in writing to the student, instructor, department chair/program director, and the student's dean's office within thirty calendar days of the student's or instructor's written appeal.

D. The student or instructor may appeal, in writing, the decision of the department review committee to the dean's office of the unit in which the incident occurred within 10 business days of receiving the written decision from the department misconduct review committee.

- The dean's office will obtain a copy of the incident report, as well as the report of the department misconduct review committee, from the department chair/program director of the department in which the incident occurred.
- The dean's office will obtain additional information, as needed, to evaluate the appeal.
- The dean's office will make known its recommendations and the reasons for its recommendations in writing to the student, instructor, department chair/program director, and the student's dean's office within thirty calendar days of the written appeal.

E. A student may appeal any additional consequences identified by the student's dean's office. The absence of the initiation of, or continuation of, an appeal within identified time frames will be interpreted as the student's acceptance of the identified consequences. The student must adhere to the steps and timelines of the appeal procedure.

- Any appeal of the filing of the incident report and/or instructor-identified consequences must be resolved prior to the initiation of an appeal of any additional consequences from the dean's office.

- The student may initiate an appeal of additional consequences from the dean's office, including dismissal from the university, by meeting with a representative of the dean's office within five business days of the filing date of the incident report or, in situations in which an appeal of the incident report and/or instructor-identified consequences has occurred, within five business days of the final decision on the initial appeal. During the meeting, the student and dean's office representative will discuss the reasons for the identified consequences and the student's concerns.

F. If the student is not satisfied with the results of the meeting with the dean's office representative, a final appeal may be made, in writing, to the Provost within ten business days after the meeting. The Provost must make known his or her decision in writing, to the student, and the student's dean's office, within thirty calendar days. The final authority rests with the Provost.

Academic Standards

To be in good standing, a graduate student must maintain a 3.0 quality point average at all times. Grades are expressed on the student's permanent record in the following manner:

A - Excellent: for each semester hour, 4.0 quality points are allowed

A- - For each semester hour 3.6667 quality points are allowed.

B+ - For each semester hour, 3.3333 quality points are allowed.

B - Good: for each semester hour, 3.0 quality points are allowed.

B- - For each semester hour, 2.6667 quality points are allowed.

C - Passing: for each semester hour, 2.0 quality points are allowed.

F - Failed: 0 quality points are assigned.

CR - Passed: Credit is awarded, but no corresponding quality points are given. This is used for all thesis and dissertation credits and for other special courses that do not affect the 3.0 cumulative quality point average needed to be in good standing.

I - Incomplete: To be used when a course has otherwise terminated but the student, for an acceptable reason, has not completed all the work for the course. The "I" has 0 quality points per hour and does not affect the cumulative quality point average. An "I" in a graduate course must be removed within one calendar year from the date listed on the grade report, or it will be changed to an "F" on the student's permanent record and the quality-point average adjusted accordingly. The time limit may be extended under exceptional circumstances, with the approval of the dean, if application for the extension is made within the one year period noted.

K - Credit: This mark is used only for credits accepted as transfer credit from other institutions. No quality points are allowed.

IP - In Progress: This designation is used in lieu of a grade for thesis/dissertation credits or other courses which have not terminated at the end of a semester. Upon completion of the thesis/dissertation all "IP" designations will be changed to "CR" in the student's permanent record. For other courses, appropriate letter grades will replace "IP" designations after the course is completed and the quality-point average will be adjusted accordingly.

N- No grade was reported by the instructor.

W - Withdrawal: Any withdrawal or change of course must be processed by an official Drop-Add Form through the Registration office, with the approval of the graduate student's advisor. During the first three weeks of a full term (or 10 calendar days of a split term) a graduate student may

withdraw from a class without record. Financial adjustments, if allowed, will be made only from the date of notification of withdrawal.

X - Audit: This mark indicates that the graduate student has registered to audit the course. No credit hours or quality points are awarded for this mark. NOTE: Any course taken for audit may not be retaken for credit.

S - This mark indicates credit given to students (registered in the University) on the basis of examinations after admission to the University. The level of achievement to be demonstrated by the student on these examinations is determined by the department in which the course is taught. Such credit shall be assigned only on authorization of the dean of the academic division in which the student is registered. No quality points are allowed.

Academic Standing: A graduate student's academic standing is determined according to the cumulative quality-point average at the end of each term. In addition:

- a) To be in good academic standing, a graduate student must maintain a cumulative quality-point average of at least 3.0 at all times. A cumulative quality-point average of at least 3.0 is also required for graduation.
- b) Thesis and dissertation credits may only be assigned "IP" and "CR" grades and do not count toward the minimum quality-point average of 3.0.
- c) A cumulative quality-point average below 3.0 will result in the student being placed on academic probation.
- d) A graduate student on academic probation must complete a written academic recovery contract with his or her graduate program director which shall specify goals, expectations and a timeline for achieving good academic standing. This contract must specify the duration of the probationary period, which may not be shorter than one academic semester nor longer than one calendar year, and must be approved by the student's academic dean, or designee.
- e) Students whose academic performance has seriously impaired their ability to succeed at the University of Dayton may be subject to academic dismissal by his or her academic dean, who authorizes the dismissal and notifies the student of his or her status. Graduate students who may be dismissed include:
 1. those who fail to achieve good standing at the end of an agreed upon period of academic probation;
 2. those who receive one or more grades of "F"; and,
 3. those who have accumulated six or more semester hours of "C" grades, regardless of the cumulative quality-point average.
- f) The Registrar will post *Academic Dismissal* on the permanent record of any student dismissed.

Advising

Initial academic advising is usually done by the program director or a temporary advisor. Following this, the graduate student may be assigned to a permanent advisor or a graduate committee. In either case, all details of the program will be decided by the student and advisor.

Appeal for Change of Grade

Any appeal for change of grade for a particular course should be directed to the dean of the academic division in which that course is offered.

Application

There are no application fees for domestic students. International students applying for admission are strongly encouraged to apply

online; however, a paper application may be requested from the Office of Graduate Admission Processing if they are unable to complete an online application. For international students, there is a \$50 (U.S.) fee for submitted applications. The application cannot be processed until the fee is received.

Official transcripts must be submitted directly from the registrars of all previously attended colleges or universities to the Office of Graduate Admission Processing. Registration will be permitted only when the final transcript (showing the university seal and highest degree attained) is on file.

Letters of reference should be completed by professional persons able to judge the applicant's academic qualifications for the proposed field of study and returned to the Office of Graduate Admission Processing.

The University of Dayton operates under an early semester, split third-term calendar. The first term begins in late August; the second term in early January; the third term, first session, in May; and the third term, second session, in June.

It is the applicant's responsibility to see that all required documents are on file at least one month prior to the beginning of the term for which admission is sought.

Admission Tests

- GMAT: required by the School of Business Administration
- GRE: required by the Departments of Biology, Communication, Physical Therapy, Psychology and Public Administration. The GRE is also required for the Ph.D. in Educational Leadership. Applicants to the School of Education and Allied Professions with a GPA below 2.75 are required to submit GRE or MAT test scores

All applicants for graduate assistantships should include a statement, not to exceed 1,000 words, describing academic preparation, vocational objectives and particular interests in their field of study. Application deadlines vary by program and applications should be submitted directly to the department.

Composition of Master's Thesis and Doctoral Advisory Committees

Composition of Master's Thesis Committees

Graduate faculty status is a prerequisite to chairing a master's thesis committee. A master's thesis committee must consist of a minimum of three members, at least two of whom must be members of the graduate faculty.

Composition of Doctoral Advisory Committees

Graduate faculty status is prerequisite to chairing a doctoral advisory committee. Additional criteria for chairing dissertation committees may be prescribed by the appropriate academic division. A doctoral advisory committee must consist of a minimum of four members, at least three of whom must be members of the graduate faculty. One of the members must be an external member whose primary appointment is outside the candidate's program or department, or outside the University. The external member must be familiar with the standards of doctoral research and should be in a collateral field supportive of the student's dissertation topic. It is recommended that this member have graduate faculty status, if from another graduate program.

The composition of the doctoral advisory committee is recommended by the chair of the relevant department/program, requires concurrence

by the dean (or designate) of the academic division and approval by the Associate Provost for Graduate Academic Affairs.

Final Exam Policy

To protect and strengthen the academic integrity of the final examination week at the University of Dayton, the following policy on final examination week has been adopted effective for the 2004-05 academic year.[1]

1. Final examination week is defined as the sum of one full week of scheduled examinations, the weekend immediately preceding and a minimum of one study day. Multiple study days are preferred.
2. Every course of study, undergraduate and graduate, must conclude with an academically rigorous culminating learning experience, normally a final examination. A culminating learning experience may involve traditional in-class examinations, presentations, performances, critiques, portfolios or other similar experiences. Laboratory, studio or similar courses may be regularly exempt from this requirement, with the approval of the department chair and a designated administrator in the office of the dean.
3. No new material may be introduced in a course after the last scheduled class meeting. No final examination may be scheduled at a time other than the time prescribed by the Registrar during final examination week, with the sole exception of block examinations. No final examination of any kind may be given prior to final examination week. Any exceptions must receive the approval of the department chair.
4. A block examination is a common examination that covers several sections of the same class, taught by different instructors, for the purpose of establishing a uniform scale of achievement. Such examinations are scheduled through the registration office. Multiple sections of a class, taught by the same instructor, are not eligible to give block examinations unless they are part of a class taught by more than one instructor.
5. Grades for all students, including graduating students, will be reported by a single deadline, as determined by the Registrar.
6. When a student has three or more final examinations scheduled for the same day, faculty are encouraged to accommodate the individual student on an alternative day agreeable to both the student and the instructor. The student must make the request by the last scheduled class meeting.
 - When a student with a disability has two or more final exams scheduled for the same day, faculty are encouraged to accommodate the individual student on an alternative day agreeable to both the student and the instructor which may include use of an alternative testing site. The student must make the request by the last scheduled class meeting.[2]
7. Students must have access to graded examinations for a period of six months after the examination has been given.
8. Any on-going or regular exception to the final examination policy requires the approval of the department chair and a designated administrator in the office of the dean.
9. The School of Law is exempt from this policy due to its independent academic calendar.

[1] Approved by the Academic Senate December 12, 2003, document number I-03-10, Final Examination Week

[2] Amendment to Academic Senate document number I-03-10, Final Examination Week, approved February 6, 2004

Graduate Certificate Programs

Graduate certificates may be awarded to recognize academic accomplishment in a cluster of related graduate courses on a topic, theme or area as defined by the appropriate faculty. These certificates serve as the student's record of coherent academic accomplishment and, thus, will also be noted on the student's official academic transcript. They are neither academic degree programs nor professional credentialing programs.

Graduate certificate programs typically consist of 3 to 6 graduate courses (9 to 18 credit hours). Specific requirements and sequences leading to these certificates are described in sections of this Catalog for the respective College or School, as are the specific curricula, courses and requirements of the divisions and departments offering them.

Types of Certificates

There are three general types of graduate-level certificates:

1. Free-standing certificates recognize the successful completion of a focused set of course work independent of a graduate degree program.
2. Certificates awarded concurrently with an associated master's or doctoral degree which indicate that a specific and elective sequence of course work has been followed.
3. Certificates that recognize the successful completion of additional course work and which reflect academic accomplishment beyond the normal requirements for a degree.

Admission Requirements

Students seeking graduate certificates must apply to and be accepted for admission into either the specific certificate program or an associated degree program. Students who are admitted into a degree program and who wish to concurrently pursue a graduate certificate should notify the certificate program director in writing before half of the required hours for the certificate are completed.

Transfer Credit

Transfer hours are not acceptable for free-standing certificate programs except in those instances where the certificate program is cross-institutional and the transfer policy is clearly articulated between the governing institutions. Transfer credit may be accepted toward certificates associated with concurrent degree programs in accordance with the transfer policies that govern those degree programs.

Subsequent Degree Programs

Students enrolled in free-standing certificate programs may usually apply their certificate course work toward an eventual degree. Exceptions should be noted in the certificate program proposal and communicated clearly to students upon admission into the certificate program. Students desiring to apply their certificate credits toward an eventual degree must also apply to and be accepted for admission into that degree program when the decision is made to pursue the degree program.

Graduate Retake Policy

University policy does not limit the number of courses that may be retaken by graduate students, nor does it limit the number of times any particular course may be attempted. Academic units are nevertheless free to impose specific restrictions according to their needs. All retaken courses, including the original attempt, will be shown on the student's transcript. With permission, however, graduate students may retake a

single course, one time, and have the lowest grade excluded from the calculation of their cumulative quality-point average.

To exclude a grade of C or F from their cumulative quality-point average, matriculated graduate students may retake at most one graduate level course of no more than four semester credit hours. For students who pursue more than one graduate degree at the University of Dayton (e.g., a master's degree followed by a doctoral degree, or multiple masters degrees), at most one graduate level course per graduate degree program may be retaken for purposes of grade exclusion according to this policy. In all cases, the course(s) in question must have been taken at the University of Dayton and must be retaken at the University of Dayton.

Courses may be retaken for the purpose of grade exclusion only once and only with the prior written permission of the student's graduate Program Director or Department Chair. In the event that the Chair/Director was the student's original instructor, permission to retake a course for the purpose of grade exclusion may be sought from the student's academic Dean or Dean's designee.

When permission to retake a course is granted according to this policy, the lowest grade for that course will be excluded from cumulative quality point average calculations. Note that, in the event that the grade received on the approved retake attempt is not better than the original grade(s), the grade for the approved retake attempt shall be excluded from the cumulative quality-point average calculation. While all attempts at the course, including corresponding grades, will be shown on the student's graduate transcript, the excluded grade will be annotated with an "E" (i.e., Grade Excluded). For all other retaken courses, the grades for all attempts will be shown and included in the calculation of the cumulative quality-point average.

Students must demonstrate that a course retaken for the purpose of grade exclusion contains essentially the same material as the original course in which a grade of C or F was earned. In all cases, retake requests must be approved prior to enrollment in order for the grade exclusion policy to apply. Moreover, within 30 days of completing the retaken course, the student's Department Chair or Program Director must communicate with the Registrar's office to initiate the grade exclusion designation and subsequent recalculation of the student's cumulative quality-point average.

Special Provisions:

1) One course taken in pursuit of the Master in the Study of Law (M.S.L.) degree may be retaken according to this policy. All courses leading to the Juris Doctor (J.D.) and Master of Laws (LL.M) degrees are, however, excluded from this policy.

2) Also excluded from this policy are all graduate courses taken by undergraduate students for undergraduate credit (i.e., graduate courses taken to satisfy one or more undergraduate program requirements which are also included in the calculation of undergraduate term and cumulative quality-point averages). This exclusion applies to, but is not limited to, students enrolled in approved Bachelor's Plus Master's (BPM) degree programs.

3) Students enrolled in the joint Accounting plus MBA 150-Hour Program may, according to this policy, retake one graduate level course taken for graduate credit (i.e., a graduate course taken to satisfy a graduate program requirement which is also included in the calculation of graduate term and cumulative quality-point averages).

International Graduate Student Admission

International students can visit online (<http://gradadmission.udayton.edu>) for information and to submit an on-line application.

International students should apply by May 1 if enrolling for the fall term and by November 1 if enrolling for the winter term. Permanent residents and Asylees/Refugees may complete the same on-line application.

Applicants with international credits seeking admission to graduate programs at the University must have completed a minimum of sixteen years of education, including the earned equivalent of a four-year bachelor's degree from a regionally accredited institution. Applicants must also present evidence of outstanding success in the chosen field of study.

Program-specific admission requirements are listed on the graduate admission website (<http://gradadmission.udayton.edu>).

International students who wish to attend the University of Dayton while on a student visa should apply for admission to an appropriate master's or doctoral degree program; admission to a free-standing certificate program alone is generally not sufficient for the issuance of a student visa.

In general, all international applicants are required to provide the following items:

1. A submitted on-line application completed here (<http://gradadmission.udayton.edu>).
2. A complete official academic record of all previous schooling. This record must include dates of attendance, all subjects studied, grades earned, marks achieved on all examinations, graduation date and conferral of degree. Documents must be sent directly from the institutions attended to the University of Dayton. These credentials must be accompanied by a certified English translation.
3. Three letters of recommendation, preferably from professors at the undergraduate school(s) attended. Letters should be original, on official stationery and include complete contact information.
4. A personal vita or statement including work experience, research study or experience and professional development objectives.
5. Official scores from the Test of English as a Foreign Language (TOEFL). A minimum score of 550 on the paper-based test (PBT), or 80 on the internet-based test (IBT) is required for full admission. An applicant who is academically qualified but who has submitted a score of 500-527 (PBT) or 70 or below (IBT) may be conditionally admitted to the University with the agreement that he or she will attend, full-time, UD's Intensive English Program (IEP). An applicant with a TOEFL score between 530-547 (PBT) or 71-79 (IBT) may be admitted with the condition that he or she will attend the IEP part-time and register for a part-time academic load. Upon successful completion of the IEP and achievement of an institutional TOEFL score of 550 or the equivalent, full admission will be granted. In lieu of the TOEFL, an applicant may submit official International English Language Testing System (IELTS) scores. A minimum Band 6.5 score is required for full admission. An applicant who submits a score of 6.0 may be conditionally admitted and attend the IEP part-time. Applicants with scores below 6.0 will be required to attend our IEP program full-time.
6. Master of Business Administration (MBA) applicants must furnish official scores from the Graduate Management Admission Test (GMAT) or from the Graduate Record Examination (GRE). Several departments in the College of Arts and Sciences and the School of Education and Health Sciences may require the GRE. The

BioEngineering program is the only program in the School of Engineering that requires the GRE. Please review the website for additional requirements for your intended program.

7. Evidence of financial support to cover all tuition and living costs in the United States. An original bank statement, with account number and cash balance, indicating sufficient liquid funds for the first year's expenses. A letter from the sponsor indicating the extent of financial support to be provided for each year of study. The approval of currency exchange and export of funds (if applicable) must be obtained. Government-sponsored students should send a letter from the government indicating support and billing information.

Requests for hard copy information and a paper application for graduate study should be made to:

Office of International Admission
University of Dayton
300 College Park
Dayton, OH 45429-1671
Toll Free phone: 855-644-5623
within US: 937-229-1850
fax: 937-229-4729
email: goglobal@udayton.edu

A \$50 non-refundable application fee will be charged for processing all paper applications.

Master's and Doctoral Degree Requirements

The College of Arts and Sciences and the Schools of Business Administration, Education and Health Sciences, Engineering and Law offer programs variously distributed in time, leading to the master's and doctoral degrees. Specific requirements and sequences leading to these degrees are described in sections of this Catalog for the respective College or School, as are the specific curricula, courses and requirements of the divisions and departments offering them.

Residence Requirement

Residence requirements for graduate degree programs may be set by the divisions and departments offering them. Consult the program for details.

Transfer Credits

Graduate work may be transferred from other accredited institutions to the University of Dayton on recommendation of the student's department chair or graduate program director, and with approval of the student's academic dean and the Graduate School. Only those hours in which the student has achieved a B grade or better will be considered for transfer; no credit will be given for hours graded B- or less. The quality points are not transferred. Usually, no transfer credit will be allowed for courses taken more than five years previous to matriculation in the student's graduate program at the University of Dayton. Thesis and dissertation credits are not eligible for transfer.

Except at the doctoral level, a maximum of six semester hours of graduate work may be transferred into a graduate degree program. At the doctoral level, the maximum number of hours eligible for transfer may be extended to one-fourth of the total hours required for the degree, provided that the coursework in the area of specialization is subject to examination prior to admission to candidacy.

For the purpose of computing equivalent transfer credit on either a course-by-course or total hours basis, the number of quarter hours completed at another institution should be multiplied by two-thirds.

Exceptions to this policy, which include articulation agreements made with other universities, may be made with the approval of the Dean of the Graduate School upon the recommendation of the student's department chair or graduate program director.

Advanced Undergraduate Courses

Some programs permit certain 400-level undergraduate courses to be applied to graduate program credit requirements. When such courses are permitted for graduate-level credit, the work done shall be of the grade of B or higher for that credit to be accepted toward a degree. The student must pay the graduate tuition rates when registering in these courses for graduate credit.

Elective Courses

Most graduate programs allow and encourage the student to select one or two courses from other related disciplines. Consult the advisor or program director for details.

Foreign Language Requirement

At the discretion of the department offering a particular program, a reading knowledge of a foreign language may be required for the master's degree. Graduate students can take language courses on a class or tutorial basis by special arrangement through Global Languages and Cultures in the College of Arts and Sciences. No graduate credit is allowed for the fulfillment of language requirements.

Comprehensive Examination

A comprehensive examination is required in most programs. This examination may be oral or written, or both. Application for any comprehensive examination must be approved by the chair of the student's major department at least two weeks prior to the examination. For further details, consult the explanation under the appropriate individual program in this Catalog.

General Thesis and Dissertation Requirements

Students in a program requiring a thesis, dissertation or other major project required for their degree may begin work only with the approval of their department chair, program director or other authorized faculty member. Other restrictions imposed by the academic unit or department may also apply.

Each student whose plan of study requires a thesis or dissertation must prepare it in accordance with the formatting and submission guidelines here: <http://libguides.udayton.edu/etd>. The content of the final work must be approved by the student's advisory committee, the composition of which is described elsewhere in this Catalog. The format of the thesis or dissertation will, however, be reviewed and must be approved by the Office for Graduate Academic Affairs.

Registration for Courses

The responsibility for being properly registered rests with the student. Registration is required each term or session of all students who enter coursework for credit and of all students who wish to audit courses.

All students must be admitted into a graduate degree, specialist or certificate program before they will be permitted to register for more than six hours of graded graduate course work. Although individuals may enroll for up to six semester hours of graduate credit before being admitted into a specific program of study, the written approval of the proper dean or the designated director is required for admission to any course. Any student who has interrupted the normal sequence of a graduate program is required to apply to the designated advisor or

program chair for permission to resume study at least four weeks prior to the first day of the term.

All students should consult the registration information published by the Office of the Registrar for each term well in advance of registration to determine the scheduling of courses. Students enrolling at the off-campus centers should note that although the scheduling of off-campus classes follows the general pattern of the University calendar, they do not necessarily conform to the on-campus academic dates in all details.

Second Master's Degree

In some cases, a student who either possesses a master's degree from the University of Dayton or who is currently studying toward one, wishes to obtain an additional master's degree in a related field. In such cases, up to six semester hours from the first degree may be applied toward the requirements of the second, i.e., at most six semester hours may be shared between the two degrees. The determination of which, if any, hours may be applied toward the requirements of the second degree will be made by the chair or director of the second degree program, in consultation with the student's advisor in the second program.

Sufficient Progress

Students are expected to maintain sufficient progress toward a degree or certificate. At various intervals, usually at each registration period, and especially at the midpoint in the program, the advisor or program director will discuss the rate of progress with the student. Students not showing promise of completing the program in a reasonable time may be advised to withdraw from the University.

Time Limit

All requirements for a free-standing graduate certificate must be satisfied within four calendar years from the time of matriculation.

All requirements for a certificate associated with a concurrent degree program must be satisfied within the time limit associated with that degree.

All requirements for a master's degree must be satisfied within seven calendar years from the time of matriculation.

All requirements for a doctoral degree must be satisfied within nine calendar years from the time of matriculation.

For legitimate and substantial reasons, requests to extend the time to complete masters and doctoral degrees may be considered. Such requests must be formally submitted to the Office for Graduate Academic Affairs for review. Ordinarily, such requests must be made prior to expiration of the normal time to complete degree requirements. Except in very unusual cases, only one such request for an extension will be considered for any student.

In addition to articulating circumstances that have prevented completion of degree requirements within the time periods specified above, and the reason(s) for requesting the extension, the request must also include a detailed plan for degree completion, including a schedule of the remaining coursework to be taken and other specific milestones to be met. Moreover, the plan for completion must describe how the plan ensures that the student's knowledge in his or her academic field can be considered up-to-date and current. Students are cautioned that in some cases this may include a requirement to retake some or all of their previously taken coursework.

Transcripts

A transcript of the permanent academic record is a confidential document to be released in compliance with the regulations of the Family Educational Rights and Privacy Act of 1974 as amended. The Registrar will issue transcripts upon a request signed by the student provided that no outstanding financial obligation to the University exists. All transcripts so requested require payment in advance. A complimentary transcript certificate will be given to each graduate when the official diploma is issued. For more information please visit: <http://www.udayton.edu/flyersfirst/registrar/forms/transcript.php>

Undergraduate Students in Graduate Courses

An undergraduate student may register for graduate courses only under the following conditions:

1. Graduate courses to count toward the undergraduate degree:
 - Approval must be obtained from the director of the appropriate graduate program.
2. Graduate courses to count toward the graduate degree:
 - Approval must be obtained from the director of the appropriate graduate program.
 - Unless the student has been accepted into a combined Bachelor's-Plus-Master's degree program, the student must be within 15 semester hours of completing the semester-hour requirements for graduation in the undergraduate program.
 - Credit obtained for the graduate courses may not be counted toward both the bachelor's degree and any future master's degree unless the student has been admitted to a combined Bachelor's-Plus-Master's program.
 - The undergraduate student whose status is less than full-time or 3/4-time must pay the graduate tuition rates to register in graduate courses for graduate credit.

Veteran Services Office

All departments at the University of Dayton have been approved by the State Approving Agency for Veterans' Training. Please contact the Flyers First Office of Veterans Services to inquire as to whether your major is listed among those approved by the State Approving Agency. The Flyers First Office of Veteran Services is located in St. Mary's Hall, room 411, and will assist in processing the necessary forms for educational benefits. A student who is receiving V.A. benefits is required to complete and sign all required forms, which can be obtained online. (<http://www.udayton.edu/flyersfirst/veterans/#2>) Students using veteran benefits must inform the Veteran Services Office of any changes made to major, enrollment and registration. Failure to follow this procedure may result in cancellation of benefits by the Department of Veterans Affairs. For the conditions for good academic standing, visit Academic Standing (catalog.udayton.edu/undergraduate/generalinformation/academicinformation/academicstanding). If a student on probation fails to acquire the required cumulative grade point average at the end of the next full-time term, the benefits from the V.A. may cease.

Admission-Graduate

Pursuing an advanced graduate or professional degree is a significant commitment. You want to make sure the program matches your academic and career goals and that the campus is a good fit. If you can

see yourself tackling graduate work at the University of Dayton, we invite you to search deeper. All it takes to apply is a simple click.

All graduates of approved colleges or universities who hold the bachelor's degree are eligible for admission. Applicants must have had adequate undergraduate preparation in their proposed fields of study and must show promise for pursuing higher studies satisfactorily.

The application for admission to graduate work, available on-line at <http://gradadmission.udayton.edu/application>, should be submitted by August 1 for the first term, by December 1 for the second term, by April 1 for the third term and by June 1 for the second half of the split third term. It is the responsibility of the student that the application, with all necessary supporting documents, be complete and in order. Registration as a graduate student will not be permitted otherwise.

Upon admission, students are designated as full-time or part-time by their deans or program directors. The determination of such status for graduate assistants, students engaged in research, and, in general, all graduate students is made by their respective chairs.

Graduate students are also classified according to their relationship to formal programs, as follows:

1. **Regular status**-the student has met satisfactorily all the general requirements of the College or School and the specific requirements of the department in which the program is offered.
2. **Conditional status**-the student must fulfill some prerequisite imposed by the school or department before admission to regular status, or the student's preparation cannot yet be determined.
3. **Non-degree status**-the student belonging to either of these categories:
 - the student will not be officially enrolled in a graduate program leading toward a degree
 - the student fulfills all the requirements and is taking courses for credit but is not seeking a degree
4. **Transient**-a properly qualified student working toward a degree in another institution who has written authorization from the dean of that institution to take specific courses at the University of Dayton for transfer of credit. The transient student must satisfy all registration requirements of the given course that are mandatory for students working for a degree at the University of Dayton.

Directories

In this section:

- Administrators (catalog.udayton.edu/undergraduate/generalinformation/directories/administrators)
- Faculty (catalog.udayton.edu/undergraduate/generalinformation/directories/textfaculty)
- Governing and Advisory Boards (catalog.udayton.edu/undergraduate/generalinformation/directories/governingandadvisory)
- Research Institute Staff (catalog.udayton.edu/undergraduate/generalinformation/directories/researchinstitute/staff)

Administrators

Title	Name
President	Daniel J. Curran, Ph.D.
Interim Provost	Paul H. Benson, Ph.D.
Associate Provost for Academic Affairs and Learning Initiatives	Deborah J. Bickford, Ph.D.

Dean, School of Business Administration	Paul M. Bobrowski, Ph.D.
Government and Regional Relations Director	S. Ted Bucaro
Vice President for Student Development	William M. Fischer, J.D.
Vice President for Mission and Rector	Rev. James F. Fitz, S.M.
Vice President for Finance and Administrative Services	Andrew T. Horner
Dean, School of Education and Health Sciences	Kevin R. Kelly, Ph.D.
Vice President for Facilities and Campus Operations	Beth H. Keyes
President, Academic Senate	Carissa M. Krane, Ph.D.
Vice President for Research and Executive Director of UDRI	John E. Leland, Ph.D., P.E.
Interim Vice President for University Advancement	Christopher Morrison
Associate Provost for Faculty and Administrative Affairs	Carolyn Roecker Phelps, Ph.D.
Dean, College of Arts and Sciences	Jason L. Pierce, Ph.D.
General Counsel	Mary Ann Recker, J.D.
Interim Vice President of Enrollment Management and Marketing	Jason K. Reinoehl, Ph.D.
Dean, School of Engineering	Eddy M. Rojas, Ph.D.
Associate Provost and Chief Information Officer	Thomas D. Skill, Ph.D.
Dean, School of Law	Andrew Strauss, J.D.
Director of Campus Ministry	Crystal C. Sullivan
Vice President and Director of Athletics	Neil G. Sullivan
Associate Provost for Graduate Academic Affairs	Paul M. Vanderburgh, Ph.D.
Associate Provost and Executive Director of UD China Institute	Weiping Wang, Ph.D.
Interim Vice President for Human Resources	Troy W. Washington
Dean, University Libraries	Kathleen M. Webb
Associate Vice President for University Marketing and Strategies	Molly C. Wilson

Faculty

PAST PRESIDENT

Fitz, Raymond L., S.M. (1969), Engineering Management and Systems, Ferree Professor in Social Justice - B.E.E., University of Dayton, 1964; M.S., Polytechnic Institute of Brooklyn, 1967; Ph.D., 1970.

DEANS EMERITI

Garten, Rev. Edward D. (1985), Library - B.S., Concord College, 1968; M.A., M.Div., in consortium, Pontifical College Josephinum, The Ohio State University, and Methodist Theological School in Ohio, 1972; M.L.S., Kent State University, 1974; Ph.D., University of Toledo, 1977.

Gould, Sam (1985), Management and Marketing - B.S., The Ohio State University, 1965; M.B.A., University of Colorado, 1970; Ph.D., Michigan State University, 1975.

Joseph, Ellis A. (1961), Education - A.B., University of Notre Dame, 1955; M.A., 1956; Ph.D., 1962; L.H.D. (Honorary), College of Mt. St. Joseph, 1989.

Morman, Paul J. (1990), History - B.A., University of Dayton, 1965; M.A., Bowling Green State University, 1966; Ph.D., Pennsylvania State University, 1973; M.S., State University of New York at Binghamton, 1984.

Sargent, Gordon A. (1985), Mechanical and Aerospace Engineering - B.S., Imperial College of Science and Technology, University of London, 1960; Ph.D., 1964.

PROFESSORS EMERITI

Ahern, David W. (1977), Political Science - B.A., Southern Connecticut State College, 1970; M.A., University of Maryland, 1972; Ph.D., 1976.

Allik, Judith P. (1976), Psychology - B.A., Wellesley College, 1958; M.S., University of Pittsburgh, 1974; Ph.D., 1978.

Amsden, Robert T. (1978), Management Information Systems, Operations Management, and Decision Sciences - B.A., University of New Hampshire, 1960; M.S., Rutgers University, 1964; Ph.D., 1969.

Anderson, Gordon S. (1969), Teacher Education - B.A., Bethany College, 1953; M.S., State University of New York, 1959; Ed.D., Case Western Reserve University, 1969.

Anderson, Rev. William P. (1968), Religious Studies - A.B., Bloomfield College, 1961; B.D., Princeton Theological Seminary, 1964; Th.D., 1968.

Artz, Theodora S. (1974), Law Library - B.Ed., University of Toledo, 1962; M.A.L.S., 1974.

August, Eugene R. (1966), English - B.A., Rutgers University, 1958; M.A., University of Connecticut, 1960; Ph.D., University of Pittsburgh, 1965.

Benedum, Richard P. (1973), Music - B.A., Concordia Teachers College, 1966; D.M.A., University of Oregon, 1972.

Berger, Robert N. (1964), Management and Marketing - B.S., University of Dayton, 1960; M.A., Ohio University, 1963; J.D., Chase School of Law, 1970.

Berney, Rex L. (1978), Physics - B.S., University of Missouri, 1971; M.S., 1973; Ph.D., 1978.

Biers, David W. (1976), Psychology - B.A., Lafayette College, 1966; M.S., Northwestern University, 1968; Ph.D., 1970.

Blatt, Stephen J. (1971), Communication - B.A., Morehead State University, 1964; M.A., Ohio University, 1967; Ph.D., 1969.

Brady, Thomas J. (1981), Accounting - B.S., New York University, 1966; M.B.A., Adelphi University, 1968; Ph.D., St. Louis University, 1981.

Bogner, Fred K. (1969), Civil and Environmental Engineering and Engineering Mechanics - B.S.C.E., Case Institute of Technology, 1961; M.S.E.M., 1964; Ph.D., 1967.

Bohlen, George A. (1980), Management Information Systems and Decision Sciences - B.S.M.E., Clemson University, 1958; M.S.I.E., Purdue University, 1963; M.S.B.A., George Washington University, 1968; Ph.D., Purdue University, 1973.

Buby, Rev. Bertrand A., S.M. (1967), Religious Studies - B.A., University of Dayton, 1955; S.T.L., Pontifical Biblicum Institute, 1964; S.S.L.,

University of Fribourg, 1966; S.T.D., Pontifical University of the Marianum, 1980.

Buckley, David M. (1968), Library - B.A., Miami University, 1966; M.A.L.S., Western Michigan University, 1968; M.A., University of Dayton, 1975.

Burns, Rev. Norbert C., S.M. (1959), Religious Studies - B.A., University of Dayton, 1945; S.T.L., University of Fribourg, 1954; S.T.D., The Angelicum, 1955.

Burrows, Ron J. (1981), Accounting - B.S., Northern Illinois University, 1965; M.S., 1968; Ph.D., Pennsylvania State University, 1980.

Butter, Eliot J. (1971), Psychology - B.A., Brooklyn College, 1965; M.A., 1969; Ph.D., University of Massachusetts, 1971.

Casey, Anthony L. (1969), Management Information Systems and Decision Sciences - M.Ed., Wright State University, 1973; M.S., University of Dayton, 1972.

Chiodo, Andria J. (1968), Global Languages and Cultures - B.A., University of Oregon, 1966; M.A., 1968. Chuang, Henry N. (1965), Mechanical and Aerospace Engineering - B.S., National Taiwan University, 1958; M.S., University of Maryland, 1962; Ph.D., Carnegie Institute of Technology, 1966; Reg. Prof. Engr.

Clark, Willard C., Jr. (1963), Accounting - B.S., University of Dayton, 1959; M.B.A., Miami University, 1960; C.P.A., Ohio, 1962.

Cochran, Rebecca A. (1991), Law - B.A., Colorado College, 1974; M.A., Northwestern University, 1975; J.D., John Marshall Law School, 1984.

Conard, Robert C. (1967), Global Languages and Cultures - B.B.A., University of Cincinnati, 1956; M.A., 1962; Ph.D., 1969.

Crist, Maria Perez (1989), Law - B.A., Northwestern University, 1978; J.D., University of Michigan, 1981.

DaPolito, Frank J. (1970), Psychology - B.A., Bowling Green State University, 1959; Ph.D., Indiana University, 1966.

Deep, Ronald (1989), Engineering Management and Systems - B.S., U.S. Air Force Academy, 1960; M.S.E., Purdue University, 1970; Ph.D., Florida State University, 1976; Reg. Prof. Engr.

Dickinson, Kelvin H. (1979), Law - B.A., Western Michigan University, 1965; LL.B., Harvard University, 1968.

Doepker, Philip E. (1984), Mechanical and Aerospace Engineering - B.M.E., University of Dayton, 1967; M.S.M.E., The Ohio State University, 1968; Reg. Prof. Engr.

Doyle, George R., Jr. (1982), Mechanical and Aerospace Engineering - B.S.A.E., Purdue University, 1965; M.S.A.E., 1967; Ph.D., University of Akron, 1973; Reg. Prof. Engr.

Drees, Doris A. (1956), Health and Sport Science - B.S., University of Dayton, 1956; M.A., The Ohio State University, 1959; Ph.D., University of Iowa, 1968.

Eastep, Franklin E. (1980), Mechanical and Aerospace Engineering - B.S., The Ohio State University, 1958; M.S., Air Force Institute of Technology, 1963; Ph.D., Stanford University, 1968.

Ebeling, Charles E. (1988), Engineering Management and Systems - B.S., University of Pittsburgh, 1965; M.S., Air Force Institute of Technology, 1969; Ph.D., The Ohio State University, 1973; Reg. Prof. Engr.

Eggemeier, F. Thomas (1986), Psychology - B.A., University of Dayton, 1967; M.A., The Ohio State University, 1969; Ph.D., 1971.

- Eid, Leroy V. (1961), History - B.S.Ed., University of Dayton, 1953; M.A., St. John's University, 1958; Ph.D., 1961; M.A., University of Toronto, 1968.
- Eimermacher, John P. (1986), Mechanical and Aerospace Engineering - M.E., University of Cincinnati, 1963; M.S.M.E., 1967; Ph.D., 1973; Reg. Prof. Engr.
- Eley, Marion J. (1961), Accounting - B.S., University of Dayton, 1959; M.B.A., Xavier University, 1964; C.P.A., Ohio, 1966.
- Evans, James H. (1981), Counselor Education and Human Services - B.A., Ohio Wesleyan University, 1961; M.A., Kent State University, 1964; Ed.D., Indiana University, 1971.
- Evers, Anthony J. (1966), Electrical Engineering - B.E.E., University of Dayton, 1953; M.S.E.E., University of Notre Dame, 1955; Reg. Prof. Engr.
- Eveslage, Sylvester L. (1948), Chemistry - B.S., University of Notre Dame, 1944; M.S., 1945; Ph.D., 1953.
- Farren, Joseph M. (1966), Engineering Technology - B.S., Bluffton College, 1959; B.E.E., University of Dayton, 1961; M.S., 1966; M.B.A., 1977; Reg. Prof. Engr.
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Anderson, Maureen (2004), Law Library, Associate Professor - B.B.B., Marymount University, 1990; L.L.M., Pace University School of Law, 1995; J.D., Thomas M. Cooley Law School, 1994; M.L.S., Kent State University, 2001.

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- Bradshaw, R. Darden (2013), Art and Design, Assistant Professor – B.F.A., Iowa State University, 1995; M.F.A., University of Arizona, 2001; Ph.D., 2013; Brahler, C. Jayne (2000), Health and Sport Science, Associate Professor - B.S., Montana State University, 1980; M.S., Washington State University, 1993; Ph.D., 1998.
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- Crosson, Kenya (2007), Civil and Environmental Engineering and Engineering Mechanics, Associate Professor - B.A., Pennsylvania State University, 1998; M.A., 2000; Ph.D., 2005.
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- Ewvaraye, Andrew O. (1995), Physics, Professor - B.S., University of Dayton, 1964; Ph.D., University of Saskatchewan, 1969.
- Falk, Thomas M. (2013), Teacher Education, Visiting Professor - B.A., Ohio University, 2004; M.A., The Ohio State University, 2011; Ph.D., 2012.
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- Fisher, Mary I. (2008), Physical Therapy, Assistant Professor—B.A., Wittenberg University, 1989; M.S., Boston University, 1991; Ph.D., University of Kentucky, 2010.
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- Flanagan, Melissa T. (1989), Student Activities, Administrative - B.S., Western Illinois University, 1986; M.A., Bowling Green State University, 1988.
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- Griffin, Jeffrey L. (1990), Communication, Associate Professor - A.B., University of North Carolina, 1979; M.A., University of Texas, 1983; Ph.D., University of North Carolina, 1990.
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- Janney, Jay J. (2001), Management and Marketing, Associate Professor - B.A., Ball State University, 1984; M.B.A., 1986; Ph.D., University of Kentucky, 1999.
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- Johnson, Kelly S. (2002), Religious Studies, Associate Professor - B.A., University of Notre Dame, 1986; M.A., 1987; Ph.D., Duke University, 2001.
- Johnson, Marina E. (2015) Engineering Technology, Assistant Professor – B.S., Gazi University, 2007; M.S., Dokuz Eylül University, 2010; Ph.D., State University of New York at Binghamton, 2014.
- Johnston, William (2006), Religious Studies, Associate Professor - B.A., University of Notre Dame, 1972; M.A., 1977; Ph.D., 1980.
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- Kango-Singh, Madhuri (2009), Biology, Associate Professor - B.S., Vikram University, 1989; M.S., Devci Ahilya University, 1991; Ph.D., 1997.
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- Kebede, Messay (1998), Philosophy, Professor - B.A., University of Grenoble, France, 1971; M.A., 1973; Ph.D., 1976.

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- Kennedy, Gregory R. (2015), Communication, Media Specialist-in-Residence – B.A., University of Tennessee, 2007.
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- Kowalski, Theodore J. (2000), Educational Leadership, Professor, Kuntz Chair in Educational Leadership - B.S., Indiana State University, 1965; M.S., 1968; Ph.D., 1971.
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- Lafdi, Kahlid (2001), Chemical and Materials Engineering, Professor & WBI Endowed Chair in Nanomaterials – M.S., Nancy University, 1987; Ph.D., 1989; D.Sc., 1991.
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- Livesay, Alisa (2007), Economics and Finance, Lecturer - B.A., University of Dayton, 1992; M.A., St. Louis University, 1997.
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- Lopper, Matthew (2007), Chemistry, Associate Professor - B.A., University of Dayton, 1998; Ph.D., University of Wisconsin, 2003.
- Lyon, Cody (2014), English, Lecturer – B.A., Seattle University, 2003; M.Ed., University of Missouri, 2010; Ph.D., Indiana University of Pennsylvania, Anticipated 2016.
- Mackay, Elizabeth (2010), English, Lecturer - B.S., Appalachian State University, 1996; M.A., 2001; Ph.D., Miami University, 2007.
- MacLachlan, Heather (2009), Music, Associate Professor - B.M.A., University of Manitoba, 1995; B.E., 1995; M.A., Cornell University, 2007; Ph.D., 2009.
- Macleod, Alex (2009), English, Lecturer - B.A., University of Arizona, 1991; M.A., 1993; Ph.D., 2001.
- Magnuson, Phillip C. (1981), Music, Professor - B.A., Duke University, 1971; M.M., University of Massachusetts, 1974; D.M.A., University of Wisconsin, 1977.
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- Masthay, Mark (2006), Chemistry, Associate Professor - B.A., University of California, San Diego, 1978; M.S., University of California, Riverside, 1984; Ph.D., Carnegie Mellon University, 1988.
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- Miller, Sheila (2004), Law, Professor of Lawyering Skills - B.A., Miami University, 1983; J.D., University of Cincinnati, 1987.
- Miller, Tracy K. (2002), Management and Marketing, Lecturer - B.S.B.A., The Ohio State University, 1985; M.L.H.R., 1986.

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- Morris III, Willie L. (1993), Music, Associate Professor - B.M.E., East Carolina University, 1982; M.A., Stephen F. Austin State University, 1984; D.M.A., University of Missouri at Kansas City Conservatory of Music, 1996.
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- Mykytka, Edward F. (1998), Engineering Management and Systems, Professor - B.S., University of Dayton, 1976; M.S., University of Iowa, 1978; Ph.D., University of Arizona, 1983.
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- Oldenski, Thomas, S.M. (1994), Educational Leadership, Associate Professor - B.A., University of Dayton, 1972; M.Ed., Boston College, 1975; M.A., Western Michigan University, 1978; Ed.S., University of Dayton, 1984; Ph.D., Miami University, 1994.
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- Prasad, Jayesh (1990), Management Information Systems, Operations Management, and Decision Sciences, Professor - B.Tech., Indian Institute of Technology, Kharagpur, 1982; P.G.D.M., Indian Institute of Management, Calcutta, 1984; Ph.D., University of Pittsburgh, 1994.
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- Richards, Stephen B. (2000), Teacher Education, Associate Professor - B.A., University of North Carolina, 1976; M.A., East Carolina University, 1979; Ed.D., Florida Atlantic University, 1999.
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- Robinson, James D. (1982), Communication, Professor - B.A., University of the Pacific, 1978; M.A., West Virginia University, 1979; Ph.D., Purdue University, 1982.
- Robinson, Jayne B. (1994), Biology, Professor - B.S., Bowling Green State University, 1978; M.S., The Ohio State University, 1984; Ph.D., 1991.
- Rodgers, Linda V. (1998), Counseling Center, Administrative - B.A., Mt. Mary College, 1989; M.S., University of Wisconsin-Milwaukee, 1991; Ph.D., 1998.
- Rodriguez, Dario N. (2012), Psychology, Lecturer – B.A., University of Dayton, 2006; M.A., University of Dayton, 2008; Ph.D., John Jay College of Criminal Justice & the Graduate Center, 2012.
- Roecker Phelps, Carolyn E. (1995), Psychology, Associate Professor - B.S., University of Illinois, 1984; M.S., Illinois State University, 1990; Ph.D., University of Iowa, 1994.
- Rojas, Eddy M. (2014), School of Engineering, Professor – M.S., University of Colorado, 1995; M.A., 1997; Ph.D., 1997.
- Roy, Haimanti (2013), History, Assistant Professor – B.A., Presidency College, 1996; M.A., Jawaharlal Nehru University, 1998; Ph.D., University of Cincinnati, 2006.
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- New York at Cortland, 1988; M.A., Syracuse University, 1992; Ph.D., 1995.
- Rumpfkeil, Markus P. (2010), Mechanical and Aerospace Engineering, Assistant Professor—B.S., Technical University of Berlin, 2000; M.S., Humboldt University, 2004; Ph.D., University of Toronto, 2008.
- Rush, Tobias W. (2011), Music, Assistant Professor – B.A., Adams State College, 1996; M.M., University of Northern Colorado, 1998; D.A., University of Northern Colorado, 2007.
- Russo, Charles J. (1996), Educational Leadership, Joseph Panzer Professor of Education - B.A., St. John's University, 1972; M.Div., Seminary of the Immaculate Conception, 1978; J.D., St. John's University, 1983; Ed.D., 1989.
- Ryan, Mark (2014), Religious Studies, Assistant Professor – B.A., Swarthmore College, 1994; Ph.D., University of Virginia, 2006.
- Sableski, Mary (2012), Teacher Education, Assistant Professor – B.S., University of Dayton, 1998; M.S., University of Dayton, 2001; Ph.D., The Ohio State University, 2007.
- Saintignon, Pauline L. (1983), Mathematics, Lecturer - B.S., Bowling Green State University, 1978; M.S., University of Dayton, 1982.
- Saliba, Joseph E. (1980), Civil and Environmental Engineering and Engineering Mechanics, Professor - B.S., University of Dayton, 1979; M.S., 1980; Ph.D., 1983; Reg. Prof. Engr.
- Saliba, Tony E. (1986), Chemical and Materials Engineering, Professor - B.Ch.E., University of Dayton, 1981; M.S., 1982; Ph.D., 1986.
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- Santamarina, Juan C. (1997), History, Associate Professor - B.A., University of Wisconsin, 1989; Ph.D., Rutgers University, 1995.
- Sanyal, Tamisra (2009), Computer Science, Lecturer - B.S., University of Calcutta, 1973; M.S., India Institute of Technology Kanpur, 1976; M.Tech., 1976; M.S., University of Rochester, 1983.
- Sarangan, Andrew M. (2000), Electrical and Computer Engineering, Electro-Optics, Professor - B.A.Sc., University of Waterloo, 1991; M.A.Sc., 1993; Ph.D., 1996.
- Scantlin, Ronda M. (2002), Communication, Associate Professor - B.A., Bethany College, 1992; M.A., University of Kansas, 1995; Ph.D., University of Texas-Austin, 1999.
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- Schneider, Kellie R. (2013), Engineering Management and Systems, Assistant Professor – B.S., University of Arkansas, 2002; M.S., 2006; Ph.D., 2013.
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- Schutte, Maria G. (2013), Economics and Finance, Assistant Professor – B.S., Pontifical Catholic University of Ecuador, 1993; M.B.A., University of Notre Dame, 1995; Ph.D., University of Missouri, 2007.
- Schweikart, Larry E. (1985), History, Professor - B.A., Arizona State University, 1972; B.A.Ed., M.A., 1980; Ph.D., University of California, Santa Barbara, 1984.
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- Segalewitz, Scott I. (2000), Engineering Technology, Professor - B.S.E.E., Rutgers University, 1983; M.S., New Jersey Institute of Technology, 1986; Reg. Prof. Engr.
- Seielstad, Andrea M. (1996), Law, Professor - A.B., Princeton University, 1988; J.D., University of Michigan Law School, 1991.
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- Shaw, Lori E. (1988), Law, Professor of Lawyering Skills - B.S., University of Dayton, 1983; J.D., 1987.
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- Singh, Amit (2007), Biology, Associate Professor - B.S., H.P. University, 1988; M.S., Devi Ahilya University, 1990; Ph.D., 1995.
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- Smith, Todd B. (2001), Physics, Associate Professor - B.S., University of Notre Dame, 1989; M.A., Miami University, 1990; M.S., University of Michigan, 1995; Ph.D., 1998.
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- Steinlage, Lester J. (2000), Mathematics, Lecturer-- B.S., University of Dayton, 1965; M.S., 1969.
- Stover, Richard C. (2014), Accounting, Lecturer—B.S., Wright State University, 1979.
- Strain, Margaret M. (1995), English, Professor - B.A., Bellarmine College, 1977; M.A., University of Louisville, 1986; Ph.D., 1995.
- Strauss, Andrew (2015), School of Law, Professor—B.A., Princeton University, 1981; J.D., New York University, 1985.
- Street, Donna L. (2002), Accounting, Professor, Al & Marcie Mahrt Chair in Accounting - B.B.A., East Tennessee State University, 1981; M.Acc., University of Tennessee, 1983; Ph.D., 1987.
- Street, P. Eric (1992), Music, Professor - B.M., Cornell College, 1975; M.M., Indiana University, 1977; D.M., 1985.
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- Hutson, Alisha L. (1995), Senior Research Engineer - B.S., Wright State University, 1995; M.S., University of Dayton, 2000.
- Hytla, Patrick C. (2008), Image Processing Engineer - B.S., University of Dayton, 2005; M.S., 2007.
- Iarve, Endel V. (1995), Group Leader-Distinguished Research Engineer - B.S., Latvian State University, 1978; M.S., 1983; Ph.D., Leningrad University, 1989.
- Imwalle, Hondo L. (2013), Software Scrum Master - B.S., University of Dayton, 1991; M.S., 1992.
- Jacobs, Nick J. (2002), Senior Research Engineer - B.S., University of Dayton, 2002; M.S., 2005.
- Jageman, Rebecca F. (2005), Business Systems Analyst - B.S., Ohio State University, 1998; M.S., 2004.
- Jespersen, Michael L. (2011), Research Chemist - B.S., University of Wyoming, 2011; Ph.D., University of Oregon, 2008.
- Jiang, Hua (2011), Associate Research Engineer - B.S., University of Science and Technology Beijing, 1985; M.S., University of Dayton, 2005; Ph.D., 2011.
- John, Peter J. (1988), Group Leader-Senior Research Physicist - B.S., University of Dayton, 1982; M.S., University of Illinois, 1984; Ph.D., 1988.
- Johnson, Douglas J. (2011), Associate Research Engineer - B.S., Kent State University, 2006; M.S., University of Dayton, 2010.
- Jones, Todd R. (2003), Research Engineer - B.S., Virginia Polytechnic Institute and State University, 2003.
- Joseph, Christopher A. (2001), Senior Coatings Research Scientist - B.S., University of Dayton, 1983; M.S., Northern Illinois University, 1992.
- Kahandawala, K A Moshan (2005), Acting Group Leader-Research Engineer - B.S., Kyiv International University of Civil Aviation, 1998; M.S., 1999; M.S., Embry-Riddle Aeronautical University, 2000; Ph.D., University of Dayton, 2004.
- Kasten, Linda S. (1996), Research Scientist - B.S., Wright State University, 1984; M.S., University of Dayton, 2002.
- Kauffman, Robert E. (1979), Group Leader-Distinguished Research Chemist - B.S., Bowling Green State University, 1976; M.S., Ohio State University, 1978.
- Kerschner, Thomas E. (2010), Research Materials Scientist - B.S., Wright State University, 1977.
- Kessler, Donald J. (2010), Senior Scientist-Autonomous Navigation - B.S., United States Air Force Academy, 1982; M.S., Wright State University, 2005; Ph.D., 2005.
- King, Robert D. (1991), Senior Research Engineer - B.S., University of Dayton, 1996.
- Klawon, Kevin T. (2008), Group Leader Image Processing Engineer.
- Klingshirn, Christopher D. (2006), Research Engineer - B.S., Wright State University, 2001; M.S., 2004.
- Klosterman, Donald A. (2002), Senior Polymer Engineer - B.S., University of Dayton, 1989; M.S., 1991; Ph.D., 1994.
- Ko, Ray T. (2000), Research Engineer - B.S., National Cheng-Hsing University, 1978; M.S., Ohio State University, 1983; Ph.D., 1993.
- Kordik, Andrew M. (2009), Associate Image Processing Engineer - B.S., University of Dayton, 2010.
- Kramb, Victoria A. (1999), Senior Research Engineer - B.A., Thomas More College, 1980; M.S., Northwestern University, 1983; Ph.D., University of Dayton, 1999.
- Kramer, Daniel P. (2004), Distinguished Research Engineer - B.S., Rutgers University, 1974; M.S., Massachusetts Institute of Technology, 1976; M.S., Rutgers University, 1979; Ph.D., 1979.
- Kramer, Jeffrey P. (2011), Associate Research Analyst - B.A., Indiana University, 2009; M.S., Pennsylvania State University, 2011.
- Krishnan, Anupriya (2009), Associate Research Engineer - B.S., University of Madras, 2004; M.S., University of Dayton, 2006; M.S., 2008.
- Kumar, Binod (1980), Group Leader-Distinguished Research Engineer - B.S., Rajendra College, 1962; B.S., Banaras Hindu University, 1967; M.S., Pennsylvania State University, 1973; Ph.D., 1976.
- Kumar, Jitendra (2007), Research Chemist - B.S., T. M. Bhagalpur University, 1996; M.S., 1999; Ph.D., University of Delhi, 2007.
- Landis, Gerald R. (1988), Research Engineer - B.S., Wright State University, 1993.
- Lanese, Paul A. (2011), Business Systems Analyst - B.S., Wright State University, 1992; B.S., 1995.
- Lauwers, William G. (2013), Research Engineer - B.S., Worcester Polytechnic Institute, 2009.
- Lawson, Jacob W. (2004), Research Engineer - B.S., Wright State University, 2002.
- Leland, John E. (2000), Director, Research Institute & Associate Vice President of Research - B.S.M.E., University of Akron, 1986; M.S.M.E., University of Dayton, 1989; Ph.D., University of Kentucky, 1994.
- Leontsev, Serhiy O. (2011), Associate Research Scientist - B.S., Cherkasy State University, 2002; M.S., University of Kentucky, 2005; Ph.D., 2011.
- Li, Lingchuan (2004), Research Engineer - B.S., University of Science and Technology Beijing, 1987; M.S., 1989; Ph.D., 1994.
- Little, Brian K. (2012), Research Chemist - B.S., Valdosta State University, 2000; M.B.A., Georgia Southern University, 2004; Ph.D., Auburn University, 2011.
- Makote, Rajendra D. (2001), Research Scientist - M.S., Shivaji University, 1989; Ph.D., Indian Institute of Technology, 1996.
- Marcucci, Nicholas J. (2010), Team Leader-Software Engineer - B.S., University of Dayton, 2010.
- Marks, Christopher R. (2010), Research Engineer - B.S., Michigan State University, 2001; M.S., Wright State University, 2006.
- Marrara, Thaddeus A. (2007), Image Processing Engineer - B.S., West Virginia University, 1998; B.S., 1998.
- Martin, Gary E. (2007), Senior Research Engineer - B.S., Ohio University, 1971; M.S., University of Dayton, 1979.
- Martin, Richard W. (1976), Research Engineer - B.S., Ohio University, 1970; B.B.A., 1972.
- Martinez, Liliانا A. (2009), Biofuel Lab Manager/Engineer - B.S., Pontificia Universidad Javeriana, 2001; M.S., University of Puerto Rico, 2008.
- McCabe, Michael V. (1993), Vice President for Research and Executive Director, Research Institute - B.S., Capital University, 1971; M.S., University of Cincinnati, 1973; Ph.D., 1976; M.B.A., 1980.
- McCray, Daniel B. (1977), Senior Research Materials Engineer - B.S., Wright State University, 1995; M.S., University of Dayton, 1997.
- McGuinness, Christopher D. (2009), Associate Image Processing Engineer - B.S., University of Dayton, 2009.
- McInturff, Angela M. (2012), Associate Research IT Professional - B.S., University of Dayton, 2000.
- McNichols, John M. (2012), Associate Digital Systems Engineer - B.S., University of Dayton, 2010; M.S., 2012.
- Meckstroth, Christopher M. (2010), Senior Research Engineer - B.S., University of Cincinnati, 2007; M.S., 2010.
- Miller, Barbara A. (2006), Research Scientist - B.S., Wright State University, 2001; M.S., Clemson University, 2006.
- Mooney, Thomas J. (2008), Research Engineer - B.S., State University of New York at Buffalo, 1986.
- Morgan, Alexander B. (2005), Group Leader-Distinguished Research Scientist - B.S., Virginia Military Institute, 1994; Ph.D., University of South Carolina, 1998.

- Morton, Scott A. (2009), Senior Research Engineer - B.S., Parks College of St. Louis University, 1985; M.S., Air Force Institute of Technology, 1989; Ph.D., 1996.
- Mueller, Susan S. (2006), Research Biologist - B.S., Wright State University, 1987.
- Murray, Paul T. (1982), Senior Research Chemist - B.S., University of Cincinnati, 1974; Ph.D., University of North Carolina, 1979.
- Nguyen, Hung M. (2000), Associate Research Information Technology Professional - B.S., Michigan State University, 1996.
- Nguyen, Monica A. (2012), Cognitive Research Coordinator - B.S., Arizona State University, 2010.
- Northenor, Christopher B. (2013), Research Engineer - B.S., Mercer University, 2006; M.S., 2012.
- O'Connor, Michael P. (2008), Group Leader-Senior Image Processing Engineer - B.S., University of Dayton, 1993.
- Olding, Robert B. (2001), Senior Research Systems Engineer - B.E.E., University of Dayton, 1977; M.C.S., 1985.
- Olson, Steven E. (1992), Senior Research Engineer - B.S., University of Dayton, 1991; M.S., 1993; Ph.D., 2001.
- Patton, Steven T. (1999), Acting Group Leader-Senior Research Scientist - B.A., Wittenberg University, 1988; M.S., Ohio State University, 1994; Ph.D., 1998.
- Pfeiffer, Phillip E. (2010), Software Engineer - B.S., University of Dayton, 2006; M.S., 2011.
- Phelps, Andrew W. (1990), Senior Research Scientist - B.S., Pennsylvania State University, 1983; M.S., 1987; Ph.D., 1990.
- Phillips, Peter L. (2008), Research Engineer - B.S., University of Dayton, 2008.
- Pierce, Jennifer L. (1998), Senior Research Materials Engineer - B.S., Wright State University, 1995; M.S., 1998.
- Pike, Megan N. (2011), Associate Research Engineer - B.S., University of Dayton, 2009.
- Pinnell, William B. (1988), Acting Group Leader-Senior Failure Analysis Engineer - B.S., University of Dayton, 1988.
- Poormon, Kevin L. (1987), Group Leader-Senior Research Engineer - B.S., University of Dayton, 1987; M.S., 1988.
- Porter, William J., III (1990), Senior Research Engineer - B.A., Miami University, 1988; M.S., University of Dayton, 1990.
- Powar, Nilesh U. (2003), Research Software Engineer - B.S., Bombay University, 1999; M.S., Wright State University, 2002.
- Rafferty, Daniel P. (2008), Sensor Researcher - B.S., Pennsylvania State University, 2000.
- Ratermann, Philip A. (2012), Distinguished Business Developer - B.S., University of Dayton, 1983.
- Reinert, James D. (2011), Associate Research Engineer - B.S., University of Dayton, 2010.
- Rice, Brian Patrick (1986), Division Head-Multiscale Composites and Polymers - B.S., Ohio State University, 1986; M.S., University of Dayton, 1990.
- Riggin, Kelly R. (2012), Software Team Leader - B.S., Purdue University, 1985.
- Roach, Kevin P. (1993), Senior Research Engineer - B.S., University of Maryland, 1988.
- Ruschau, John J. (1974), Division Head-Structural Integrity - B.S., University of Dayton, 1973; M.S., 1979.
- Safriet, Sirina (2005), Research Scientist - B.S., King Mongkut's Institute of Technology, 1991; M.S., University of Akron, 1995; Ph.D., 1999.
- Saliba, Susan S. (1986), Division Head-Nonstructural Materials - B.S., Auburn University, 1984; M.S., University of Dayton, 1986.
- Samios, John E. (2012), Systems/Security/Network Engineer - B.S., University of Pittsburgh, 1985; M.S., University of Dayton, 1990.
- Sathish, Shamachary (1996), Group Leader-Distinguished Research Engineer - B.S., Yuvaraja College, 1974; M.S., University of Mysore, 1976; Ph.D., 1984.
- Schehl, Norman D. (1993), Research Engineer - B.S., University of Dayton, 1991; M.S., 1993.
- Schindelholz, Joseph F. (2007), Senior Program Manager - B.S., University of Wisconsin, 1969; M.S., Webster University, 1987.
- Schultek, Brian R. (2011), Associate Computer Engineer - B.S., University of Dayton, 2007.
- Scott, Ollie L. (1986), Research Engineer - B.S., Wilberforce University, 1982; M.S., University of Dayton, 1997.
- Scudder, Richard P. (2009), Director, Center for UAS Exploitation - B.S., University of Bridgeport, 1981; M.S. Naval War College, 2002.
- Sebastian, James R. (1995), Research Engineer - B.M.E., B.E.E., University of Dayton, 1995; M.S., 1998.
- Shafer, Linda M. (2002), Senior Research Chemist - B.S., University of Akron, 1986.
- Shaffer, Daniel A. (2012), Associate Image Processing Engineer - B.S., Cedarville University, 2011.
- Shen, Yuhui (2009), Senior Research Scientist - B.S., Dalian University of Technology, 1985; M.S., 1988.
- Shin, Eunsung (2004), Research Engineer - B.S., Hallym University, 1990; M.S., 1997; Ph.D., University of Dayton, 2004.
- Sidhu, Sukhjinder S. (1992), Division Head-Energy Technologies and Materials - B.S., Osmania University, 1987; M.S., University of Illinois, 1991; Ph.D., 1992.
- Sihn, Sangwook (1999), Senior Research Engineer - B.A., Seoul National University, 1990; M.S., Stanford University, 1992; Ph.D., 1997.
- Simone, Kenneth C. (2008), Digital Systems Engineer - B.S., Southern Illinois University, 1982.
- Smith, Francis R. (2005), Senior Research Engineer - B.S., Syracuse University, 1982; M.S., Air Force Institute of Technology, 1988.
- Smith, Howard E. (2002), Senior Research Scientist - B.S., DePauw University, 1980; M.S., Cornell University, 1982; Ph.D., 1986.
- Stacy, Bradley M. (2012), Associate Composite Research Engineer - B.S., University of Dayton, 2011; M.S., 2012.
- Stipp, Ryan A. (2008), Associate Image Processing Engineer - B.S., Ohio State University, 2008.
- Stonecash, T. Jared (2005), Acting Group Leader-Composites Research Engineer - B.S., University of Dayton, 2003; M.S., 2005.
- Stouffer, Scott D. (1996), Senior Research Engineer - B.S., Virginia Polytechnic Institute and State University, 1985; M.S., 1989; Ph.D., 1995.
- Striebich, Richard C. (1986), Senior Research Engineer - B.S., University of Notre Dame, 1982; M.S., University of Dayton, 1993.
- Strunks, Gregory A. (2007), Senior Research Engineer - B.S., University of Dayton, 1988; M.S., 1990; M.S., State University of New York at Albany, 2002.
- Sundlie, Paul O. (2012), Associate Image Processing Engineer - B.S., University of Dayton, 2010.
- Szmulowicz, Frank (1978), Group Leader-Distinguished Research Physicist - B.S., Case Western Reserve University, 1971; M.S., 1973; Ph.D., 1976.
- Tandon, Gyaneswar P. (1999), Group Leader-Distinguished Research Scientist - B.T., Indian Institute of Technology, 1981; M.S., Rutgers University, 1984; M.Phil., 1985; Ph.D., 1986.
- Taylor, Kerry D. (2010), Aerospace Hub Development Director - B.S., University of Kentucky, 1980; B.S., University of South Florida, 1984; M.A., Central Michigan University, 1987; M.S., 1999.
- Taylor, Philip H. (1985), Group Leader-Distinguished Research Scientist - B.S., Oneonta State College, 1980; Ph.D., Pennsylvania State University, 1984.

Thomas, David K. (2009), Research Engineer - B.S., University of Dayton, 1976; M.S., Marshall University, 1988.

Thomas, Evan L. (2009), Materials Scientist - B.S., Southern University & A&M College, 2002; Ph.D., Louisiana State University, 2006.

Thomas, Ronald L. (1999), Internet/Programmer Analyst.

Tienda, Kevin A. (2011), Associate Research Engineer - B.S., Wright State University, 2010.

Toth, Douglas K. (1990), Research Lubricants Engineer - B.S., Southern Methodist University, 1987; M.S., Case Western Reserve University, 1989.

Tsao, Bang-Hung (1999), Group Leader-Distinguished Materials Research Scientist - B.S., National Cheng Kung University, 1980; M.S., Arizona State University, 1986; Ph.D., 1989.

Tsao, Victor (2009), Associate Research Software Engineer - B.S., University of Dayton, 2008.

Turri, William F. (2007), Group Leader-Image Processing Engineer - B.S., University of Dayton, 2000; M.S., 2002.

Vangsness, Marlin D. (1985), Senior Research Physicist - B.S., North Dakota State University, 1985.

Vehorn, Keith A. (2011), Associate Structural Analyst - B.S., Wright State University, 2011.

Velker, Michael R. (2012), Associate Software Engineer - B.S., University of Dayton, 2012.

Vicen, Nicholas P. (2007), Associate Image/Signal Processing Engineer - B.S., University of Dayton, 2005; M.S., 2007.

Voevodin, Natalia N. (1999), Senior Research Scientist - B.S., Tula Polytechnical Institute, 1985; M.S., 1986; Ph.D., University of Dayton, 2002.

Vukelich, Sharon I. (2003), Group Leader-Distinguished Research Engineer - B.S., Michigan State University, 1974; M.S., University of Cincinnati, 1980.

Walker, David M. (2009), Digital Systems Engineer - B.S., Wright State University, 2002; M.S., 2004.

Walters, Larrell B. (2003), Division Head-Sensor Systems - B.S., Bowling Green State University, 1978; M.S., Kent State University, 1985.

Walters, Molly R. (2011), Research Engineer - B.S., University of Dayton, 2003.

Warm, Joel S. (2013), Distinguished Research Cognitive Psychologist - B.S., City College of the City University of New York, 1956; M.S., 1958; Ph.D., University of Alabama, 1966.

Webber, Frederick C. (2011), Associate Programming Engineer - B.S., Rose-Hulman Institute of Technology, 2007; M.S., Air Force Institute of Technology, 2009.

West, Zachary J. (2004), Research Engineer - B.S., Tri-State University, 2001; M.S., University of Dayton, 2004.

Whiting, Christofer E. (2011), Research Scientist - B.S., University of Minnesota, 1999; Ph.D., 2007.

Wicks, Michael C. (2011), Distinguished Researcher-RF Technology - B.S.E.E., Rensselaer Polytechnic Institute, 1981; M.S.E.E., Syracuse University, 1985; Ph.D., 1995; M.A., 2000.

Williams, Theodore F. (1990), Group Leader-Senior Research Engineer - B.S., University of Dayton, 1982.

Wolf, James D. (1979), Group Leader-Senior Research Materials Scientist - B.S., University of Dayton, 1979; M.S., 1982.

Workman, John M. (2010), Senior Research Materials Scientist - B.S., Miami University, 1971; M.S., University of Cincinnati, 1985; Ph.D., 1987; M.A., Wright State University, 1995.

Yamada, Takahiro (1999), Senior Research Chemist - B.S., University of Osaka, 1985; M.S., 1987; M.S., University of New Haven, 1994; Ph.D., New Jersey Institute of Technology, 1999.

Yoon, Yuhchae (2006), Research Scientist - B.S., Yonsei University, 1996; M.S., 1998; M.S., Ohio State University, 2002; Ph.D., 2004.

Zabarnick, Steven S. (1988), Group Leader-Distinguished Research Chemist - B.S., State University of New York at Binghamton, 1980; Ph.D., Pennsylvania State University, 1984.

Zhang, Qihong (2011), Materials Scientist - B.S., Hebei Institute of Technology, 1983; M.S., 1991; Ph.D., University of Dayton, 2010.

Zhou, Eric Guangming (2005), Research Engineer - B.S., China Textile University, 1986; M.S., Kansas State University, 1999.

Financial Information

The first thing you'll discover is how affordable a top graduate education can be. Our programs are competitively priced, and our reputation for quality and academic excellence is nationally known.

Assistantships and Fellowships

A limited number of graduate assistantships are available in the College of Arts and Sciences and the Schools of Business, Education and Health Sciences, and Engineering. These carry a stipend plus tuition remission for courses required in that degree. Graduate summer fellowships for research and creative activities during the third term are also available to graduate students who wish to devote that term to a research project.

Detailed information and application forms may be obtained from the chair or director of the desired graduate program.

Cancellations and Refunds

If registration is cancelled before the first day of classes, full tuition refunds will be made with the exception of the admission deposit. Housing refunds will be made in accordance with the terms of the "Student Housing Contract".

Cancellations will be allowed only after the completion of proper drop/add procedures. Students who do not attend classes and do not officially complete withdrawal procedures during the cancellation period will be responsible for the full amount of the applicable tuition and charges.

Detailed housing cancellation information can be found at the Housing and Residence Life website at housing.udayton.edu.

During the four-week cancellation period for the first and second terms, tuition credits will be given according to the following schedule:

- During first week of classes 80%
- During second week of classes 60%
- During third week of classes 40%
- During fourth week of classes 25%
- During or after fifth week of classes 0%

(The 1st week starts on the first day of a term; the 2nd week begins 7 days later, etc.)

During the two-week cancellation period for each six-week session of the split third term, tuition credits will be given according to the following schedule:

- During first week of classes 65%
- During second week of classes 30%
- During or after third week of classes 0%

Cancellations for a full third term course have a four-week cancellation period and will be on the same schedule as cancellations for the first and second terms.

Financial adjustments for tuition are based on the date the drop (withdrawal) form is finalized in registration.

Financial adjustments for housing (please refer to your housing contract) are based on the date of checkout from housing, if applicable.

Special rules may apply for students who withdraw and who received Title IV funds. Please contact the Office of Financial Aid if additional information is needed.

All tuition refund requests and appeals must be in writing and directed to Beth Gloekler, Director of Student Accounts.

Students suspended/dismissed from the University or from University residence facilities as a result of disciplinary action are not eligible for any refund of tuition, room or board charges under the University's Cancellation and Refund policy. Exceptions to this position will be made to comply with refund requirements of federal financial aid programs.

General Policy

The graduate tuition and charges of the University are set at the minimum permissible for financially responsible operation and, in general, these charges are less than the actual costs incurred. Gifts and grants received through the generosity of industry, friends and alumni help to bridge the difference between income and costs. The trustees of the University reserve the right to change the regulations concerning the adjustment of tuition and charges at any time the need arises and to make whatever changes in the curricula they may deem advisable.

Tuition, charges, room and board are to be paid in full before the term begins or in accordance with payment terms for the fall and spring semesters. Late registration charges are assessed when scheduling and registration are completed after the start of the term.

All checks should be made payable to the University of Dayton. The student's name and student identification number should be shown on the face of each check to insure proper credit.

An assessment of \$25.00 + 1% of the check amount will be made for payment of tuition and charges by a bad check or for any other returned check from any area at the University. This assessment is made each time a check is dishonored.

Registration for a new term, transcripts of credit, and honors of graduation may be permitted only for students whose financial University records are clear.

Graduate Financial Aid

Financial aid may be available for those degree-seeking graduate students seeking assistance. The federal government requires that any student seeking the use of Title IV funds must first be admitted to a degree-seeking program. Once you have been accepted, our office will be notified so we can begin to prepare your aid for the upcoming year. Use the links on the left to explore aid options.

The Office of Financial Aid establishes the annual student expense budget which represents the maximum amount of financial aid a student may receive over a standard academic year (fall/spring). Included in the student expense budget are commonly accepted educational expense allowances for items such as tuition, fees, books, supplies and personal spending in accordance with federal regulations.

These annual student expense budgets reflect average cost of attendance figures. If you plan to attend classes during the summer term as well, please contact our office. If you register for more than the

budgeted amount or if your projected personal expenses are higher than our estimate, you are encouraged to contact a financial aid counselor to discuss your needs and the possibility of increasing your individual personal expense allowance.

Since gift aid is limited, the majority of a graduate student's financial aid eligibility comes in the form of federal student loans. If you wish to be considered for these loans, you must file the Free Application for Federal Student Aid (FAFSA). As an independent student, you will only need to submit your income and asset information, and that of your spouse, if married. The FAFSA becomes available to file each January 1st for the next academic year. For our graduate student population, we encourage you to submit the FAFSA three months prior to the first term you plan to enroll for that academic year and renew it annually.

In addition, the Higher Education Act (HEA) of 1965, as amended, requires institutions that receive and disburse federal Title IV aid to develop and enforce, annually, their standards of satisfactory academic progress (SAP). These requirements encourage students to successfully complete courses for which financial aid is received and to progress satisfactorily toward degree completion. The Office of Financial Aid will review your progress in May of each year to make sure you are still eligible to borrow for the Direct Loan program. We recommend you review your SAP requirements: https://www.udayton.edu/flyersfirst/_resources/files/financial_aid/sap_-_graddoc.pdf

Your Federal loan eligibility will be impacted by all other resources such as employee reimbursement, graduate assistantship tuition remission, grants/ scholarships as your total resources cannot exceed the cost of attendance as determined by the financial aid office.

Please visit our website for additional information: <https://www.udayton.edu/flyersfirst/financialaid/grad/index.php>

Tuition Remission for UD Full-time Employees

Full-time benefit-eligible employees, when admitted in accordance with University of Dayton admission standards, are eligible for tuition remission benefits. Eligible employees receive 100% remission for both graduate and undergraduate classes for themselves up to 18 credit hours per academic year, not to exceed 6 credit hours in each of the first and second semesters.

Tuition and Charges

Description	Amount
Tuition Charges:	
Masters, Arts & Sciences and Engineering (not Religious Studies)	\$873
MBA	\$951
PhD Biology and Engineering	\$951
PhD Religious Studies	\$722
Masters, Religious Studies (Fall and Spring)	\$603
Masters, Religious Studies IMRI (Summer only)	\$420
MPA	\$603
English (Teaching Track Only)	\$603
Bachelor plus Masters	\$603

Description	Amount
School of Education and Health Sciences:	
Masters	\$603
Education Specialist Program	\$722
PhD	\$781
Student Teaching Charge	\$254
Professional Development Workshop Credit	\$175
Financial aid assistance equal to 1/2 of the cost of tuition is available to Full-Time Catholic Educators and Lalanne students. Catholic Educators must submit documentation to the Education Dept. to determine eligibility.	
Doctor of Physical Therapy (DPT)- Includes tuition, lab professional and clinical charges	\$10,605
Physician Assistant	\$11,110

Description	Amount
Miscellaneous Graduate Charges:	
University Charge	\$25
Auditing of Courses (per hour)	1/2 Regular Tuition Rate
Credit by Examination- EM Credit (per hour)	\$35
Late Registration Charge- \$25 per week	\$75 Max
Graduation Charge	\$90

Students with sponsors paying a portion of their tuition must pay the balance plus any additional charges.

An assessment of \$25 plus 1% of the check amount will be made for payment of tuition by a bad check. Cancellation of the student's registration may result until proper payment is made.

Subject to change. The University reserves the right to make changes to tuition and charges for any or all graduate courses at any time. Current information should be obtained from the Office of Student Accounts, course composites, by contacting the department in which the course is offered or the Registrar's Office.

Interdisciplinary and Joint Studies

For information regarding Interdisciplinary and Joint Studies, contact the Program Director or the Graduate School.

Individual Interdisciplinary Programs

The University of Dayton offers individual interdisciplinary graduate programs designed by the student in cooperation with an advisor and representatives from the selected programs. Applicants must have an undergraduate degree with a general cumulative point average of 2.8 or above, and submit a formal written request for an individually

designed interdisciplinary program to her/his faculty advisor and graduate committee.

The interdisciplinary program does not take the place of an established graduate program. Rather, it is a specific program drawn from several disciplines to meet a special need, frequently for job-related requirements. It must produce interrelated applications of specific disciplines and skills at the graduate level. For instance, a clinical dietitian employed in a hospital may seek graduate level expertise in counseling and education for patients with chemical dependencies and for teaching interns. Such a student finds that a Master of Science in the interdisciplinary program serves the special needs for a broader knowledge base encompassing physiology, communication, and counseling. Or, to take an instance in the humanities, a student may seek graduate level expertise in historical preservation. Such a student seeks more general learning and professional expertise, and finds that a Master of Arts in the interdisciplinary program serves special needs in history, art, and public administration.

The degree will be either a Master of Arts or a Master of Science. The program should involve several disciplines and be directed by one faculty member from each discipline. The three faculty members constitute the advisory committee. The final program will be drawn up and approved by the advisory committee. Copies will be sent to the chair of the departments involved.

A program of study must be at least 30 semester hours: 15 may be divided between directed study and a thesis, but must be related to the interdisciplinary areas; and 6 semester credit hours of electives in more distantly related areas may also be chosen.

The formal request for an individual interdisciplinary program must include:

1. A general description of the proposed course of study and the reasons for choosing such an interdisciplinary program, rather than one offered in a single department.
2. The courses (at least 30 semester hours) which will be taken and the department involved in the overall work.
3. If a project or thesis is desired, a clear statement of the specific nature of the topic, the research intended, and the purpose of the project or thesis.

Other Interdisciplinary Programs

Juris Doctor/Master of Business Administration Program

Juris Doctor/Master of Business Administration Program
937-229-3555

MBA Program
937-229-3733

The University of Dayton offers a unique dual degree program for students interested in both law and business. The joint JD/MBA program allows the student to apply six hours of approved elective credit earned in the MBA Program to the Law Program and six hours of approved elective credit earned in the Law Program to the MBA Program. The dual program results in the elimination of a total of 12 semester hours that are normally required if the degrees were pursued individually, thus fulfilling both degrees at a much faster pace. Students may begin either program first, but the first year Law student is required to take Law courses exclusively during the first two semesters of Law studies.

Students applying for admission to the joint degree program must meet the admission requirements of both the Law School and the MBA Program. Applications for admission should be submitted to each school,

along with other records and data required by each school. The applicant should indicate on each application that application is for the JD/MBA program. Applicants should contact the Directors of both programs for information and admission applications. Upon admission to both programs, the student will be enrolled in the JD and MBA programs simultaneously.

Upon admission to the joint degree program, the student will be assigned an advisor from both the Law School and the MBA Program. Each student is required to meet with the respective program advisors to plan his/her program. Continuous liaison must be maintained throughout the joint degree program.

Communication (CAI) Interdisciplinary Program

Anna L. Langhorne, Director of Graduate Studies

The Communication interdisciplinary study program leads to the Master of Arts. It requires 24 semester hours of study in communication, and 12 semester hours of study in one of several designated interdisciplinary areas. The designated areas are psychology, English, business and political science. Upon completion of the coursework, students must pass a written and oral comprehensive exam. Visit the Academic Information section of this website for program details.

Electro-Optics (EOP)

Joseph W. Haus, Program Director

The programs of study for the Master of Science and Doctor of Philosophy in Electro-Optics are administered by the School of Engineering with the cooperative support of the College of Arts and Sciences. This interdisciplinary activity is coordinated by the Electro-Optics Program with active participation of the Electrical Engineering and Physics departments and the University of Dayton Research Institute. State-of-the-art graduate electro-optics courses have been designed to prepare electrical engineers and physicists for careers in the emerging electro-optics field. Facilities at the University include 25 laboratories used for electro-optics research. There is also close research cooperation with the Air Force Research Laboratory. Visit the Academic Information section of this website for program details.

International Marian Research Institute (IMRI)

Johann G. Roten, S. M., Program Director

To facilitate and encourage Marian Studies in the United States and abroad, the International Marian Research Institute (IMRI) was founded in 1975 at the University of Dayton in affiliation with the Roman Pontifical Theological Faculty Marianum. Housed in the Marian Library, IMRI offers annual graduate-level summer schools on a three-year cycle to promote the programs of Marian Studies established by the Marianum. World-renowned theologians often join the faculty as guest instructors or lecturers.

Through IMRI, students can work toward a Pontifical Licentiate of Sacred Theology (S.T.L.) or Doctorate of Sacred Theology (S.T.D.), each with specialization in Mariology, a certificate in Marian Studies, or a master's degree in religious studies with specialization in Mariology from the University's Department of Religious Studies, offered in a joint program. Course offerings include studies in Mariology, Christology, ecclesiology, spirituality and theological anthropology.

Recognized as one of the world's leading centers for Mariological studies, the International Marian Research Institute also is committed to scholarly Marian research and the promotion of Marian art.

Admission is approved by the director of IMRI and an advisory council.

Teacher Education (EDT) Interdisciplinary Program

Connie Bowman, Chair, Department of Teacher Education

The Department of Teacher Education in the School of Education and Health Sciences offers an opportunity for students to develop an individually designed program that includes coursework in education as well as a discipline or field outside of education. Students develop a plan through a selection of offerings in teacher education and other departments.

For more information on any of these programs, consult with the program director or chair of the department.

Libraries and Research Services

The University Libraries include:

- Marian Library (catalog.udayton.edu/undergraduate/generalinformation/librariesandresearchservices/marianlibrary)
- Roesch Library (catalog.udayton.edu/undergraduate/generalinformation/librariesandresearchservices/roeschlibrary)
- School of Law Library (catalog.udayton.edu/undergraduate/generalinformation/librariesandresearchservices/schooloflawlibrary)

Also in this section:

- Access to Other Resources (catalog.udayton.edu/undergraduate/generalinformation/librariesandresearchservices/accesstoootherresources)
- International Marian Research Institute (IMRI) (catalog.udayton.edu/undergraduate/generalinformation/librariesandresearchservices/internationalmarianresearchinstitute)
- Literature Searching (catalog.udayton.edu/undergraduate/generalinformation/librariesandresearchservices/literaturesearching)
- Research Institute (UDRI) (catalog.udayton.edu/undergraduate/generalinformation/librariesandresearchservices/researchinstitute)
- School of Education and Health Sciences Curriculum Materials Center (catalog.udayton.edu/undergraduate/generalinformation/librariesandresearchservices/schoolofeducationandalliedprofessionscurriculummaterialscenter)

Access to Other Resources

OhioLINK: The University Libraries are a member of OhioLINK, a consortium of 90 Ohio college and university libraries and the State Library of Ohio, providing access to more than \$40 million in digital content and 50 million print items.

Interlibrary loan: For materials not available at the University of Dayton or through OhioLINK, the University Libraries provides an interlibrary loan service to faculty, staff, and registered students. Types of materials borrowed may include books; videos and DVDs; music CDs; copies of journal, magazine, and newspaper articles; microfilms; and dissertations.

Uncommon materials: As an associate member of the Center for Research Libraries, University Libraries provide access to the CRL's 5 million newspapers, journals, books, pamphlets, dissertations, archives, government publications, and other resources from Sub-Saharan Africa, Eastern Europe, Latin America, the Middle East, South Asia, Southeast Asia, North America, and Europe. Collections focus on news; law and government; finance; the history of science, technology and engineering; and the history and economics of agriculture.

Privileges at other libraries: Membership in the Library Division of the Southwestern Ohio Council for Higher Education provides students,

staff, and faculty with access to materials in SOCHE member libraries. Graduate students have direct onsite borrowing privileges at all OhioLINK libraries and at nearly all SOCHE libraries.

International Marian Research Institute (IMRI)

Francois Rossier, S.M., Program Director

The Marian Library/International Marian Research Institute is recognized as the largest and most comprehensive collection of materials on the Virgin Mary and as a leading center for Marian studies. Established in 1943 by the Marianists at the University of Dayton, the Marian Library comprises over 100,000 books and pamphlets which include theological, Scriptural and ecclesial documents and commentaries, biographies of Marian devotees, sermons and Marian art. It also has collections of postcards, religious images, postage stamps, medals, rosaries, Christmas crèches and recordings of Marian music.

A principal mission of the Marian Library is to promote research in Marian studies. The International Marian Research Institute was founded in 1975 (in affiliation with the Pontifical Theological Faculty Marianum in Rome) offering an academic program leading to the licentiate (S.T.L.) and the doctorate (S.T.D.) in theology; the master's degree in religious studies with a Marian concentration (in conjunction with the Department of Religious Studies of the University of Dayton); a certificate in Marian studies; and a guided program of studies. The academic program is organized in a three-year cycle and serves a diverse, international student population: laity (men and women), priests and religious. The S.T. L., S.T.D. and certificate are awarded by the Marian and are not degree-seeking programs from UD. While most students seek the degree in theology with specialization in Mariology, others simply wish to satisfy personal interests in Marian studies.

The Marian Library provides exhibits of Marian art, reference services, circulation of books and videos, conferences and workshops. Four publications originate at the Marian Library: Marian Library Studies, a scholarly journal of original research; Marian Studies, the journal of the Mariological Society of America; the Marian Library Newsletter, which covers current books and topics of interests; and Art and Spirituality, a series of monographs promoting personal meditation through religious art.

The Marian Library maintains the Mary Page (catalog.udayton.edu/graduate/generalinformation/librariesandresearchservice/internationalmarianresearchinstitute/%20http://www.udayton.edu/mary) with extensive resources: information on art exhibits and classes, Marian ecclesial documents, FAQs and seasonal meditations.

Literature Searching

Roesch Library subscribes to more than 200 databases for all areas of study offered by the University. Most are available both on and off campus. The library also has access to hundreds of additional databases from commercial database providers. Librarians work with graduate students and faculty free of charge to search these resources when appropriate.

Marian Library

The Marian Library, located on the seventh floor of the Roesch Library, houses the world's largest collection of published materials on the Virgin Mary. Its comprehensive collection is devoted to information about and references to the Virgin Mary found in works of Scripture,

doctrine, history, tradition, art, culture, spirituality and devotion. The multi-language collection includes over 95,000 books and pamphlets (6,000 of which were printed before 1800), 165 periodicals, a clipping file of over 60,000 items and a growing number of microforms. These works are supplemented by a Marian stamp collection, Christmas crèche collection, statues, medals, postcards and other works of art. Publications include Marian Studies (papers given at the annual meeting of the Mariological Society of America), Marian Library Studies (original research on Marian topics) and the twice-yearly Marian Library Newsletter. The Marian Library's collections can be accessed via the University Libraries' online catalog. Hours, an explanatory video and information on current art exhibits can be found on the Mary Page (<http://www.udayton.edu/mary/library>).

Research Institute (UDRI)

The University includes research as one of its stated purposes. In addition to faculty members in academic departments, a large staff of research scientists, engineers and technicians conduct basic and applied research. Most of these activities are externally funded and are conducted in the laboratories of the University of Dayton Research Institute.

Several hundred students are employed in research programs in accord with the University's emphasis on integration of research and instruction. In addition to financial benefits, this research participation provides students with valuable experience and an exposure to issues at the forefront of contemporary science and engineering.

Roesch Library

Roesch Library has more than 1 million print and electronic books, subscribes to more than 200 databases, and provides access to more than 68,000 print and electronic journals. Through OhioLINK, a statewide consortium of college and university libraries, students, faculty, and staff can access more than 50 million additional items at member institutions, delivered on demand within a few days. A Federal Depository Library since 1969, the University also provides access to government records in physical and electronic forms.

With limited exception, Roesch Library is open every day, normally until 5 a.m. during regular weeks of the term and 24 hours during exam weeks. Research and writing assistance is available in person or via email, telephone, or online chat.

Computers, printers, copiers, and scanners are available, as well as cameras, phone chargers, e-readers, tech-enabled team tables, and study rooms for individuals and groups. Wi-Fi is available throughout the building.

The Libraries also provide all University of Dayton students, faculty, and staff with an online subscription to (<https://myaccount.nytimes.com/grouppass/access>) *The New York Times* free of charge. The first-floor gallery features several exhibitions each year, and community programs address a variety of curricular topics and current issues. An open-access institutional repository, eCommons (<http://ecommons.udayton.edu>), provides a permanent and discoverable electronic archive of University scholarship, culture, and documents. For more information or to browse the catalog, see the website (<https://www.udayton.edu/libraries>).

School of Education & Health Sciences Curriculum Materials Center

The Brother Louis J. Faerber, S.M., Curriculum Materials Center (CMC) houses the SEHS's specialized education collections and is located on the sixth floor of Brother Ray Fitz Hall. Its collection includes professional education books and journals, literature for children and young adults, elementary, middle and secondary textbooks, standardized assessments, teaching aids (games & manipulatives), DVD's, CD's, etexts, charts, material kits and other resources. A copier, four networked computer workstations, a comb binder, Ellison and Accu-Cut die cutting machines, and an assortment of letter and shape dies are available for student use.

School of Law Library

The University of Dayton School of Law's Zimmerman Law Library (<https://www.udayton.edu/law/library>) in Joseph E. Keller Hall provides access to 300,000 printed materials, microfilms, and legal databases on Anglo-American, foreign, comparative, and international law. Its open-stack arrangement permits easy access to all materials, and library faculty and staff are readily available to provide assistance to law students, undergraduates, graduate students, lawyers, judges, faculty, and the public. The Library also has a host of bar exam preparation materials and academic support resources.

Open until midnight Sunday through Thursday and until 10 p.m. Friday and Saturday during the academic terms, the Zimmerman Law Library provides 500 seats for study and research, an abundance of electrical outlets, and several computers with Internet access for public use. Group study rooms are available to faculty, staff and enrolled students in the School of Law, and wireless access is available with a UD login name and password.

Student Life and Services

At the University of Dayton, you're not alone. And not just because you'll make friends at every turn, but because our faculty, staff and community are eager to help you along your path. To guide you, advise you and even help you land a job after graduation.

As a Catholic, Marianist institution, our educational philosophy addresses the needs of the whole person: mind, body and spirit. And you'll find a plethora of offices are here to support you every step of the way.

Affirmative Action Office

The Compliance and Affirmative Action Office aids in the implementation of the University's commitment to equal opportunity, affirmative action and diversity. This office ensures campus compliance with Federal, State and Local laws pertaining to non-discrimination and affirmative action.

Athletics

Many people throughout the country have come to know the University of Dayton through the accomplishments of its intercollegiate athletic teams. The mission of the Division of Intercollegiate Athletics at the University of Dayton reflects the mission of the University. That mission is embodied in the following core purposes:

- To educate the total person by integrating the primary academic purposes with educational possibilities and opportunities for young people beyond the classroom
- To teach the value of community and family through collaboration and teamwork
- To instill the fundamentals of sportsmanship, adhering to the values of respect, fairness, civility, honesty and responsibility
- To teach the tools of achievement, including self-discipline, personal responsibility and the setting of high standards
- To develop the individual talents of our student-athletes within the context of shared team goals
- To enhance diversity and minority opportunity at the University of Dayton
- To advance the University of Dayton locally, regionally and nationally through the more highly visible sports, particularly the men's basketball program

There are seven men's intercollegiate sports:

Fall

- Football
- Soccer
- Cross Country

Winter

- Basketball

Spring

- Baseball
- Golf
- Tennis

There are ten women's intercollegiate sports:

Fall

- Volleyball
- Soccer
- Cross Country

Winter

- Basketball
- Indoor Track

Spring

- Softball
- Rowing
- Golf
- Tennis
- Outdoor Track

Cheerleading tryouts, open to all students, are held each year.

Any student, male or female, who plans to participate in a varsity sport, must be certified through the NCAA Initial-Eligibility Clearinghouse. Additionally, student-athletes are required to complete a physical examination and provide documentation of their medical history and current insurance coverage.

The University of Dayton and its Division of Athletics are committed to abiding by the rules of the NCAA and the Atlantic 10 Conference. The volume and complexity of the NCAA rules prohibits addressing all the possible scenarios that may impact athletic eligibility. Therefore, you are

encouraged to visit the Dayton Flyers website and NCAA to access the various rules and policies which assist our University in continuing to operate with honor and dignity.

Contact the Compliance Staff if you should have any questions. Visit our website (<http://www.daytonflyers.com>).

University of Dayton
Athletics Division Compliance Office
300 College Park
Dayton, OH 45469-1230
Phone: (937) 229-1285
Fax: (937) 229-4969

Bookstore

The University of Dayton Bookstore is a service facility owned and operated by the University. Its primary purpose is to provide for the intellectual needs of the University community by making available all required textbooks and by providing a source for essential engineering, art and academic supplies which students need in their areas of study. The UD Bookstore offers new, used, rental, and digital options for most titles.

Methods of payment include cash, American Express, Discover, MasterCard, Visa, Flyer Express, Textbook Scholarship, along with personal checks are accepted with proper I.D.

The UD Bookstore also offers a variety of merchandise including apparel, gift items, school & office supplies, health & beauty items, over the counter medication, technology supplies and accessories, gift cards and more.

For your convenience, the UD Bookstore offers laundry and dry cleaning services, bus passes, book buyback, graduation services and special order services.

In addition to the UD Bookstore, University Retail Operations also operates Flyer Spirit on Brown Street and the Law Bookstore in Keller Hall.

Campus Ministry

Faith formation and reflective religious dialogue play important roles in the education and development of the whole person at the University of Dayton. As a primary agent in faith formation at UD, Campus Ministry, inspired by the University's Marianist tradition, forms persons and communities in a lived faith, expressed in worship, in challenging and compassionate relationships and in commitment to justice and service.

With thirty staff persons and a wide variety of programs, UD has one of the largest and most active campus ministry programs anywhere.

Informed by the Roman Catholic Tradition, the vast majority of our programs appeal to students from different Christian backgrounds and those of other faiths. A full-time protestant campus minister serves as a part of the campus ministry team. Campus Ministry also connects students from other faith traditions to their respective faith communities off campus. A number of independent, religiously based student organizations exist on campus. Together, these provide a range of options and opportunities for students to be a part of a faith community during their time at UD.

Our primary activities for students are outlined below.

Residence Life Ministry

Each residential area has campus ministers who actively engage students in faith based activities. Student leaders guide participation in activities such as faith sharing groups, bible studies, retreats, Mass, service and social opportunities and other prayer experiences. In these and other ways, campus ministry is able to accompany, encourage and support students in areas of leadership, personal growth and spiritual development.

Center for Social Concern

Campus Ministry's Center for Social Concern is committed to faith-based social justice education, including direct service to the poor and marginalized, work on behalf of social justice and changing unjust structures in society that oppress and marginalize human beings. The Center for Social Concern provide regular BreakOut Trips, Summer Immersion Trips and the Summer Appalachia Program, offer opportunities for service and justice education in domestic and international settings. Guest speakers and a number of other activities also contribute to these goals. At the heart of it all is a wide array of opportunities to reflect on the service and justice work in the context of faith.

Retreats and Faith Communities

Over twenty retreats are offered each year for UD students. The retreats vary in size, style, theme and focus to provide opportunities for faith development in many ways. There are quiet relaxing guided retreats, wilderness retreats, retreats specifically for first-year students and graduate students, large community focused retreats, interdenominational retreats and more that foster faith development through activities, discussion and prayer. Most retreats are led by student teams who prepare through weekly meetings.

Students also join small Christian communities called PORCH. These student led groups meet regularly and focus in unique ways including faith sharing, scripture study and theological reflection.

Campus Ministry's Program for Christian Leadership offers Callings, a pre-orientation experience for incoming first year students focused on fostering faith, vocation and leadership for new UD students as well as PORCH communities, retreat and leadership experiences.

Liturgies and Prayer

Students, faculty, and staff are active in the liturgical life of the University as lectors, Eucharistic ministers, music ministers, Mass coordinators and hospitality ministers at both daily and Sunday celebrations of the Eucharist. The sacrament of Reconciliation and Eucharistic adoration are scheduled regularly, and during the seasons of Advent and Lent, sung weekly Vespers are offered along with communal Reconciliation services. An interdenominational Christian worship service is held every Sunday during the academic year. Other opportunities for worship are available in the local community.

Campus Recreation

The Department of Campus Recreation is located on the "M" level of the RecPlex. The RecPlex, which opened in January 2006, houses a state of the art recreation facility. Full time undergraduate students are eligible to use the RecPlex with their UD student ID. The facility may be used by graduate students who purchase a RecPlex Membership. Highlights of the building include:

- Main Gym with four full sized wood court basketball courts and three racquetball courts, one of which can be converted for squash.

- MAC Gym with two rubberized courts surrounded by a professional grade dasher board system adequately sized to play a variety of sports including tennis, indoor soccer, basketball, volleyball and floor hockey.
- Aquatic Center with a 25 yard eight lane lap pool, four foot deep vortex leisure pool, diving well and an eight-person spa.
- Fitness Studios A, B, and C which are used for a variety of instructional and group fitness classes.
- 10,000 sq. ft. Fitness Floor is home to 80 cardio machines and 70 strength training stations.
- Wellness Assessment Lab from which services such as athletic training, massage and personal training consultation are offered.
- Four lane 1/8 of a mile rubberized jogging track.

Campus Recreation is excited to feature a new 5+ acre outdoor facility due to the installation of an infill turf surface. This new resource matches the quality of the RecPlex and provides year round access and a consistent surface for sports programming.

Campus Recreation offers many programs and facilities for students, including:

- Intramural Sports
- Sport Clubs
- Aquatics
- Fitness Programs
- Climbing Wall
- Strength and Cardio Equipment

Campus Recreation provides a variety of intramural activities in which anyone can find exercise surrounded by a spirit of fun and competition which is uniquely enhanced by our Marianist values. Activities include:

- Softball
- Flag Football
- Indoor and Outdoor Soccer
- Volleyball
- Basketball
- Dodge-ball
- Bowling
- Racquetball
- Golf meet
- Wallyball
- Floor Hockey

All students are invited to participate; ability is not important, just the desire to play. Please contact us at udintramurals@udayton.edu.

Another popular feature of the Department of Campus Recreation is the Sports Club Program. Currently, there are 36 recognized sports clubs on campus. The Sports Club Program offers students the opportunity to participate in a highly organized activity, while at the same time learning and developing new skills. Anyone interested in joining a sport club or starting a new one is encouraged to come in and speak with the Assistant Director of Sport Clubs.

Schedules concerning open recreation hours and scheduled events may be secured from the Campus Recreation Office. For more information please visit the website (https://www.udayton.edu/studev/health_wellness/campusrec) or call 229-2731.

Career Services

The University of Dayton Career Services is a team of dedicated, caring professionals committed to providing excellent career related-resources, programs, services and opportunities that build confidence and job search skills. We serve as a connecting point between students, faculty, alumni and employers in an increasingly diverse and globally influenced job market. We are a leader in career planning and preparation, balancing the latest technology with personal guidance in the Marianist tradition.

Career advisors are available to discuss:

- Major selection
- Career direction
- Job search strategies
- Resume critique
- Networking
- Graduate school strategies
- Interview tips

Practice interviews with a career advisor can be digitally recorded and evaluated upon request to prepare the student for actual interviews by company representatives. All students, including first year students, are encouraged to utilize the services available. Appointments may be made by calling (937) 229-2045.

The Hire a Flyer Network is available from the Career Services web site for students to access job listings, post resumes and register for events such as workshops, career fairs and on-campus interviews with employers. Students may also access the Alumni Career Network through Hire a Flyer.

Career Fairs are scheduled Fall and Spring semesters for all majors. These events provide an opportunity for employers, students, and alumni to meet and discuss job opportunities. Approximately 150 companies attend looking for internship, co-op and full-time employees.

The on-campus recruiting program is open to all students and alumni.

On-campus recruiting is held October-April each year.

In addition, Career Services offers other venues for students to interact with employers as well as mini-courses, workshops, and presentations on a wide variety of job search and career related topics.

Additional information is available online (<http://careers.udayton.edu>).

Career Related Experiences

The goal of any career related experience is to provide practical work experience associated with a student's course of study and/or life experience. All students pursuing a four-year degree should consider one or more of these programs.

- Internships
- Career-related summer employment
- Cooperative education
- Student contract program positions
- Externships and/or job shadowing
- Community/service learning
- Volunteer opportunities
- International placement or study/work abroad opportunities

Internship, summer employment, cooperative education, and student contract program positions are posted in Hire a Flyer. This online system is available at no charge to all students and alumni and may be accessed from the Career Services website (<http://careers.udayton.edu>).

Center for International Programs

The Center for International Programs provides leadership, coordination, strategic planning and administrative support for the internationalization of campus. In cooperation with other University departments and Dayton area organizations, the CIP operates programs and provides services which enhance intercultural education at the University of Dayton. The CIP is part of Academic Affairs and Learning Initiatives, under the Office of the Provost. Our areas include:

Campus Engagement

The office of Campus Engagement facilitates opportunities for U.S. and international students, faculty and staff to learn from one another as a way to increase intercultural competence and awareness of one's own culture. We achieve this through strategic communication campus training and education; on-campus collaborative programming; and experiential learning opportunities including the Global Learning Living Community.

Education Abroad

University study abroad programs including university summer study abroad programs are managed through the Office of Education Abroad. Additional resources are available through partner institutions and affiliate programs for semester and year-long study. The education abroad office offers advising for all students to encourage engagement in educational, research and service experiences abroad.

International Student and Scholar Services

International Student and Scholar Services provides students and exchange visitors with immigration advising, workshops, orientation, academic and non-academic advising, as well as social and extracurricular activities. Services include support of international faculty and research scholars and their dependents. The ISSS staff works collaboratively with other departments and organizations to advance the University's commitment to building a global community.

Intensive English Program

The University's English as a Second Language program develops students' English skills in preparation for an undergraduate or graduate program or the work place. Course offerings include writing and grammar, reading and vocabulary, oral communication, listening and speaking.

Partnership and Exchanges

The University's international exchanges and partnerships are managed through the CIP. UD's partnerships with international universities and institutions benefit our students, faculty and staff through education abroad programs, semester and year-long exchange programs, research collaborations and more.

Center for Student Involvement - Kennedy Union

A variety of cultural, educational, social and recreational activities are presented in Kennedy Union to enrich and enhance campus life and foster a spirit of community. In addition, the Center for Student Involvement provides support, direction and programming opportunities for students and recognized student organizations. Activities in the union include game shows, trivia contests, movie nights, concerts, theatrical productions, lectures, dance ensembles, performances and recitals by students and faculty members. Meeting rooms, the Ballroom, Boll Theatre and University vans are available for use and can be reserved by calling 229-3333 (Kennedy Union Room 241). Information about student

organizations can also be found at go.udayton.edu/involvement or by calling 937-229-3333 (Kennedy Union Room 241).

The John F. Kennedy Memorial Union, centrally located on the campus, offers comfortable surroundings and a variety of services for the University community. Lounges provide space for discussion, studying and socializing. A lounge for commuter students is located on the first floor, with lockers available for rent. The Hangar games room on the ground floor includes bowling lanes, pool tables, lounge space, a cafe and video games. The food court, automatic teller machines, charging stations, display cases and vending machines are housed in the Union, as are student offices for the Student Government Association, Campus Activities Board, Christmas on Campus, Daytonian Yearbook, three values-based Greek Councils, Flyer News, Flyer TV, Orpheus literary magazine and the Campus Concert Committee. Also in the union are the Information Center, Box Office, the Copy Center, KU Dining Services, Catering Services and the Travel Office.

The Center for Student Involvement is responsible for registering all student organization-sponsored events, granting recognition to student organizations, providing resources and support for organization advisers, publicity approval and coordinating campus-wide events. The office works directly with commuter students, Student Government Association, IFC, NPC, NPHC, Flyer News, Flyer Radio, Daytonian Yearbook, Orpheus, Campus Activities Board, the Charity Concert Committee, Christmas on Campus, the Campus Concert Committee and all additional recognized student organizations.

Community Wellness Services

Community Wellness Services supports and enhances the mission of the University of Dayton by promoting learning and personal development in the seven dimensions of wellness, providing alcohol and other drug interventions for students and consultation to faculty and staff in these areas.

Through prevention and intervention, the student is guided to create a balanced lifestyle to contribute to their optimal personal development. Community Wellness Services utilizes science based wellness promotion strategies to support the Marianist principles of community living and contribute to the educational mission of the University.

Community Wellness Services is located on the first floor of Gosiger Hall and in the McGinnis Center. Phone (937) 229-1233. Hours are 8:30 a.m. - 4:30 p.m. Monday - Friday. The main mailing address is Community Wellness Services, 300 College Park, Dayton, OH 45469-2610.

Commuter Student Services

Commuter Student Services provides an essential aspect to the University of Dayton campus. Commuter students knowledge and pride of the Dayton area help make out-of-town students feel more comfortable and at home while at the University. A lounge for commuter students is located in Kennedy Union 118 which is used for study, relaxation and meeting friends. A telephone, microwave and refrigerator are provided for the convenience of commuter students. Lockers are also available in the lounge and can be rented on a yearly basis.

The commuter advisor (Brandy Clifford, 229-3333) provides services and facilities to meet the educational, developmental and physical needs of these students and maintains contact with the academic and nonacademic areas of the University to increase understanding of these specific needs.

Counseling Center

The main purpose of the Counseling Center is to assist students in self-development, including personal adjustment, career planning and social skills building. All students in need of objective insights or merely "a listening ear" are encouraged to make use of the Center's services. No student's concern is too minor to explore. This is usually accomplished through one-to-one and group counseling, although there are opportunities for workshops on certain topics, consultation and outreach programming for student, faculty and staff groups. The Center also provides career and personality testing services.

Because counseling often involves sensitive personal matters, discussions between counselors and students are strictly confidential. An exception occurs when students' problems become life threatening. The University and the student may enter into a contract to establish conditions regarding required treatment/assessment, if there is imminent danger. The student may decide to use the services offered by the University or to receive treatment elsewhere. In the latter case, periodic review by the University is required to confirm that contract conditions are met. For the welfare of the student, problems warranting treatment more intensive than the University can offer may require temporary medical withdrawal from the University. The student may be readmitted to the University upon acceptable completion of contract conditions. In life threatening circumstances, the University assumes the position that the parents or guardians of the student generally should be notified, and it will initiate such notification if the student has not done so within an appropriate time, refuses to do so, or is unable to do so. Other exceptions to confidentiality include a) receiving a court order, and b) when evidence suggests abuse or endangerment to a person under the age of 18 or over 60.

Matriculating undergraduates, graduate assistants and law students are eligible for services at no charge. Other graduate students, Intensive English Program participants and non-matriculated undergraduate students pay on a fee-for-service basis. Contact us for information about charges and services. The Center is accredited by The International Association of Counseling Services, Inc.

Dining Services

The University of Dayton Dining Services operates two full-service a la carte student dining facilities located in Kennedy Union and Marycrest Complex, and two restaurants, Passports and The Grainary, located in the V.W. Kettering Residence Hall. The Brown St. Bistro, located in Fitz Hall, offers made to order sandwiches and salads. The Emporium, a mini grocery store with a full service deli, is located in the Marianist Residence Hall, and Stuart's Landing, a convenience store, is located in Stuart Hall Complex. Dining Services also operates The Galley, a pretzel/ ice cream/ gourmet coffee shop located in Kennedy Union, and The Chill, a juice bar with healthy snack options, located in The RecPlex. All students living in Marycrest, Stuart, Founders, Marianist and Virginia Kettering Residence Halls are required to purchase a meal plan. Meal plan options are as follows:

- **Standard Plan** – This structured meal plan has a spending allowance associated with it during specific meal periods. If you don't spend the entire allowance for that meal, you lose it. This plan starts with breakfast the first day of classes.

Note: Only one block of funds may be used during each meal period. For example, two blocks may not be used during the lunch meal period on the same day.

- **The Flexible Plan**- This is a debit style meal plan and provides complete flexibility, with no specific meal periods and no spending allowances.

Note: There are no refunds on debit plan balances however, 100% of balances remaining at the end of fall semester will roll over to the spring semester. Plan participation charge applies.

All students living in residence halls must have one of the following:

- **Standard Plan** (3 blocks per day, 7 days) \$2,440.00/ semester
- **Flexible Plan** (debit account) \$2,440.00/ semester

For complete information on meal plans, please visit website (<http://dining.udayton.edu>).

When a student does not choose a meal plan the default plan is the Flexible Plan.

Non-resident students may purchase a Neighborhood meal plan (debit account).

FlyerCard

The FlyerCard is the official photo identification card at the University of Dayton. Your FlyerCard must be presented for purchases using your FlyerCard account(s), admission to the RecPlex, library services and building access.

Your FlyerCard can be used as a form of payment for food, textbooks, supplies, laundry, printing and other essential services. It is safe, fast and convenient to use. You can view your transactions and the balance of your accounts by choosing the "My Account" link (catalog.udayton.edu/graduate/generalinformation/studentlifeandservices/flyercard/%20https://flyerexpress.udayton.edu).

To get your FlyerCard, stop by the Campus Card Services office located in room 102 of the Powerhouse. The first FlyerCard received is issued at no charge. All students must be registered for classes before receiving their card. Visit the FlyerCard website (<http://FlyerCard.udayton.edu>) for a detailed view of the FlyerCard program.

Flyer Express

Flyer Express is a declining-balance prepaid account accessed with your FlyerCard. It is the convenient way to pay for products and services on and off campus. Your Flyer Express account eliminates the need to carry cash and saves you the hassle of searching for correct change. Flyer Express has you covered with whatever you need, 24 hours a day, 365 days a year. It is safe, fast, and convenient to use. The money in your Flyer Express account is carried over from one semester to the next and from year to year.

The Card Services office offers you multiple options to deposit funds into your account.

- Online (catalog.udayton.edu/graduate/generalinformation/studentlifeandservices/flyercard/%20https://flyerexpress.udayton.edu/AddFlyer.aspx)
- Phone: (937) 229-2456 or 1-800-259-8864 (option 4)
- In person at the Campus Card Services office in the Powerhouse or the Bursar's office in St. Mary's Hall
- At kiosks located in all Dining Services locations and the Roesch Library.

Flyer Express is accepted at:

- All Dining Service locations
- Art Street Cafe

- UD Bookstore
- Residence Hall laundry
- Campus Copy Center
- Selected vending areas
- The Hangar
- The Galley
- Stuart's Landing
- Campus Computer Store
- Roesch Library
- Post Office
- The Chill
- KU Box Office
- The Blend
- The Blend Express
- Selected off campus businesses.

Flyer Express is used to pay for printing in the Library and many computer labs. Visit the FlyerCard website (<http://FlyerCard.udayton.edu>) for a current listing of off campus vendors that accept Flyer Express.

Health Center

Medical care is available at the Health Center to all full-time and part-time undergraduate, graduate and law students. During the academic year, the Health Center is open from 8:30 a.m. to 5:30 p.m. on weekdays, except University holidays. A physician is available for consultation every weekday morning and afternoon throughout the year, except University holidays. Summer hours are 8:30 a.m. to 4:30 p.m. with limited physician hours. Students should call the Health Center to schedule an appointment at (937) 229-3131, or can schedule or cancel appointments through our portal at myhealth.udayton.edu. In case of emergency, call Public Safety, (937) 229-2121.

Pre-admission physical examinations are not required, but students with chronic health problems are advised to have their physicians send records or recommendations to the medical director. Every student born after 1956 is required to show evidence of immunity to measles, mumps, and rubella. All students are required to fill out a tuberculosis screening questionnaire. Students living in on-campus housing also have specific requirements for meningitis and hepatitis B vaccines, specified by Ohio law. A link to the Health Requirements form is located on the Health Center website (<http://www.udayton.edu/studev/healthcenter>).

Undergraduate and law students are eligible for Health Center services at no extra charge. Graduate and IEP students pay on a fee for service basis at the Health Center. The charge for a physician visit ranges from \$45 to \$65, depending on the length of the visit and the type of services provided. Charges for medicines dispensed, allergy injections, laboratory tests and x-ray examinations are billed to ALL STUDENTS.

The University believes it is the responsibility of each student to have health insurance and therefore expects students will have it for the entire time they are enrolled. Having health insurance protects both the student and the community. International students are required to provide evidence that they have health insurance that will cover them the entire time they are a student at the University of Dayton. The University is not responsible for covering health care costs. All charges incurred at the Student Health Center are reported to the Office of Student Accounts with the University. Inquiries regarding bills should be made at the Health Center between 9:00 a.m. and 3:00 p.m. weekdays. Itemized statements can be provided upon patient request. These are

not automatic and the Health Center does not bill outside insurance companies directly, however, students should bring a copy of their health insurance/pharmacy cards to each visit.

Housing and Residence Life

One of the most challenging and growth-oriented experiences available to students is residential living. The University strives to provide a co-curricular environment that both supports and challenges students to reach their full potential. Understanding, mutual respect and openness to diversity foster the development of a positive community.

In order to attain this goal, professional, graduate and undergraduate staffs in the Department of Housing and Residence Life are creating living and learning environments within University residence halls, suites, apartments and houses. A student elected governance board or council represents residential student opinions and assists the residence life staff in providing programmatic initiatives for each on-campus living area.

All first-year and second-year students are required to live in UD housing unless they are married, are twenty-one years of age or older, or are local residents living with their legal guardian at their permanent residence within 40 miles of the University of Dayton campus. Junior and senior students have the opportunity to live in UD apartments and houses or to choose to live in non-University housing.

Upon official acceptance to the University of Dayton, the Office of Enrollment Management provides students with information and instructions for securing residential living accommodations. Questions regarding housing can be directed to Housing and Residence Life at (937) 229-3317 or email housing@udayton.edu or visit the Housing and Residence Life website (<http://housing.udayton.edu>).

International Student and Scholar Services Office

The International Student and Scholar Services Office provides students and exchange visitors with immigration advising, workshops, orientation, academic and non-academic advising, as well as social and extracurricular activities. ISSS extends its services and support to international faculty and research scholars and their dependents. The ISSS works collaboratively with other departments and organizations to advance the University's commitment to building a global community.

ISSS also presents Bridges, the international student orientation, every August, January and May. All international students new to the University of Dayton must attend. During Bridges, ISSS assigns immigration check-in times to students. Completing immigration check-in is vital to maintaining F-1/J-1 status. All new undergraduate international students are also required to attend the University's New Student Orientation, for all new undergraduate students.

Office of Community Standards and Civility

Mission:

The purpose of the Student Conduct System and the Code of Conduct are to maintain a campus environment that is conducive to learning, protects the university's educational mission, maintains reasonable order, protects the community and assists in the character development of each student or student organization. The Standards of Behavior and

Code of Conduct are applicable to all students and student organizations regardless of where a violation may occur.

For additional information:

go.udayton.edu/civility

go.udayton.edu/studenthandbook

Office of Learning Resources

The Ryan C. Harris Learning Teaching Center (LTC) Office of Learning Resources is Your Partner in Learning. We offer a wide variety of services designed to meet individual learning needs. Services offered through OLR are free of charge for all students.

Academic Coaching and Consultations

Discuss goals, motivation, transition to college and study skills. Obtain referrals to campus and community resources. Request an informal disability screening.

Courses offered

DEV 055	Learning Enrichment Workshop	1
UDI 175	The Art & Science of Learning	2
UDI 149	Learning Connections	2

International Student Learning Support

Meet with staff or peer coaches, individually or in groups, or attend a seminar to develop skills for learning in a diverse community.

Tutoring

Take advantage of tutoring with trained peer tutors for selected courses. Available to all students. Check the Learning Support Guide on the OLR website for hours: go.udayton.edu/learning.

Services for Students with Disabilities

Meet with disability specialists for individual consultations, disability management, and services including academic and testing accommodations, alternative formats, and assistive technology with training.

Supplemental Instruction

Attend regular group study sessions led by trained leaders who help students master course material. Available in selected courses.

Online Resources

Check out the OLR website for study tips, self-assessments, apps, learning technologies and other resources including the full Learning Support Guide: go.udayton.edu/learning

The Write Place

Offers peer-to-peer writing consultations in the Knowledge Hub on the first floor of Roesch Library. Online feedback on writing is also available. Visit the Write Place website for hours and other info: go.udayton.edu/writeplace

Office of Learning Resources: Students with Disabilities

The Ryan C. Harris Learning Teaching Center's Office of Learning Resources (OLR) focus is to provide all students with disabilities an equitable opportunity to participate freely and actively in all areas of university life. OLR provides access to programs and services through academic, housing and testing accommodations; individual consultations;

on-going disability management; and production of alternative format course materials.

For students with disabilities, OLR:

- Encourages the development of self-advocacy and self-determination skills.
- Assists in the interactive process between students and faculty for determining and implementing reasonable accommodations.
- Ensures registered students with Ensures access to university programs and services through reasonable accommodations to students with disabilities registered with OLR.
- Assists the university community in understanding the concept and the realities of disability and in working to eliminate barriers that limit the opportunities for students with disabilities at the University of Dayton.
- Assists the university in complying with the provisions of Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act (ADA) of 1990, and the ADA Amendments Acts (ADAAA) of 2008.

OLR does not provide special, structured programs specifically for students with disabilities.

For more information about OLR services for students with disabilities, please visit the OLR website (<http://www.udayton.edu/lrc/learningresources/#3>). (<http://www.udayton.edu/lrc/learningresources/#3>)

The Academic Accommodation Process

The LTC's Office of Learning Resources (OLR) asks students who wish to make an official request for disability accommodations to contact OLR and set up an appointment with our disability staff. During this appointment we will discuss the barriers/difficulties the student anticipates, or is facing, and the kinds of accommodations that may be appropriate while attending classes and participating in community life at the University of Dayton. It is the responsibility of the student to make their request for accommodations known in a timely manner.

Students who are interested in discussing academic accommodations for the first time can complete the Initial Accommodation Request form online (https://udayton-accommodate.symlicity.com/public_accommodation). This form allows OLR to gather information about your potential needs in the academic, housing, dietary and parking areas. Once completed, the student will meet with OLR staff to discuss accommodation needs and, when applicable, an accommodation letter which outlines specific needs will be created. This accommodation letter will be used by the student to aid in discussion of accommodations with their professors.

Please contact OLR for assistance.

Phone: (937) 229-2066

TTY: (937) 229-2059

Fax Number: (937) 229-3270

Email: disabilityservices@udayton.edu

Mail:

University of Dayton

Office of Learning Resources

Attn: Disability Services

300 College Park

Dayton, OH 45469-1302

For additional information on OLR services see the section in this Bulletin entitled "Office of Learning Resources" or visit the OLR website (<http://www.udayton.edu/lrc/learningresources>).

Office of Multicultural Affairs

The University of Dayton is committed to creating an environment that celebrates cultural diversity while focusing on the Marianist philosophy of service, leadership and community. The Office of Multicultural Affairs, in the division of Student Development, provides facilities and services to support the academic achievement, social and cultural involvement of multicultural students and assists in enhancing the understanding that all UD students have of themselves and others through co-curricular experiences. Staff members in the Office of Multicultural Affairs collaborate with campus and community partners to provide a supportive community that promotes academic success.

Major programs and services offered by the Office of Multicultural Affairs (OMA) are listed below:

Academic Excellence - Support is offered to students through academic consultations, tutoring and workshops. OMA works in collaboration with other academic and student service offices to assist students in achieving their academic goals.

Cultural Programming - Cultural programming offered by OMA and in collaboration with other departments supports the University of Dayton's academic mission by providing educational opportunities that assist students in exploring new experiences while also enhancing their understanding of their cultural identity. Some of the ways to get involved are through Culture Fest, at one of the Culture Heritage Month programs celebrated on campus and nationally or the Intercultural Talent Showcase.

Leadership Development - A variety of leadership initiatives are offered, including the annual OMA Retreat, Kindred Presidents, Program to Engage and Exchange Resources for Students (PEERS) and Colors of Leadership Conference. The leadership skills of students involved with multicultural student organizations are enhanced through group and individual meetings that occur on a monthly basis.

Social Justice and Inclusion - The Office of Multicultural Affairs provides opportunities for students, faculty and staff to participate in critical dialogue around difference and social justice. Participants can attend presentations, brown bag discussions, mini-conferences and other events to gain skills and resources on how to lead and participate in difficult conversations. Students can interested in actively promoting dialogue and/or facilitating workshops and conversations can participate in the Diversity Peer Educators (DPE) program and engage others as community change agents.

Office of Multicultural Affairs Staff & Facility - Staff members who work with OMA are excellent resources. Stop by the office to speak to a staff member, to use the facility to study, to socialize, or attend an event. Ample study and programming space is available in OMA, which is located on the first floor of Alumni Hall. Contact OMA at 937-229-3634 or oma@udayton.edu to reserve space or to inquire about after-hours access.

Privacy Rights of Parents and Students

In compliance with Section 438 of the General Education Provisions Act, the University of Dayton has published regulations designed to protect the privacy of parents and students as to the access and to the release of records maintained by the institution.

Public Safety

The Department of Public Safety seeks to provide a safe and secure environment for the entire University of Dayton community, which includes the students, faculty, staff and visitors. The department provides police, parking and emergency medical services to the U.D. campus community. The Student Cadet program is also operated by Public Safety. Public Safety offices are located on the first floor of Fitz Hall. For additional information about Public Safety services, please visit our website: udayton.edu/publicsafety.

Police

Police operations include enforcement of laws and campus regulations, criminal investigation, crime prevention and providing for the physical security of University of Dayton property and interests. The department has primary jurisdiction for law enforcement and criminal investigation on all University of Dayton owned or controlled property, and all public property within the defined campus boundaries according to the mutual aid agreement with the City of Dayton Police Department. Police officers are all graduates of the Basic Police Academy and are sworn law enforcement officers, the same as their municipal counterparts.

Emergency assistance is available 24 hours per day, seven days a week. Call 911 in the event of an emergency, or 229-2121 for all other assistance. (Non UD Network Phones will call the City of Dayton Police and Fire Departments when dialing 911.)

Parking Services

Parking Services is responsible for management of the University's more than 5,500 parking spaces located in over 50 parking lots, and with enforcement of parking regulations. Lots are patrolled daily by Parking Services Representatives, who issue citations to violators. The following information applies to student parking.

- Campus parking facilities are extremely limited. We recommend you determine parking availability before bringing a vehicle to campus, as on street parking is also severely restricted in the vicinity of campus.
- All vehicles parked on University of Dayton property must have a valid parking permit displayed, except during open parking hours.
- First-Year residential students will NOT be permitted to bring vehicles to campus.
- Graduate/law students and graduate assistants will be sold student parking permits.
- Commuting students will be sold permits for Lot S1.
- Students living in landlord housing within one mile of campus will be sold resident student permits.
- Resident student parking priority will be given to upper class students with the highest priority being given to students with disabilities.
- Information concerning permit sales will be disseminated to students annually.
- All students are required to apply online at parking.udayton.edu
- Evening students are sold N (night) permits, which are valid in Lots A, B, C, P, and S1 at 4:00 p.m. and anytime during weekends in any campus parking lot except those marked with a double letter. Student permits will be honored in any student parking lot during the summer sessions.
- Students may contact Parking Services at (937) 229-2128, M-F 8:00 a.m.-4:30 p.m. or at parking@udayton.edu.

Rescue Squad

The Department of Public Safety also provides around the clock emergency medical services, primarily through the support of the University of Dayton Student Volunteer Rescue Squad. The Student Volunteer Rescue Squad is comprised of full-time undergraduate students who receive their training and equipment from the Department of Public Safety. All UD Student Rescue Squad members are nationally registered EMTs and volunteer their time to serve the community.

Student Cadet Program

The Student Cadet Program consists of part-time student employees who operate the Student Escort Service through the Department of Public Safety. The Student Escort Service is a program that provides free transportation for students within the campus community with a focus on crime prevention.

Residence Coordinator

The Department of Residence Life seeks to intentionally engage students in the integration of a strong liberal arts education with their development as citizens and lifelong learners. The department offers graduate assistantships, as residence coordinators, in a variety of residential areas to help accomplish this effort.

A student must be accepted into a graduate program to be eligible for a residence coordinator position. For more information, please call 937-229-3321. Remuneration includes stipend, room, board, tuition remission and a health insurance option. Submit applications and resumes to:

Department of Residence Life
206 Gosiger Hall
Dayton, Ohio 45469-0965

Residential Living

The University of Dayton maintains a limited number of diverse housing units for graduate students. There are approximately 64 spaces for first-year law students in University housing. Housing needs of upper-class law and graduate students also may be accommodated on a space-available basis. Graduate and law students interested in University housing should contact Residence Life at 937-229-3317 upon their acceptance.

Students are advised to coordinate their housing arrangements as early as possible. If University housing is not available, information can be provided regarding private housing in the Dayton area.

Student Handbook

Each student at the University of Dayton is responsible for knowing and observing the policies, regulations and procedures contained in the official student handbook. This publication also provides useful information on such subjects as University services, student organizations and resource numbers.

The entire Student Handbook is available here (<http://www.udayton.edu/studev>).

All Student Handbook information provided on the website may be printed from personal computers and printers.

The "University of Dayton Student Standards of Behavior" section of the the Student Handbook is printed in booklet form and distributed to all residents of UD owned housing facilities. The handbook is also

available at the Kennedy Union Information Desk for students living in other residences.

Changes in disciplinary policies and procedures made during an academic year will be announced to the student population via campus e-mail. Informing students of policy and procedure changes via campus e-mail is considered official notification. The website version of the Student Handbook will be updated upon implementation of said change.

Student Life and Kennedy Union

A variety of cultural, educational, social, and recreational activities are presented in the Union regularly to enrich and enhance academic life and foster a spirit of community. In addition, this office provides support, direction, and programming opportunities for students and officially recognized student organizations. Activities include theatrical productions, lectures, dance ensembles, and recitals and concerts by students and faculty members. Meeting rooms, a ballroom, Boll Theatre, and University vans are available for use and can be reserved by calling 229-3333 (Kennedy Union Room 241). Information about student organizations can also be found at 229-3333 (Kennedy Union Room 241).

The John F. Kennedy Memorial Union, centrally located on the campus, offers comfortable surroundings and a variety of services for the University community.

- Lounges provide space for discussion, studying, and socializing.
- The Hanger games room on the ground-floor includes:
 - Bowling lanes
 - Pool tables
 - Lounge space
 - A cafe
 - Video game
- The ground-floor food court includes:
 - A full-service deli
 - Pizza
 - Southwest cuisine
 - Daily specials
 - Grill favorites
 - Desserts
- The Union offers:
 - Automatic teller machines
 - Display cases
 - Vending machines
 - As are student offices for:
 - The Campus Activities Board
 - Christmas on Campus
 - Daytonian Yearbook
 - Flyer News
 - Flyer TV
 - Orpheus literary magazine
 - Student Government Association
 - A lounge for commuter students
- Information Center
- Box Office
- Leadership Development Office
- KU Dining Services

- Catering Services
- Travel agency

Student Life and Kennedy Union is responsible for:

- Registering all student organization-sponsored events
- Granting recognition to all student organizations
- Providing assistance for organization advisors
- Publicity approval
- Programming the Flyer TV information channel
- Coordinating campus-wide events

The office works directly with:

- Commuter students
- Flyer News
- Flyer Radio
- Daytonian
- Orpheus
- Campus Activities Board
- Christmas on Campus
- All recognized student organizations

Women's Center

The Women's Center at the University of Dayton is an educational space which serves to enhance the climate for women and men on campus. Located on the second floor of Alumni Hall, the Center, which includes a Resource Center, gallery space and several reservable rooms, advances the full and active participation of women students, staff and faculty who learn and work at the University of Dayton, while promoting campus and community conversations on the role of women in society and the world. The Center accomplishes this mission by facilitating and coordinating programs and initiatives which: promote the physical and psychological well being of women through education, support services and referral; provide an ongoing assessment of the campus climate for women; promote the active and full participation of UD women through service, education, mentoring, networking and advocacy; inculcate leadership skills; address gender-related topics; provide information to the campus community on women's issues; provide a place to build a community of scholarship to advance research on women and gender; create a welcoming and safe space for persons of different racial, social, gender, religious and cultural backgrounds; call women and men of all faiths to explore and incorporate faith-based living into their everyday lives. Connected, distinctive and community-building, the UD Women's Center strives to promote equality, understanding and mutual respect and to foster a strong educational community in which women and men are supported, challenged, and prepared to learn, lead and serve. For more information on the UD Women's Center, visit <http://womenscenter.udayton.edu> or call 937-229-5390.

College of Arts and Sciences

Jason L. Pierce, Dean
 Jonathan A. Hess, Associate Dean
 Donald L. Pair, Associate Dean
 Danielle M. Poe, Associate Dean
 Cynthia T. Shafer, Assistant Dean
 Kimberly A. Trick, Assistant Dean
 Timothy A. Wilbers, Assistant Dean
 Aaron E. Witherspoon, Assistant Dean
 Maura S. Donahue, Director of Budget and Operations

The objectives of graduate work in the College of Arts and Sciences coincide with the general aims and philosophy of education that characterize the University of Dayton.

Programs leading to the Master of Arts or the Master of Science are offered in biology, chemistry, communication, English, mathematics, pastoral ministries, psychology and theological studies. The Department of Computer Science offers the Master of Computer Science. The Master of Public Administration is also offered through the Department of Political Science.

The Department of Physics, as part of the Center for Electro-Optics, offers graduate courses in support of the Master of Science and the Doctor of Philosophy in Electro-Optics. The Doctor of Philosophy degree is also offered by the Department of Biology and the Department of Religious Studies.

Programs of Study

To learn more about the available programs in the College of Arts and Sciences, explore the departments:

- Biology (p. 60)
- Chemistry (p. 63)
- Communication (p. 64)
- Computer Science (p. 67)
- English (p. 69)
- Geology (p. 70)
- Mathematics (p. 71)
- Music (p. 76)
- Philosophy (p. 77)
- Physics (p. 77)
- Political Science/Public Administration Program (p. 77)
- Psychology (p. 80)
- Religious Studies (p. 84)

Biology

- Doctor of Philosophy in Biology
- Master of Science, Biology

Mark G. Nielsen, Department Chairperson
 Amit Singh, Graduate Program Director

Please visit our department website (<https://www.udayton.edu/artssciences/academics/biology>).

The Department of Biology offers programs leading to the Master of Science and the Doctor of Philosophy. The degrees are in biology, but each program is tailored to the student's own interests and career plans. Specialization is accomplished by selection of courses, choice of thesis or dissertation topic, and participation in weekly seminars in the area of interest. The specific program is determined after consultation between the student and the advisory committee. The Department of Biology also offers a Master of Science program without a thesis requirement. Two major areas of specialization are available. These areas and the typical spectra of graduate BIO 101 courses available are as follows:

Environmental/Ecological Sciences

- Field Biology
- Microbial Ecology
- Biochemistry
- Molecular Biology
- Community Ecology
- Behavioral Ecology
- Biometrics
- Advanced Bioinformatics
- Biochemical Genetics
- Evolution and Development
- Ecosystem Dynamics

Basic Biomedical Sciences

- Advanced Developmental Biology
- Biochemical Genetics
- Immunology
- Biochemistry
- Advanced Bioinformatics
- Biometrics
- Advanced Microbiology
- Advanced Cell Biology
- Molecular Biology
- Bioinstrumentation

Assistantships

Qualified applicants are eligible for financial assistance in the form of fellowships, traineeships, and research or teaching assistantships. Students admitted to the doctoral program are given priority for these awards. In addition to a stipend, all appointments with financial aid are exempt from tuition during both the academic year and the summer session. Financial aid is available during the summer on a competitive basis.

Advising

Each student is assigned a provisional advisor for assistance during the first semester. Prior to registration for the second semester each student selects a major professor, who will serve as director of the student's advisory committee. The composition of this committee is representative of the general field of study in which the student expects to work. The committee helps to plan the student's entire program. The committee generally meets with the student twice a year to offer suggestions and assess progress in the program and thesis research.

Doctor of Philosophy in Biology (BIO)

Each student is required to complete each course by the end of the first year:

BIO 552 & BIO 553	Research Methods in Biomedical Science and Research Methods in Ecology	8
BIO 501	Seminar	0
BIO 601	Special Topics	1
Two advanced courses		6

Following completion of the first year, each doctoral student follows the program outlined by the advisory committee. In practice, most students find it helpful to take at least 30 semester hours of graduate course credits beyond the bachelor's degree in addition to 30 credit hours of dissertation research to attain the level of competence suitable for a doctoral candidate. All Ph.D. students who have not taken a biostatistics course as an undergraduate must enroll in BIO 550 Biometrics. Individuals on teaching assistantships must complete the teaching seminar BIO 503 College Teaching Seminar and teach at least one laboratory course during their tenure in the program.

Residence Requirement

A student is strongly advised to devote as much time as possible to graduate studies. To satisfy the residency requirement, Ph.D. students must attend the University as a full-time student. The Ph.D. program is a full-time only program. If the advisory committee encourages attendance of a semester or a summer as a full-time student at a neighboring institution or in an off-campus research site, that time may be applied to the residence requirement.

Sequence of Evaluation

The program is centered on the development of professional competence. Each student is formally assessed in the following steps:

1. A qualifying examination at the beginning of the second year of full-time graduate study for all graduate students.
2. A candidacy examination over the area of specialization (Ph.D. students only).
3. A defense of dissertation.

Each semester the graduate coordinating committee evaluates the overall performance of each student toward obtaining the degree. A student judged to be making unsatisfactory progress may be placed on probation or dismissed from the program. Further details concerning the policies of the graduate program can be found in the Manual for Graduate Studies in the Department of Biology at the University of Dayton.

Qualifying Examination

At the beginning of the second full year of graduate work, all Ph.D. students will take a qualifying examination. An important purpose of the examination is to aid the student's advisory committee in planning the remainder of the program. The examination will cover basic biological concepts, subject matter of graduate courses taken, and broad areas of the student's specialty. The emphasis will be not only on facts but on the student's command of self-expression, ability to reason, and to integrate knowledge.

Utilizing the student's performance in both the written and oral phases of the exam, the advisory committee makes an evaluation and suggests one of the following possible alternatives:

1. The student should continue to work toward completion of the Ph.D. degree.
2. The student should correct obvious deficiencies and retake the written and/or oral examination(s) - (retake must be scheduled no later than the middle of the next semester and result in a clear pass or fail/withdrawal from graduate work).

3. After consultation with the advisory committee, the student should switch to the M.S. program.
4. The student should withdraw from graduate work (student has failed the examination without an opportunity of a second chance).

All other graduate examinations come at specific times in the progress of the student's program and are scheduled and administered by the advisor and advisory committee. These examinations consist of the Ph.D. candidacy examination, and the defense of the Ph.D. dissertation.

Ph.D. Candidacy Examination

The candidacy examination for Ph.D. students is administered by the advisory committee, which may be supplemented by members requested by the committee and/or the department chair. The examination will be taken no later than the end of the sixth semester for those entering the program with a B.S. or M.S. The purpose of the examination is to judge the student's competence in the special area and in related fields. Following the examination, the student may be directed to (a) complete the dissertation, (b) strengthen preparation by demonstrating competence in one or more areas, (c) withdraw from the Ph.D. program and complete a thesis M.S. degree, or (d) withdraw from the program. At the committee's discretion, additional competence in an area may be demonstrated by special examination or by completion of specific courses to the committee's satisfaction. The student is considered a candidate for the Ph.D. after successful completion of these requirements.

Defense of Dissertation

1. The examination on the Ph.D. dissertation will consist of a formal oral examination on the subject matter of the dissertation.
2. A Ph.D. student must present the dissertation for defense within five years after admission to candidacy.

Master of Science in Biology (BIO)

The M.S. degree requires 24 semester hours of coursework plus a research thesis. Each student is required to complete each course by the end of the first year:

BIO 552 & BIO 553	Research Methods in Biomedical Science and Research Methods in Ecology	8
BIO 501	Seminar	0
BIO 601	Special Topics	1
Two advanced courses		6

All M.S. students who have not taken a biostatistics course as an undergraduate must enroll in BIO 550 Biometrics. Individuals on teaching assistantships must complete the teaching seminar BIO 503 College Teaching Seminar and teach at least one laboratory course during their tenure in the program.

Students declaring the M.S. non-thesis option are required to complete 30 hours of coursework consisting of the aforementioned courses.

A research paper is required, and the subject matter of the paper is determined by the advisory committee.

Combined B.S./M.S. Program

The B.S./M.S. in Biology is an accelerated, highly structured program designed for students who show an early interest in, and a strong potential for, research in the biological sciences. The combined program provides an undergraduate liberal arts education, a broad, basic background in the biological sciences, the development of expertise in a biological subfield, and thorough introduction to research instrumentation and techniques. Graduates from the program are prepared for either direct entry into the job market or for continuation toward the Ph.D.

degree. The combined B.S./M.S. Program in Biology is open only to students pursuing a B.S. degree in Biology or Environmental Biology at the University of Dayton. Interested students should apply by October 15th of their Junior Year (or credit hour equivalent) of undergraduate education. Qualified students will have a minimum of a 3.5 science GPA (BCMP). The general GRE is required for admission to the program. Applicants are conditionally admitted to the program until completion of their B.S. degree, after which they will be officially admitted into the program. Students will be expected to begin Honors undergraduate thesis research in the summer prior to their 4th year of undergraduate education. The undergraduate B.S. degree in Biology or Environmental Biology will be awarded at the completion of the 4th year. The fifth year is devoted to graduate coursework and thesis research. Students are expected to maintain a graduate GPA of 3.5. Students will be expected to conduct research during the summer between the 3rd and 4th, 4th and 5th year, and the summer after their 5th year with defense of the M.S. thesis anticipated for August of that summer. The master's degree in Biology is awarded upon the successful defense of the M.S. thesis. No tuition waivers or financial support exists for the 5th year of this program, though summer research fellowship support is available on a competitive basis. Applications can be submitted through the online UD Graduate School application site: <https://www.udayton.edu/academics/graduate/index.php>. Please indicate the B.S./M.S. option on your application.

Residence Requirement

A student is strongly advised to devote as much time as possible to graduate studies. To satisfy the residency requirement, M.S. students must attend the University as a full-time student for at least one full year. If the advisory committee encourages attendance of a semester or a summer as a full-time student at a neighboring institution or in an off-campus research site, that time may be applied to the residence requirement.

Sequence of Evaluation

The program is centered on development of professional competence. Each student is formally assessed in the following steps:

1. A qualifying examination at the beginning of the second year of full-time graduate study for all graduate students.
2. A defense of thesis.

Each semester the graduate coordinating committee evaluates the overall performance of each student toward obtaining the degree. A student judged to be making unsatisfactory progress may be placed on probation or dismissed from the program. Further details concerning the policies of the graduate program can be found in the Manual for Graduate Studies in the Department of Biology at the University of Dayton.

Qualifying Examination

At the beginning of the second full year of graduate work, all M.S. students will take a qualifying examination. An important purpose of the examination is to aid the student's committee in planning the remainder of the program. The examination will cover basic biological concepts, subject matter of graduate courses taken, and broad areas of the student's specialty. The emphasis will be not only on facts but on the student's command of self-expression, ability to reason, and to integrate knowledge.

Utilizing the student's performance in both the written and oral phases of the exam, the advisory committee makes an evaluation and suggests one of the following possible alternatives:

1. The student should continue to work toward completion of the M.S. degree.

2. The student should correct obvious deficiencies and retake the written and/or oral examination(s) - (retake must be scheduled no later than the middle of the next semester and result in a clear pass or fail/withdrawal from graduate work).
3. The student should withdraw from graduate work (student has failed the examination without an opportunity of a second chance).
4. M.S. students who show outstanding ability and wish to proceed toward the Ph.D. may be encouraged to stay at UD. They are required to pass the qualifying exam, present and defend an oral research progress report, and Ph.D. proposal to their advisory committee in their third semester of the program. The advisory committee will decide if the student shows sufficient ability to enter the Ph.D. program. Upon positive recommendation from the advisory committee, the student must submit a formal application for admission to the Ph.D. program to the Admissions Committee by the third week of their fourth semester of the program. The Admissions Committee will make the final recommendation regarding their acceptance. If accepted, the student must conform to all requirements of the Ph.D. program.
5. At the time of the qualifying exam, both the student and advisory committee have the final opportunity to review the choice of the M.S. program - thesis or non-thesis option. For the non-thesis option, the nature of the requirements should be specified by the advisory committee. If under unusual circumstances, a student wishes to change options after this date and the advisory committee concurs, it should be recognized that this may result in an additional semester or more of work. However, consideration should be given to the availability of support for continuation of a M.S. program beyond two years.

Students who choose to complete a Master's degree are considered candidates for that degree after the qualifying examination. A student who wishes to continue beyond the Master's degree will be advised to continue for the doctorate (see requirements above) or to terminate his/her studies at the university on the basis of his/her performance in earning the Master's degree.

All other graduate examinations come at specific times in the progress of the student's program and are scheduled and administered by the advisor and advisory committee. These examinations consist of the defense of M.S. thesis and the final M.S. non-thesis program exam.

Defense of Thesis

1. The examination on the M.S. thesis will consist of a formal oral examination on the subject matter of the thesis.
2. For students electing the non-thesis option, an oral examination is held over the subject matter of the research paper.
3. All those working toward the master's degree must complete the program within five years after admission to the program.

Courses

BIO 501. Seminar. 0 Hours

Presentation of biological research data by faculty members and visiting scientists. Required of all graduate students each semester.

BIO 503. College Teaching Seminar. 1 Hour

To assist graduate teaching assistants in acquiring information, understanding, and skills seen as important components of effective teaching.

BIO 509. Ecological Restoration. 3 Hours

Principles and practices of ecological restoration. The course presents the rationale and knowledge needed to understand, appreciate, plan and perform ecological restoration. Prerequisite(s): Graduate status.

BIO 511. Ecosystem Dynamics. 3 Hours

An advanced course examining ecosystem structure and function. Emphasis on community level interactions, applied ecology and the ways in which ecosystem biodiversity can be influenced by the biotic and abiotic forces of the environment, including the global impact of the human species.

BIO 522. Immunology. 3 Hours

Study of innate and acquired immunity, cells and organs of the immune system, antigens and immunoglobulins. Specific emphasis on the organization and expression of immunoglobulin genes; genetic restriction; cytokines and immune regulation including hypersensitivity, immune tolerance, transplantation and autoimmunity. Biochemistry recommended.

BIO 535. Problems in Field Biology. 1-3 Hours

Course designed to acquaint students with field-oriented problems in biology.

BIO 545. Evolution & Development. 3 Hours

Molecular and population genetic examination of the evolution of animal form. Topics include comparative developmental biology, population genetics, and molecular evolution. Prerequisite(s): Student status in Biology or permission of instructor.

BIO 550. Biometrics. 3 Hours

Design and analysis of experiments in quantitative biology. Parametric and nonparametric analyses of both laboratory and field-generated data sets.

BIO 551. Laboratory Skills in the Biological Sciences. 2 Hours

Laboratory Skills in the Biological Sciences (BIO 552-P3), taught in the Department of Biology, is tailored to introduce our graduate students to this fast changing field of research by teaching shared methodologies and techniques involved in biology.

BIO 552. Research Methods in Biomedical Science. 4 Hours

Theory and applications of protein and nucleic acid techniques designed to acquaint students with advanced laboratory techniques used in biological research.

BIO 553. Research Methods in Ecology. 4 Hours

Advanced research techniques and instrumentation in Ecology and Field Biology. Prerequisite(s): Graduate Student Standing.

BIO 554. Scientific Practice. 2 Hours

Students are prepared for practicing aspects of a scientific profession. Scientific ethics, grant and manuscript writing, internal regulatory boards, and intellectual properties are covered. This course also covers topics in the responsible conduct of research drawing from case studies from the Association of American Medical Colleges and the NIH. Students will review case studies in preparation for class discussion. Graduate Student Standing.

BIO 555. Laboratory Techniques (Topic). 1-3 Hours

Advanced treatment of new techniques and instrumentation used in specialized areas of biology. Changes with advances in a specialty are reflected in the course title.

BIO 594. Molecular Biology - Theory & Practice. 3 Hours

Introduction to the theory and practice of molecular biology techniques. Topics and laboratory exercises include the enzymatic manipulation of DNA and RNA, Southern and Northern blotting, library screening, DNA sequencing, DNA amplification, and gene promoter structure and function.

BIO 596. Current Biology Problems. 1-3 Hours

Consideration of recent developments in biological thought and procedure. Prerequisite(s): Permission of department chairperson.

BIO 599. Thesis. 1-6 Hours

Research for the master's degree.

BIO 601. Special Topics. 1 Hour

Development, presentation, and discussion of topics in specialized areas of biology. Required of graduate students each semester.

BIO 699. Dissertation. 1-6 Hours

Research for the doctoral degree.

Chemistry

- Master of Science, Chemistry

David W. Johnson, Department Chairperson

Kevin M. Church, Graduate Program Director

The Department of Chemistry offers graduate programs leading to the Master of Science in chemistry.

The purpose of the master's program in chemistry is to present a rigorous approach to modern chemical theories and research.

The student and advisor determine the composition of the program of study with the approval of the graduate committee. All candidates for the Master of Science are required to submit proof of their ability to do independent work. Normally, this proof takes the form of a research thesis. Additional coursework may be substituted if the student has previously demonstrated research proficiency commensurate with a master's degree as judged by the graduate committee.

Assistantships

Teaching assistantships requiring a maximum of nine hours of laboratory instruction per week are available. The stipend for a 9 to 12 month appointment is supplemented by tuition remission for graduate coursework. Appointment as a teaching assistant requires fluency in spoken English. Research assistantships in selected areas are sometimes available.

Master of Science in Chemistry (CHM)

A minimum of 30 semester hours of graduate coursework is required for the Master of Science. This includes 21-24 semester hours of coursework and 6-9 hours of research. The student and advisor determine the composition of the program of study with the approval of the graduate committee. All candidates for the Master of Science are required to submit proof of their ability to do independent work. Normally, this proof takes the form of a research thesis. Additional coursework may be substituted if the student has previously demonstrated research proficiency commensurate with a Master's degree as judged by the graduate committee.

Non-Thesis Option

CHM 541	Topics in Physical Chemistry	3
CHM 515 & 515L	Analytical Chemistry and Analytical Chemistry Laboratory	4

CHM 512	Intermediate Organic Chemistry	3
CHM 517	Inorganic Chemistry	3
Select four courses from:		12
CHM 550	Special Topics in Organic Chemistry	
CHM 544	Coordination Chemistry	
CHM 546	Special Topics in Modern Analytical Chemistry	
CHM 539	Special Topics in Physical Chemistry	
CHM 552	General Biochemistry II	
Electives		6
Total Hours		31

Courses

CHM 512. Intermediate Organic Chemistry. 3 Hours

Modern theory of organic chemistry and reaction mechanisms. Prerequisite(s): CHM 314 or equivalent.

CHM 515. Analytical Chemistry. 2 Hours

Methods of analysis based on modern instrumentation including chemical, electrical, and spectral methods. Prerequisite(s): CHM 201 or CHM 302 or CHM 304.

CHM 515L. Analytical Chemistry Laboratory. 2 Hours

Laboratory course to accompany CHM 515.

CHM 517. Inorganic Chemistry. 3 Hours

An introductory course. The fundamentals of modern inorganic chemistry including atomic structure, principles of structure and bonding, acid-based chemistry, periodicity, coordination compounds, nonaqueous solvents, electrochemistry, molecular symmetry, and the chemistry of representative elements.

CHM 525. Principles of Organic Chemistry. 3 Hours

An introduction to the fundamentals of organic chemistry. Prerequisite(s): CHM 124.

CHM 526. Principles of Organic Chemistry. 3 Hours

An introduction to the fundamentals of organic chemistry. Prerequisite(s): CHM 124.

CHM 528. Theoretical Principles of Chemistry. 3 Hours

No description available. Prerequisite(s): MTH 218.

CHM 528L. Theoretical Principles of Chemistry Laboratory. 1 Hour

Laboratory course to accompany CHM 527 - CHM 528. One three-hour laboratory per week.

CHM 536. Biosynthetic Organic Chemistry. 3 Hours

Mechanistic fundamentals of the biosynthesis and transformation of organic natural products, with special emphasis on medicinal compounds, toxins, pheromones and other secondary metabolite structures. Prerequisite(s): CHM 314, CHM 314L or equivalent.

CHM 539. Special Topics in Physical Chemistry. 3 Hours

Topics of current interest in areas such as chemical instrumentation, electronics, physical biochemistry, macromolecular chemistry, and spectroscopy.

CHM 541. Topics in Physical Chemistry. 3 Hours

Modern aspects of physical chemistry, which may include the solid state, electrochemistry, or mathematical methods of physical chemistry.

CHM 544. Coordination Chemistry. 3 Hours

Properties of transition metal ions, reaction mechanisms in coordination compounds, bioinorganic systems, electron transfer mechanisms, and the experimental tools common to coordination chemistry. Prerequisite(s): CHM 517 or equivalent.

CHM 546. Special Topics in Modern Analytical Chemistry. 3 Hours

Modern analytical methods. Subject matter may include NMR, EPR, electroanalytical methods, GLC, mass spectrometry, IR and Raman spectroscopies, visible and ultraviolet spectrophotometric methods, X-ray techniques, ESCA and Auger spectroscopies, atomic absorption, and fluorescence.

CHM 550. Special Topics in Organic Chemistry. 3 Hours

Modern physical organic chemistry, spectroscopy, photochemistry, molecular rearrangements, stereochemistry, and natural products.

CHM 551. General Biochemistry I. 3 Hours

Discussion of the chemistry and biochemistry of carbohydrates, amino acids, proteins, and nucleic acids, including health-science and methodologic aspects. Descriptions of enzymology, protein purification, and carbohydrate metabolism related to such topics as bioenergetics, membranes, and disease processes. prerequisite(s): CHM 201, CHM 314.

CHM 552. General Biochemistry II. 3 Hours

Discussion of selected topics in bioenergetics, and metabolism of lipids, amino acids, porphyrins, nucleic acids, and proteins. Current aspects of nutrition, biochemical genetics, endocrinology, regulation, and genetic engineering are addressed and related to health-science topics as time permits. Prerequisite(s): CHM 551.

CHM 553. Topics in Biochemistry. 1-3 Hours

Topics of current interest in biochemistry. Prerequisite(s): (CHM 551 or CHM 552) or permission of instructor.

CHM 554. Directed Readings. 1-3 Hours

Readings in Chemistry.

CHM 555. Modern Trends in Chemistry. 3 Hours

An advanced topics course that offers an up-to-date treatment of new areas of research. Possible subjects to be offered in this course include, but are not limited to, synthetic chemistry of natural and medicinal products, nano-materials/polymer chemistry, and advanced biochemical topics. Prerequisite(s): Graduate standing.

CHM 557. Biophysical Chemistry. 3 Hours

No description available.

CHM 560. Research I. 0-9 Hours

Research.

CHM 561. Research II. 0-9 Hours

Research.

Communication

- Master of Arts, Communication

Jon Hess, Department Chairperson

JeeHee Han, Director of Graduate Studies

The graduate program in Communication leads to a Master of Arts degree.

Course work within the Department of Communication focuses upon symbolic processes in human communication in a variety of contexts including health communication, organizational communication, and mass communication. The program will provide a solid grounding in research,

theory, message development, and analysis to prepare graduates for careers in education, business, mass media, and/or government. The master's student should begin study in the Department of Communication with the standard undergraduate competencies. If the student lacks such competencies, they should be developed prior to attempting the master's program. Students receiving the master's degree from the Department of Communication must:

1. Have a thorough grounding in theories relevant to a particular area of interest, and have the ability to apply this knowledge to the solution of a variety of communication-related problems;
2. Have been exposed to a variety of research and analytical or critical methods, have a basic understanding of these, and have demonstrated a working command of at least one methodology; and
3. Have a basic knowledge of and appreciation for approaches to the study of communication from a variety of perspectives.

Assistantships

A small number of graduate teaching assistantships are available annually. The assistantships carry a stipend and tuition remission for courses required for the degree. The assistantships are for one year with possible renewal for one additional year. No student can receive an assistantship for more than two academic years. Assistantships are only offered for the Fall term. The deadline for applying for an assistantship is March 9th.

The minimum requirements for assistantship in the department are:

1. The equivalent of an academic minor in communication and related areas or a demonstrated successful professional background in a communication-oriented occupation for a minimum of three years.
2. A 3.0 undergraduate cumulative point average (or the equivalent) and a 3.0 in the academic major or minor (communication).
3. Admission to the master's degree program in communication on regular status.

Advising

The advisor serves the student in planning the program of study, supervising the administration of comprehensive examinations, and (when appropriate) directing the student's thesis project.

The graduate program director serves as a temporary advisor to assist the student with initial enrollment and program planning. The student should choose a permanent advisor from among available communication faculty before the middle of the second semester (or completion of nine semester hours). The student must gain approval from the faculty member and the program director before the faculty member will be appointed as permanent advisor. Subsequent changes of advisor require approval of the program director.

After consultation with the permanent advisor, the student should submit a proposed program plan (on the forms provided by the program director) no later than the end of 12 semester hours. A copy of the proposed program should be on file in the program director's office.

Master of Arts in Communication (CMM)

General Requirements

All students enrolled in the program are subject to the following general requirements.

COM 501	Communication Research & Methods	3
COM 536	Theories & Models of Communication	3
COM 502	Rhetorical Criticism	3

or COM 503	Communication Research Seminar	
COM 517	Organizational Communication	3
or COM 571	Mass Communication Processes & Effects	
Total Hours		12

1. The number of semester hours as specified by the program options described below.
2. All students must complete the following core requirements:
3. Demonstration of satisfactory progress toward the degree which includes the requirement that students maintain a minimum average of B (3.0) in coursework. Students who fail to meet this requirement will be dismissed from the program.
4. Students are permitted no more than six semester hours with grades of C or lower. Students who fail to meet this requirement will be dismissed from the program.
5. It is the student's responsibility to know and to meet the requirements of the University and of the Department of Communication graduate program.

NOTE: It is expected that each master's students will enroll in the required core courses as early as possible.

Program A - Communication Non-Thesis Option

Program A consists of 36 semester hours of coursework, of which 24 semester hours must be from the Department of Communication. Students who choose Program A are required to successfully complete the core requirements as early as possible in the academic program. Students in Program A are encouraged to complete a capstone project or independent study project in their final semester of coursework.

Program B - Communication Thesis Option

Program B consists of 30 to 33 semester hours of coursework, 18 semester hours of which must be from the Department of Communication. In addition, students complete three to six credit hours of COM 598 Thesis and/or COM 599 Thesis.

The student will select a thesis committee consisting of the advisor and at least two other faculty members. (One of the faculty members may be from outside the Department of Communication.) Students may register for three semester hours of COM 598 Thesis during the term that the prospectus will be presented to the thesis committee for approval.

The thesis should report original research on some important question relevant to the study of communication. The prospectus should also include a detailed description of the research methods to be used as well as suggested analytic techniques.

The prospectus will be developed in consultation with the thesis advisor, although the student must have the methodological competence necessary to complete the proposed project. Once the prospectus is approved by the advisor, it must be presented to the thesis committee for approval. The completed prospectus will constitute the first half of the thesis and serves, essentially, as a contract between the student and the committee.

After the prospectus has been approved, the student may register for an additional three hours of thesis credit while completing COM 599 Thesis. The student will then collect and analyze the data required to answer the questions raised in the prospectus. Once this has been completed, the prospectus will become the first half of the thesis, followed by a chapter reporting the results of the study and a chapter discussing the implications of those results. The thesis will be revised until the advisor considers it satisfactory, at which time it will be presented to the members of the thesis committee by the student, who will orally defend the thesis in

an examination conducted by the thesis committee. The master's degree is not completed until the thesis has been approved by the committee.

Should a student fail the final oral defense, the thesis may be defended again, provided the student's thesis committee recommends a second attempt. The second attempt to defend the thesis will be final. Failure of the second oral defense will require a majority vote of the student's thesis committee.

Program C - Communication/Interdisciplinary

Courses in business administration, English, psychology, and political science have been designated for Communication/Interdisciplinary study leading to the Master of Arts.

Students take 36 semester hours of coursework; 24 of those hours must be in communication and 12 in one of the interdisciplinary areas. Students who choose Program C are required to successfully complete the core requirements.

Program D - 5 Year BA + MA

A five-year BA+MA program in communication is also available. Communication majors maintaining a 3.2 overall GPA are invited to apply during their junior year. Students accepted into the program will take two graduate courses during their senior year. These six credits will count toward their MA degree as well as toward their BA degree. Contact the Director of Graduate Studies at 937-229-2486 for further information about the program.

Courses

COM 501. Communication Research & Methods. 3 Hours

Introduction to the study of communication research and methods. Required course for all communication graduate students.

COM 502. Rhetorical Criticism. 3 Hours

Critical survey and application of traditional to contemporary methods of rhetorical criticism.

COM 503. Communication Research Seminar. 3 Hours

Focused study on the methods and process of conducting communication-related research. Builds upon fundamentals covered in COM 501. Prerequisite(s): COM 501.

COM 504. Principles of Communication Education. 3 Hours

No description available.

COM 506. Ethics of Communication. 3 Hours

Investigation and application of the general ethical principles of persuasion and the special problems related to professional areas: platform and business communication, electronic and print journalism, public relations, classroom communication, and forensic behavior.

COM 508. Interpersonal Communication. 3 Hours

Focus on the theories, concepts, constructs, and research related to the process of interpersonal communication.

COM 511. Theories of Persuasion. 3 Hours

An examination of the major approaches to the study of persuasion from classical rhetorical to contemporary behavioral theorists.

COM 515. Language & Meaning. 3 Hours

Focuses on the origin and development of language and meaning. Comprehensive exploration of the many perspectives and theories of language and meaning.

COM 517. Organizational Communication. 3 Hours

A study of communication activities within organizations: theories and systems of organizational communication, internal communication systems, research methods, and the interface of management and communication.

COM 520. Public Communication Campaigns. 3 Hours

Investigation of noncommercial public communication campaigns concentrating on social change or public information. Analysis and development of campaigns through mass media, organizational, group and interpersonal communication.

COM 525. Communication Training & Development. 3 Hours

No description available.

COM 526. Communication Consulting. 3 Hours

No description available.

COM 530. Development of Mass Media. 3 Hours

History and analysis of the development and interdependence of mass media, print and electronic. Emphasis on its role and responsibility in political and economic progress of the U.S.

COM 531. Directed Study of Communication. 1-3 Hours

An intensive study of a specialized area of communication selected through consultation with the instructor. Permission. May be repeated for up to six semester hours.

COM 536. Theories & Models of Communication. 3 Hours

Survey and analysis of current theories and models of communication. Required course for all communication graduate students.

COM 537. Conflict Management. 3 Hours

An analysis of the role of communication in the process of conflict, with special emphasis on communication strategies for managing conflict. Special focus on types of conflict, conflict contexts, power, and communication style.

COM 547. Seminar in Health Communications. 3 Hours

An examination of communication theory and research related to health care. Issues include reassurance, the role of the patient, interviews, health organizations, the media and health, compliance, providing explanations, and health care professions frequently neglected.

COM 555. Public Relations. 3 Hours

Focuses on the theoretical principles behind the current-day practice of public relations. Special emphasis on public opinion, diffusion, persuasion, problem analysis, and audience assessment within the PR context.

COM 562. Topics in Communication. 3 Hours

Selected topics in communication, for example: argumentation, listening, law and the news media, historical and contemporary public address and criticism. Repeated when topic and instructor change.

COM 571. Mass Communication Processes & Effects. 3 Hours

An examination of the historical and current research as it relates to our understanding of the processes and effects of mass communication.

COM 598. Thesis. 3 Hours

Thesis.

COM 599. Thesis. 3 Hours

Thesis.

COM 617. Organizational Rhetoric & Symbolism. 3 Hours

No description available.

COM 620. Election Campaign Communication. 3 Hours

Survey of communication research and theories concerning election campaign communication including candidates, voters and the media. Analysis of campaign communication including development of appropriate research methodologies.

COM 622. Propaganda Analysis. 3 Hours

An examination of the foundations of modern propaganda analysis. Topics include classical rhetorical contributions to argumentative analysis; historical development of propaganda; points of propaganda analysis. Special emphasis on modern mediated propaganda from World War I to the present.

COM 630. International Communication. 3 Hours

Discussion of current issues in international communication. Possible topics include international news flow, globalization of mass media, communication and development, comparative mass media, mass media in political revolutions, democracy and terrorism.

Computer Science

- Master of Computer Science

Medhi Zargham, Department Chairperson

Graduate Committee: James Buckley, Raghava Gowda, Zhongmei Yao

The graduate program in computer science offers a comprehensive approach to the theory and application of computer science. Graduates of the program will have:

1. A thorough grounding in the theory of computing science and the ability to apply that knowledge to a variety of problem areas,
2. Been exposed to a variety of analytical methods and will demonstrate a basic understanding of those methods, and
3. Been exposed to a wide breadth of computer science information by having studied several of the dominant sub-disciplines of computer science.

The program is individualized to meet each student's needs and provides a firm foundation for continuing on to the doctorate or a professional career. The program accommodates both full-time and part-time students.

Assistantships

Graduate assistantships are offered to qualified students for assisting with introductory computer science courses and assisting faculty with research. Competent assistants making satisfactory progress toward the degree can normally renew their assistantships for a second year. Recipients are expected to complete the requirements for the master's degree in two years. Assistants contribute half-time service of 20 hours per week. Stipends and complete tuition remission for six semester hours per term are provided. Detailed information and application forms may be obtained from the Department of Computer Science.

Additional Information

See http://www.udayton.edu/artssciences/computerscience_grad for additional and recent information on the Department of Computer Science graduate program; see <https://www.udayton.edu/academics/graduate/index.php> for admission requirements for the Department of Computer Science graduate program; see <http://gradschool.udayton.edu/> for general information on the University of Dayton Graduate School.

Master of Computer Science (CPS)

The degree requires 33 semester hours.

Each student's program requires the advance approval of a faculty advisor. A student failing to make normal progress will be required to withdraw from the program.

The student seeking admission should have a Bachelor's degree from an accredited institution of higher education with a cumulative grade point average of at least 3.0 out of 4.0. For success in the program the student should have the equivalent of at least one year of college mathematics which is normally calculus. A few of the graduate courses, in addition to the calculus, cover topics such as linear algebra, statistics, and discrete mathematics as prerequisites.

Students are expected to have a better than average knowledge of algorithm construction and implementation of algorithms in an object-oriented language. Students are encouraged to take CPS 501 during their first term as a graduate student. This course counts towards the 30 graduate semester hours needed for the degree. They should discuss this with the Graduate Program Director prior to registering for any courses.

Graduate credit from other accredited institutions of graduate learning will be reviewed by the graduate committees. Transfer of such credit may be accepted up to a maximum of six semester hours.

Academics

The degree requires thirty semester hours, as follows:

- Required Core Courses – nine semester hours as follows:
 - One course from either CPS 530 Algorithm Design or CPS 543 Comparative Language
 - One course from either CPS 536 Operating Systems I or CPS 570 Data Communications
 - One course from either CPS 510 Systems Analysis or CPS 542 Database Management Systems
- CPS Electives – fifteen semester hours from CPS courses numbered 510 and above. Up to six of these semester hours can be 400-level CPS courses and must be approved by an advisor. Up to six of these semester hours can be taken from graduate courses of other university departments (with advisor approval).
- Culminating Experience – six semester hours, from one of the following three options:
 - 1) CPS 599 Thesis
 - 2) CPS 595 and CPS 596 Software Engineering Project
 - 3) Additional CPS courses numbered 510 and above

Each student's program requires the advance approval of a faculty advisor. A student failing to make normal progress will be required to withdraw from the program.

Courses

CPS 501. Advanced Programming and Data Structures. 3 Hours

A bridge course for students who already have a programming background. Covers advanced data structures and programming techniques in a high level programming language.

CPS 509. Topics in Computer Science. 1-3 Hours

Lectures in special areas of interest determined by the department. May be taken more than once for additional credit when the topics or contents change. Prerequisite(s): Permission of department chairperson.

CPS 510. System Analysis. 3 Hours

Process-oriented, data-oriented, and object-oriented approaches for systems development; comparison of various systems development life cycles; DFD methodology for systems analysis using state-of-the-art CASE (Computer Aided Software Engineering) tools; logical and event analyses of DFD specifications; tools and techniques for modeling real-time systems; data modeling; introduction to object-oriented analysis methodologies. Prerequisite(s): CPS 350.

CPS 512. System Design. 3 Hours

Principles of design, introduction to software design methodologies; issues in transition from analysis to logical and physical designs; detailed discussion of structured design methodology (Yourdon, Constantine, Myers); design guidelines; transform analysis; Warnier/Orr design methodologies; designing methodologies for real-time systems; introduction to object-oriented design; CASE tools and code generators. Prerequisite(s): CPS 510.

CPS 518. Software Engineering. 3 Hours

No description available.

CPS 520. Object-Oriented Systems Development. 3 Hours

Unified Modeling Language (UML), use cases, class diagrams, sequence diagrams, collaboration diagrams, state charts, activity diagrams, component and deployment views, design patterns, and implementation of various UML models through team projects. Prerequisite(s): CPS 350, CPS 510.

CPS 522. Software Project Management. 3 Hours

Cost and effort estimation models for software projects, planning techniques, productivity metrics, risk management, maintenance, reuse, quality assurance, configuration management, Capability Maturity Models (CMM and P-CMM), and ISO 9001. Prerequisite(s): CPS 510 or CPS 518 or CPS 520.

CPS 530. Algorithm Design. 3 Hours

The design and analysis of computer algorithms, including order notation, sorting, dynamic programming, graph algorithms, string matching, matrix multiplication, NP-completeness. Prerequisite(s): CPS 350.

CPS 534. Distributed Computing with Big Data. 3 Hours

This course introduces students to distributed computation frameworks (such as MapReduce) associated with massive datasets. Topics focus on parallel/distributed algorithms, data mining and machine learning algorithms for processing and analyzing very large amounts of data, and data visualization. Prerequisite(s): CPS 350.

CPS 536. Operating Systems I. 3 Hours

Models and algorithms pertinent to the design of computer operating systems; concurrent processes including synchronization, communication and deadlock problems, process and device scheduling policies, design of file systems, reliability and protection. Prerequisite(s): CPS 350.

CPS 542. Database Management Systems. 3 Hours

Physical and logical organization of data files; hierarchical, network, and relational database models; data definition language and data manipulation language of a commercial database management system; query languages. Prerequisite(s): CPS 350.

CPS 543. Advanced Concepts of Programming Languages. 3 Hours

This course involves the study of advanced programming language concepts and paradigms. Possible topics, covered at the discretion of the instructor, include metalinguistic abstraction and macros, fixed-point combinators, reflection and meta-object protocols, and generative and aspect-oriented programming with emphasis on applying these concepts in practical application domains. Prerequisite(s): CPS 352.

CPS 544. Systems Programming. 3 Hours

Analysis of compilers and their construction; programming techniques discussed in the current literature; advanced computer applications in both mathematical and nonnumeric areas. Prerequisite(s): CPS 350.

CPS 552. Discrete Event Simulation Techniques. 3 Hours

Simulation models; random number generation testing, special purpose simulation languages, statistical analysis of output; regenerative models; trace-driven models. Emphasis on models related to computer operating system design and performance evaluation. Prerequisite(s): CPS 350; statistics.

CPS 560. Computer Graphics. 3 Hours

Types of graphic hardware and their characteristics. Overview of software and techniques used in computer graphics. Two- and three-dimensional graphics displays. Prerequisite(s): CPS 350; programming ability in a procedure-oriented language.

CPS 561. Virtual Reality. 3 Hours

This course offers a broad introduction of virtual reality from fundamental theories to software/hardware technologies involved with the current state of the art in VR. Topics include 3D interaction techniques on virtual immersive systems, human pose/face/hands tracking, graphics and 3D animation collaborative networked virtual environment, augmented reality systems, and security. Some unforeseen security issues in many emerging VR systems are also addressed. Prerequisite(s): CPS 350.

CPS 562. Database Management Systems II. 3 Hours

Study of query execution and optimization, transaction management, concurrency control, recovery and security techniques. Advanced data models and emerging trends in database systems, like object-oriented database systems, distributed database systems, client-server architecture, multidatabase and heterogeneous systems. Other current database topics and emerging technologies will be discussed. Prerequisite(s): CPS 542.

CPS 566. Image Processing. 3 Hours

This course introduces students to a wide range of topics on digital image processing techniques. Topics includes image enhancement, 2D linear and nonlinear filtering, image compression and restoration, pattern recognition, big visual data analysis, and stochastic modeling on images. Prerequisite(s): CPS 350.

CPS 570. Data Communications. 3 Hours

The study of networks of interacting computers. The analysis of distributed processing and distributed databases. Prerequisite(s): CPS 350.

CPS 572. Computer Networking. 3 Hours

A unified view of the broad field of local area and long haul networks. A survey of the state of the art. Topics covered include networking theory, design approaches, standards, topologies and protocols. Prerequisite(s): CPS 536, CPS 570.

CPS 577. Computer System Design I. 3 Hours

Introduction to design and analysis of combinational and sequential circuits of MSI devices to design arithmetic and other computer functions. Analysis of a specific microcomputer architecture including usage of its machine and assembler language. Interfacing of various components with computers. Prerequisite(s): CPS 250.

CPS 580. Artificial Intelligence. 3 Hours

Presentation of theoretical concepts for artificial intelligence in the areas of knowledge representation and search techniques. These are examined in the context of applications for expert systems, semantic networks, and planning problems. Issues concerning functional programming and logic programming are also presented. Prerequisite(s): CPS 350.

CPS 581. Advanced Artificial Intelligence. 3 Hours

This course continues the studies pursued in Artificial Intelligence CPS 580. It delves more deeply into certain areas such as multiple agent systems and induction, and introduces new areas, such as neural networks and planning, not covered in CPS 580. As in CPS 580, each student shall complete a final project investigating some area of research in Artificial Intelligence. The project will encompass a literature search, paper, presentation, and implementation.

CPS 582. Automata Theory. 3 Hours

Finite automata, sequential machines. Turing machines, computability, existence of self-reproducing machines. Prerequisite(s): CPS 528.

CPS 583. Graph Algorithms. 3 Hours

Design and analysis of algorithms for problems based on graphs. Classical algorithms and efficient algorithms for restricted domains of graphs are covered. Analysis of algorithms, complexity classes P, NP, and NP-complete, traversals, bi-connectedness, strongly-connectedness, 2-SAT, planarity testing, and algorithms for restricted classes of graphs. Prerequisite(s): CPS 501.

CPS 591. Special Research Problems. 1-3 Hours

Individual readings and research in a specialized area. May be taken for at most six semester hours. Prerequisite(s): Permission of department chairperson.

CPS 592. Special Topics. 1-3 Hours

Lectures and/or laboratory experience in some areas determined by the department. Prerequisite(s): Permission of department chairperson.

CPS 595. Software Engineering Project I. 3 Hours

First of a two-course project sequence. Students, either individually or in teams, must propose a project, conduct background research, justify the adequacy of the work for a graduate project, complete analysis and design using appropriate methodologies and CASE tools, and write preliminary coding. Students are expected to write code and minimize the usage of visual or other development environments. A minimum of three class presentations is expected for project proposal, progress, and final analysis/design. Prerequisite(s): (CPS 510, CPS 530); permission of department chairperson.

CPS 596. Software Project II. 3 Hours

Continuation of CPS 595. Students are required to implement the analysis and design of their projects and make periodic presentations. Special attention needs to be given to the overall architecture of the system, usability, testing, and documentation. A minimum of two class presentations is expected for design and implementation. Prerequisite(s): CPS 595.

CPS 599. Thesis. 3-6 Hours

Thesis.

English

- Master of Arts, English

R. Andrew Slade, Chairperson

Tereza Szeghi, Graduate Program Director

The English graduate program leading to the Master of Arts degree allows students to concentrate in one of the following track options:

1. English and American literature
2. Writing
3. Teaching

The program accommodates both full-time and part-time students, allows them to achieve different goals, and prepares them for a wide variety of careers. The English and American literature track serves prospective Ph.D. students in literature and students generally seeking greater literary understanding or research skills; the writing track prepares students who go on to doctoral programs in rhetoric, composition, and writing as well as those seeking careers in professional, business, technical, or creative writing; the teaching track provides students with advanced work in the content area for teachers of English.

Assistantships

Graduate teaching assistantships are offered to a select number of qualified students in the M.A. program. Assistantships provide tuition remission for the 30-hour program, a stipend, and benefits. Applications for assistantships are part of the online admission form. Students making satisfactory progress toward their degree who also have a strong teaching record may renew their contract for a second year. Teaching assistants can expect to assist faculty in teaching or research, work as consultants in the Write Place (the University's writing center), and in the second-year may teach in the department's composition program.

Master of Arts in English (ENG)

Normally 30 semester hours are required. Every student who has attained a grade point average of at least 3.00, after completing 12 hours of graduate work, will take a Diagnostic Examination. This examination will be reviewed by a faculty committee consisting of the candidate's advisor, the graduate program director, and another member of the graduate faculty or staff.

ENG 601 Grad Studies in ENG is required of applicants for the degree and should be taken during the students' first semester. ENG 588 Literary Theory or another appropriate theory course (approved by the Director of Graduate Studies) is required of each student in the literature track. ENG 596 Composition Theory or another appropriate theory course (approved by the Director of Graduate Studies) is required of each applicant in the writing track. Students in the teaching track may select ENG 588, ENG 596, or another appropriate theory course (approved by the Director of Graduate Studies) to fulfill their theory requirement. Students in the teaching track are required to take two courses from the department of Teacher Education and should consult with the Director of Graduate Studies about those courses.

Courses

ENG 505. Creative Writing. 3 Hours

Supervised practice in various literary forms. Both group discussions and individual conferences and critiques. Permission of chair required.

ENG 507. Studies in Writing. 1-6 Hours

Special topics in composition, argumentation, technical writing, report writing, and the like.

ENG 514. Medieval English Literature. 3 Hours

A study of the dominant types in the literature of England from the beginning to 1500.

ENG 515. Chaucer. 3 Hours**ENG 522. Early Renaissance Lit. 3 Hours****ENG 524. Shakespeare. 3 Hours****ENG 532. Late Renaissance Lit. 3 Hours****ENG 536. Studies-Drama 1642. 3 Hours****ENG 538. Milton. 3 Hours**

Study of the major and minor poems and selected prose of Milton.

ENG 541. TESOL Methods. 3 Hours

Introduction to key concepts, theories, and methods in TESOL. Graduate standing.

ENG 542. St:Neo-Classic Lit. 3 Hours**ENG 552. English Romanticism. 3 Hours**

Study of the major poets and critics of the Romantic Age.

ENG 556. Studies in Nineteenth-Century Literature. 3 Hours

Study of the literature in England in the nineteenth century.

ENG 560. Twentieth-Century British Literature. 3 Hours

Consideration of significant developments in modern British literature.

ENG 572. American Romanticism. 3 Hours**ENG 576. Major Amer Writers. 3 Hours****ENG 580. American Realism & Naturalism. 3 Hours**

Study of representative writers from the post-Civil War period in American literature.

ENG 584. Studies in Twentieth-Century American Literature. 3 Hours

Study of significant developments in American literature of the twentieth century.

ENG 585. Hist of Rhetoric. 3 Hours**ENG 587. Contemporary Rhetoric. 3 Hours**

An examination of one or more contemporary forms of argumentation and their application in writing.

ENG 588. Literary Theory. 3 Hours

A study of significant trends in theoretical and/or practical criticism.

ENG 589. Studies in Criticism. 3 Hours

A treatment of specific topics or approaches within the field of critical theory or applied criticism.

ENG 590. Teaching in College English. 0.5 Hours

Discussion, instruction, and practice in the methods of teaching composition and literature. Required of and open only to graduate assistants.

ENG 591. Studies in Literature. 1-6 Hours

An analysis of selected literary problems or areas.

ENG 592. History of English. 3 Hours

Study of stages in the development of the English language and of influences shaping its development from the beginning to the present time.

ENG 594. Structure of English. 3 Hours

No description available.

ENG 596. Composition Theory. 3 Hours

Study of the principal current theories of composition, with application to the teaching and evaluating of writing.

ENG 599. Thesis. 3-6 Hours

Thesis.

ENG 601. Introduction to Graduate Studies in English. 3 Hours

An introduction to the field of English studies. The course provides an overview of bibliographic studies, relevant research methodologies, and current critical trends in scholarship. Required of all degree applicants.

ENG 605. Studies in an Author. 3 Hours

Consideration of the body of an author's work and its relationship to the life of the author.

ENG 609. Studies in a Genre or Mode. 3 Hours

An intensive analysis of a significant literary form or mode.

ENG 613. St:Literary Movement. 3 Hours**ENG 621. Studies in the Teaching of Literature. 3 Hours**

An exploration of ways to teach literature more effectively for particular students.

ENG 624. Teaching Writing in High School & College. 3 Hours

This course introduces students to the pedagogical methods and relevant research which informs contemporary writing instruction at the secondary and post-secondary level. Required of all teaching assistants.

ENG 625. Studies in the Teachings of Composition. 3 Hours

An exploration of ways to teach writing more effectively for particular groups of students.

ENG 627. Professional Writing. 1-3 Hours

Analysis of and practice in professional writing in different contexts, for example, proposal writing, evaluative report writing, and editing skills.

ENG 629. Writing Non-Fiction. 3 Hours

Geology

- Certificate, Geographic Information Systems

Dan Goldman, Department Chairperson

Shuang-Ye Wu, Graduate Program Director

Certificate in Geographic Information Systems (GIS)

The GIS certificate program contains four courses at its core:

GEO 550	Applied Geographic Information Systems	4
GEO 555	Environmental Remote Sensing	4
GEO 560	Advanced Applications of Geographical Information Systems	3
GEO 598	Capstone Project	3
Total Hours		14

Students may take 1 or 2 other courses relating to distinctive areas of concentration that they may choose. These courses can be existing UD courses that provide additional background knowledge to GIS usage, or GIS-specific courses that can be developed later with collaboration from other departments.

Courses

GEO 550. Applied Geographic Information Systems. 4 Hours

This course covers the fundamentals of Geographic Information Systems (GIS) technology and how it is being applied in such diverse fields as physical sciences, social/political sciences, planning, marketing, health, criminal justice, natural resources, and engineering. Students will learn the processes to collect, organize, analyze and display geographic data obtained from sources such as address geocoding, GPS, CD-ROM and World Wide Web sites. However, the emphasis of the course will be on data preparation and visualization based on sound knowledge of basic principles of cartographic design. Some preliminary data analysis techniques will be introduced but it is not an emphasis of the course. Each student will complete a series of mini projects that illustrate the typical steps in a GIS project. Major topics include: representation of geography, coordinate systems and map projections, principles of basic cartography, thematic mapping, data acquisition using GPS, geocoding, basic editing, and basic data management and exploration.

GEO 555. Environmental Remote Sensing. 4 Hours

Introduction to principles and concepts of Remote Sensing, a sophisticated technology of earth observation that provides fundamental data for global environmental investigation. Prerequisite(s): GEO 307 or Permission.

GEO 560. Advanced Applications of Geographical Information Systems. 3 Hours

Building upon GEO 450 / GEO 550, this course aims to broaden students' understanding of GIS theories and emphasize advanced spatial analysis, modeling and visualization methodologies. Based on an applied approach, this course will use a variety of projects to illustrate these techniques. Prerequisite(s): GEO 450 / GEO 550 Applied GIS.

GEO 585. Geographic Information Systems Applications in Water Resource Planning & Management. 4 Hours

This course introduces GIS applications in water resource management. Following an introduction to raster-based modeling in GIS, it will focus on GIS techniques in surface water modeling and floodplain delineation and management.

GEO 598. Capstone Project. 3 Hours

This capstone course aims to integrate concepts and capabilities developed in previous courses (GEO 450 / GEO 550 and GEO 560) and to apply them in a realistic setting relevant to individual student interests. The course seeks to refine skills in project implementation using GIS, emphasizing project development, organization and management, presentation technique, and the use of modern information-acquisition and processing technology in GIS and/or Remote Sensing. Prerequisite(s): GEO 450 / GEO 550 Applied GIS; GEO 560 Advanced GIS.

Mathematics

- Master of Science in Applied Mathematics
- Master of Financial Mathematics
- Master of Mathematics Education
- Certificate, Computational Finance
- Certificate, Financial Risk Management
- Certificate, Statistical Finance

Joe Mashburn, Department Chairperson

Paul Eloë, Master of Science in Applied Mathematics and Master of Financial Mathematics Program Director

Rebecca J. Krakowski, Mathematics Education Program Director

The Department of Mathematics offers three masters degrees, the Master of Science in Applied Mathematics (MAS), the Master of Financial Mathematics (MFM) and the Master of Mathematics Education (MME).

Master of Science in Applied Mathematics (MAS)

The MAS program is interdisciplinary in nature. A plan of study may include up to a four-course concentration in computer science, engineering, or business for students with appropriate backgrounds. The primary objective of the program in applied mathematics is to train students to do professional work in the applications of mathematics. The program provides a background in mathematical, numerical, and statistical analyses and students will gain valuable experience in modeling and computation. Students will have the opportunity to work on a semester or year-long project known as the Mathematics Clinic project.

The program strives to offer an individualized plan of study that meets the needs and career goals of the student. This is achieved by offering a core of courses blending analysis, linear algebra, modeling, and numerical analysis in the Department of Mathematics. The student, with departmental approval, will select a four-course concentration. The Mathematics Clinic project, the capstone requirement, is a research project in which the student applies mathematical, numerical, or statistical modeling methods to a problem related to the student's four-course concentration. The Mathematics Clinic project can be a team project and can involve faculty members from several departments.

An individualized degree program consists of courses satisfying the five core areas, an area of concentration, and electives. The program is approved by the student's committee and program director, and is intended to satisfy the specific needs and interests of the individual. Any core course that is already part of the student's academic background may be replaced with an elective consistent with the other requirements of the program.

MTH 404	Complex Variables	3
or MTH 525	Complex Variables I	
MTH 430	Real Analysis	3
MTH 531	Advanced Differential Equations	3
or MTH 535	Partial Differential Equations	
MTH 541	Mathematics Clinic	3
MTH 555	Numerical Analysis I	3
or MTH 556	Numerical Analysis II	
MTH 565	Linear Algebra	3
Select five of the following:		15
MTH 519	Statistical Inference	
MTH 520	Statistical Inference	
MTH 521	Real Variables	
MTH 522	Real Variables	
MTH 525	Complex Variables I	
MTH 526	Complex Variables II	
MTH 532	Difference Equations & Applications	
MTH 540	Mathematical Modeling	
MTH 541	Mathematics Clinic	
MTH 543	Linear Models	
MTH 545	Special Functions	
MTH 547	Statistics for Experimenters	
MTH 551	Methods of Mathematical Physics	

MTH 552	Methods of Applied Mathematics
MTH 561	Modern Algebra I
MTH 562	Modern Algebra II
MTH 565	Linear Algebra
MTH 567	Combined Designs Theory
MTH 571	Topology
MTH 572	Topology II
MTH 573	Functional Analysis
MTH 575	Differential Geometry
MTH 582	Vector & Tensor Analysis
MTH 583	Discrete & Continuous Fourier Analysis
MTH 590	Topics in Mathematics

Total Hours 33

Footnotes

* At most, 6 hours of approved 400-level courses may be part of the student's program.

To satisfy the requirement of an area of concentration, a student will be required to take 12 semester hours of 500-level coursework in the selected area of concentration. Examples of areas of concentration include (but are not limited to):

Differential Systems

MTH 531	Advanced Differential Equations	3
MTH 535	Partial Differential Equations	3
Six additional hours of mathematics courses approved by the committee		6
Total Hours		12

Engineering Systems

EGM 503	Introduction to Continuum Mechanics	3
EGM 533	Theory of Elasticity	3
Six additional hours of engineering courses (of a mathematical nature) approved by the committee		6
Total Hours		12

Computational Systems

MTH 555	Numerical Analysis I	3
MTH 556	Numerical Analysis II	3
Six additional hours of computer science courses approved by the committee		6
Total Hours		12

Master of Financial Mathematics (FIM)

The MFM is a professional program in quantitative methods in finance to support a growing local and regional market in financial services. It is offered in cooperation with the Department of Economics and Finance. The program integrates statistics, computation and modeling with training in the professional domain and graduates will find employment opportunities in the banking, insurance and financial trading industries. A plan of study includes six core courses that include coursework in the MBA program, and four electives courses, selected, in consultation with a faculty advisor, from a broad set of electives from Mathematics, MBA, Management Science and Computer Science. There are two introductory courses, one in partial differential equations and one in principles of

finance; one or both of these courses can be waived for students with appropriate background in mathematics or finance.

As with the MAS program, the MFM program requires a capstone experience of a Mathematics Clinic project. Teams of students will report to a faculty member and work on a project that is posed by the financial industry.

MBA 620A	Principles of Corporate Financial Management	1.5
MBA 620B	Principles of Corporate Investment & Assets Management	1.5
MTH 535	Partial Differential Equations **	3
MTH 541	Mathematics Clinic	3
MTH 544	Time Series	3
MTH 556	Numerical Analysis II	3
MTH 558	Financial Mathematics I-Discrete Model	3
MTH 559	Financial Mathematics II-Continuous Model	3
MBA 627	Financial Derivatives & Risk Management	3
or MTH 557	Financial Derivatives & Risk Management	
MTH 563	Computational Finance	3
Select four courses: ***		12
CPS 542	Database Management Systems	
CPS 562	Database Management Systems II	
MBA 625	Investments & Finance Marketing	
MBA 628	Fixed Income Analysis	
MTH 531	Advanced Differential Equations	
MTH 532	Difference Equations & Applications	
MTH 543	Linear Models	
MTH 547	Statistics for Experimenters	
MTH 551	Methods of Mathematical Physics	
MTH 552	Methods of Applied Mathematics	
MTH 565	Linear Algebra	
MTH 567	Combined Designs Theory	
MTH 583	Discrete & Continuous Fourier Analysis	
Total Hours		39

* This is a required introductory finance-related course. It can be replaced for students with sufficient background.

** This is a required introductory mathematics course. It can be replaced with an appropriate elective for students with sufficient background.

*** ECO 441 and FIN 480 can be taken for graduate credit.

Master of Mathematics Education (MME)

The MME program was developed primarily to meet the professional needs of high school mathematics teachers. Although Ohio Department of Education licensure guidelines no longer require all K-12 grade teachers complete a master's degree program in their content area or general education, the MME completed in its entirety or in part will certainly satisfy ongoing professional development requirements for license renewal, and has been designed by the Department of Mathematics to address issues that are especially important to high school mathematics educators. The MME may also be of interest to upper grades middle school mathematics teachers, provided they have the AYA 7-12 license in mathematics. (Note: The MME is NOT an initial licensure program.)

Key features of the MME include: curriculum that focuses on pedagogical content knowledge - the special knowledge that distinguishes the mathematics knowledge of teachers from that of mathematicians; student development of a stronger mathematics content knowledge, as well as the ability and opportunity to apply this knowledge to the 9-12 grade curriculum; introduction to major research issues and both quantitative and qualitative methods in mathematics education; continued growth as leaders in education; an emphasis on the latest technological advances - both computer-based and using hand-held graphing utilities; consistent experience of "best practices" modeled by program faculty whose area of expertise is mathematics education.

This is primarily a summer program that offers a solid base in the teaching of secondary school mathematics. The curriculum includes both mathematics and education coursework consisting of 10 classes, three graduate semester hours each, that may be completed over the course of three summers, with minimal requirements during the regular school year.

As is the case with other graduate programs within the Department of Mathematics, the MME program requires a capstone experience of a Mathematics Clinic project. Each student will work with a faculty member to design and implement an action research project in mathematics education. A "journal ready" report will be required, as well as a presentation of their findings in one of our departmental colloquia.

EDT 500	Models of Teaching	3
EDT 502	Philosophical Studies in Education	3
EDT 650	Professional Development of Teacher Leaders	3
MTH 512	Geometry for Secondary Teachers	3
MTH 513	Algebra for Secondary Teachers	3
MTH 514	Advanced Mathematics for Secondary Teachers	3
MTH 515	Applications of Graph Theory & Combinatorics in Modern Mathematics	3
MTH 516	Applications of Linear & Abstract Algebra in Modern Education	3
MTH 517	Research Methods & Issues in Mathematics Education	3
MTH 541	Mathematics Clinic	3
Total Hours		30

Certificate Programs

Certificate programs appeal to students who do not want to commit to the full MFM program. Upon successful completion of five courses focused on a specific set of concepts, a student will earn a post-baccalaureate certificate in that area. The certificate programs and the associated five courses are:

Certificate in Computational Finance (CFN)

Certificate Requirements:

MTH 556	Numerical Analysis II	3
MTH 563	Computational Finance	3
MTH 558	Financial Mathematics I-Discrete Model	3
MTH 559	Financial Mathematics II-Continuous Model	3
MBA 627	Financial Derivatives & Risk Management	3
Total Hours		15

Certificate in Statistical Finance (STF)

Certificate Requirements:

MTH 543	Linear Models	3
or ENM 501	Applied Engineering Statistics	
MTH 544	Time Series	3
or ENM 530	Engineering Economy	
MTH 563	Computational Finance	3
MTH 558	Financial Mathematics I-Discrete Model	3
MTH 559	Financial Mathematics II-Continuous Model	3
Total Hours		15

Certificate in Financial Risk Management (FRM)

Certificate Requirements:

MBA 627	Financial Derivatives & Risk Management	3
MBA 628	Fixed Income Analysis	3
MTH 558	Financial Mathematics I-Discrete Model	3
MTH 559	Financial Mathematics II-Continuous Model	3
MTH 563	Computational Finance	3
Total Hours		15

The certificate programs are designed as mini-programs in focus areas. Thus, each includes the capstone applied research experience of Mathematics Clinic.

Entrance, performance, and exit standards

Students seeking admission to the Certificate Programs will satisfy the entrance requirements to the MFM program. These are:

- Completion of a graduate application for admission to a certificate program at the University of Dayton
- Bachelor's degree in a science or technical area such as mathematics, physics, computer science, engineering, economics or finance, and at least a 3.0 GPA on a 4.0 scale
- Prerequisite mathematics coursework in calculus, differential equations, linear algebra, elementary probability and statistics
- Programming skills

Students applying for a Certificate must be enrolled in the Certificate program and must have completed the requirement of five courses with a minimum G.P.A. of 3.0.

Students cannot simultaneously be admitted to the Master of Financial Mathematics and one of the certificate programs. Students can be simultaneously enrolled in any other post-baccalaureate program at the University of Dayton and a certificate program. Students must meet the entrance standards of the Master of Financial Mathematics to gain admission to a certificate program. To learn more about the application process for admission to a certificate program, please contact the Department of Mathematics.

Assistantships

Financial assistance is available to qualified students through graduate teaching assistantships. A graduate assistant receives a stipend, tuition remission and health benefits. Most graduate assistants require two years to complete the requirements for a master's degree. Internships in the MFM program are recommended and the Department facilitates finding internship opportunities.

Facilities

Departmental PCs and the MATHSCI Computer Learning Environment are available for student use in conjunction with projects or coursework.

Courses

MTH 512. Geometry for Secondary Teachers. 3 Hours

Investigation of traditional secondary school topics in Euclidean geometry, introduction to similar ideas in non-Euclidean spaces, examination of the impact of mathematics education research on the teaching and learning of geometry, and exploration of real-world applications. Extensive use of the dynamic software package The Geometer's Sketchpad® will also be incorporated into every aspect of the course. Topics to be explored may include transformations, symmetry, tessellations, centers of triangles (incenter, centroid, orthocenter, and circumcenter), similarity, coordinate geometry, and spherical or hyperbolic geometry. Prerequisite(s): MTH 370 or permission of instructor.

MTH 513. Algebra for Secondary Teachers. 3 Hours

Investigation of traditional secondary school topics from introductory and advanced algebra courses, examination of appropriate use of manipulatives (e.g., algebra tiles) to explore algebraic concepts, integration of hand-held graphing technology and data collection devices in the study of algebra, and implications of research in mathematics education on the teaching and learning of algebra. Topics discussed in the course may include basic properties and mechanics of equations and functions, functions that model real-world phenomena, models for factoring polynomial expressions, and integration of physical science and mathematics. Prerequisite(s): Permission of instructor.

MTH 514. Advanced Mathematics for Secondary Teachers. 3 Hours

Investigation of concepts related to trigonometry, analytic geometry, precalculus, and calculus; integration of appropriate uses of graphing technology and data collection devices to enhance students' understanding in their investigation of real-world examples; and implications of research in mathematics education on the teaching and learning of the concepts discussed in this course. A variety of topics that may be explored include: trigonometric functions and applications; rate of change in business, physics, and society; limits, continuity, and differentiability; and applications of area and volume. Prerequisite(s): MTH 218 or permission of instructor.

MTH 515. Applications of Graph Theory & Combinatorics in Modern Mathematics. 3 Hours

An opportunity to study selected topics in graph theory and combinatorics in depth. Appropriate uses of computing technology will be included. Topics may include an introduction to circuits and graph coloring theorems, traveling salesperson problems, and sorting algorithms, problems, and methods in counting, networks, and finding winning strategies for Nim-type games. Prerequisite(s): (MTH 367 or MTH 411) or permission of instructor.

MTH 516. Applications of Linear & Abstract Algebra in Modern Education. 3 Hours

Study of topics connected to real-world applications in both linear and abstract algebra, and an introduction to matrix operations with EXCEL and TI graphing technology. Topics discussed may include: introductory coding theory and cryptography; symmetry groups in mathematics, science, engineering, architecture, and art; permutation groups; linear programming problems and the simplex method; and Markov chains. Prerequisite(s): (MTH 302, MTH 361) or permission of instructor.

MTH 517. Research Methods & Issues in Mathematics Education. 3 Hours

Review of related literature and research in education and mathematics education, and a study of key concepts necessary to analyze, evaluate, and conduct educational research. Application of both qualitative and quantitative research methods specifically related to the development of a research proposal. The focus on quantitative research methods provides ample opportunities to review fundamental concepts and properties of both descriptive and inferential statistics. Introduction to SAS or SPSS, both statistical programming packages appropriate for use in educational research, will be included in the course. Prerequisite(s): (MTH 367 or MTH 412) or permission of instructor.

MTH 519. Statistical Inference. 3 Hours

Sample spaces, Borel fields, random variables, distribution theory, characteristic functions, exponential families, minimax and Bayes' procedures, sufficiency, efficiency, Rao-Blackwell theorem, Neyman-Pearson lemma, uniformly most powerful tests, multi-variate normal distributions.

MTH 520. Statistical Inference. 3 Hours

Sample spaces, Borel fields, random variables, distribution theory, characteristic functions, exponential families, minimax and Bayes' procedures, sufficiency, efficiency, Rao-Blackwell theorem, Neyman-Pearson lemma, uniformly most powerful tests, multi-variate normal distributions.

MTH 521. Real Variables. 3 Hours

The topology of the real line, continuity and differentiability, Riemann and Stieltjes integrals, Lebesgue measure and Lebesgue integral. Measure and integration over abstract spaces, Lp-spaces, signed measures, Jordan-Hahn decomposition, Radon-Nikodym theorem, Riesz representation theorem, and Fourier series.

MTH 522. Real Variables. 3 Hours

The topology of the real line, continuity and differentiability, Riemann and Stieltjes integrals, Lebesgue measure and Lebesgue integral. Measure and integration over abstract spaces, Lp-spaces, signed measures, Jordan-Hahn decomposition, Radon-Nikodym theorem, Riesz representation theorem, and Fourier series.

MTH 525. Complex Variables I. 3 Hours

Analytic functions, integration on paths, the general Cauchy theorem. Singularities, residues, inverse functions and other applications of the Cauchy theory.

MTH 526. Complex Variables II. 3 Hours

Infinite products, entire functions, the Riemann mapping theorem and other topics as time permits. Prerequisite(s): MTH 525 or equivalent.

MTH 527. Biostatistics. 3 Hours

Introduction to statistical concepts and skills including probability theory and estimation, hypothesis tests of means and proportions for one or two samples using normal or t-distributions, regression and correlation, one- and two-way ANOVA, selected nonparametric tests. Prerequisite(s): MTH 149 or MTH 169 or permission of instructor.

MTH 531. Advanced Differential Equations. 3 Hours

Existence and uniqueness theorems, linear equations and systems, self-adjoint systems, boundary value problems and basic nonlinear techniques. Prerequisite(s): MTH 403 or equivalent.

MTH 532. Difference Equations & Applications. 3 Hours

The calculus of finite differences, first order equations, linear equations and systems, z-transform, stability, boundary value problems for nonlinear equations, Green's function, control theory and applications.

MTH 535. Partial Differential Equations. 3 Hours

Classification of partial differential equations; methods of solution for the wave equation, Laplace's equation, and the heat equation; applications. Prerequisite(s): MTH 403 or equivalent.

MTH 540. Mathematical Modeling. 3 Hours

An introduction to the use of mathematical techniques and results in constructing and modifying models designed to describe and/or predict behavior of real-world situations. Prerequisite(s): Permission of instructor.

MTH 541. Mathematics Clinic. 3 Hours

Student teams will be responsible for developing or modifying and testing a mathematical model designed for a particular purpose. Faculty guidance will be provided. May be repeated once for a maximum of 6 credit hours. Prerequisite(s): Permission of department chairperson or program director.

MTH 543. Linear Models. 3 Hours

Least square techniques, lack of fit and pure error, correlation, matrix methods, F test, weighted least squares, examination of residuals, multiple regression, transformations and dummy variables, model building, ridge regression, stepwise regression, multiple regression applied to analysis of variance problems. Prerequisite(s): MTH 368 or equivalent.

MTH 544. Time Series. 3 Hours

Estimation and elimination of trend and seasonal components; stationary time series, autocovariance, autocorrelation and partial autocorrelation functions; spectral analysis; modeling and forecasting with ARMA processes; nonstationary and seasonal time series. Prerequisite(s): Courses in single and multivariate calculus; courses in statistics and probability; courses in linear algebra.

MTH 545. Special Functions. 3 Hours

The special functions arising from solutions of boundary value problems which are encountered in engineering and the physical sciences. Hypergeometric functions, Bessel functions, Legendre polynomials. Prerequisite(s): MTH 403 or equivalent.

MTH 547. Statistics for Experimenters. 3 Hours

Covers those areas of design of experiments and analysis of quantitative data that are useful to anyone engaged in experimental work. Designed experiments using replication and blocking. Use of transformations. Applications of full and fractional factorial designs. Experimental design for developing quality into products using Taguchi methods. Prerequisite(s): MTH 367 or equivalent.

MTH 551. Methods of Mathematical Physics. 3 Hours

Linear transformations and matrix theory, linear integral equations, calculus of variations, eigenvalue problems. Prerequisite(s): MTH 403 or equivalent.

MTH 552. Methods of Applied Mathematics. 3 Hours

Dimensional analysis and scaling, regular and singular perturbation methods with boundary layer analysis, the stability and bifurcation of equilibrium solutions, other asymptotic methods. Prerequisite(s): MTH 403 or equivalent.

MTH 555. Numerical Analysis I. 3 Hours

Solutions of nonlinear equations, Newton's methods, fixed point methods, solutions of linear equations, LU decomposition, iterative improvement, QR decomposition, SV decomposition. Prerequisite(s): (CPS 132 or CPS 150) or equivalent; MTH 310 or equivalent.

MTH 556. Numerical Analysis II. 3 Hours

Interpolating functions, numerical differentiation, numerical integration including Gaussian quadrature, numerical solutions of differential equations. Prerequisite(s): (CPS 132 or CPS 150) or equivalent; MTH 219 or equivalent.

MTH 557. Financial Derivatives & Risk Management. 3 Hours

This course provides a theoretical foundation for the pricing of contingent claims and for designing risk-management strategies. It covers option pricing models, hedging techniques, and trading strategies. It also includes portfolio insurance, value-at-risk measure, multistep binomial trees to value American options, interest rate options, and other exotic options. Prerequisite(s): MBA 620.

MTH 558. Financial Mathematics I-Discrete Model. 3 Hours

Discrete methods in financial mathematics. Topics include introduction to financial derivatives, discrete probability theory, discrete stochastic processes (Markov chain, random walk, and Martingale), binomial tree models for derivative pricing and computational methods (European and American options), forward and futures, and interest rate derivatives. Prerequisite(s): MTH 411 or equivalent.

MTH 559. Financial Mathematics II-Continuous Model. 3 Hours

Continuous methods in financial mathematics. Topics include review of continuous probability theory, Ito's Lemma, the Black-Scholes partial differential equation, option pricing via partial differential equations, analysis of exotic options, local and stochastic volatility models, American options, fixed income and stopping time. Computational methods are introduced. Prerequisite(s): MTH 558.

MTH 561. Modern Algebra I. 3 Hours

Groups, rings, integral domains and fields; extensions of rings and fields; polynomial rings and factorization theory in integral domains; modules and ideals.

MTH 562. Modern Algebra II. 3 Hours

Finite and infinite field extensions, algebraic closure, constructible numbers and solvability by use of radicals, Galois theory, and selected advanced topics. Prerequisite(s): MTH 561.

MTH 563. Computational Finance. 3 Hours

The purpose of this course is to introduce students to numerical methods and various financial problems that include portfolio optimization and derivatives valuation that can be tackled by numerical methods. Students will learn the basics of numerical analysis, optimization methods, monte carlo simulations and finite difference methods for solving PDEs. Prerequisite(s): MBA 620 or permission of instructor.

MTH 565. Linear Algebra. 3 Hours

Vector spaces, linear transformations and matrices; determinants, inner product spaces, invariant direct-sum decomposition and the Jordan canonical form.

MTH 567. Combined Designs Theory. 3 Hours

Latin squares, mutually orthogonal Latin squares, orthogonal and perpendicular arrays, Steiner triple systems, block designs, difference sets and finite geometries. Prerequisite(s): MTH 308 or instructor's permission.

MTH 571. Topology. 3 Hours

An axiomatic treatment of the concept of a topological space; bases and subbases; connectedness, compactness; continuity, homeomorphisms, separation axioms and countability axioms; convergence in topological spaces.

MTH 572. Topology II. 3 Hours

Compactification theory, para-compactness and metrizable theorems, uniform spaces, function spaces, and other advanced topics of current interest. Prerequisite(s): MTH 571 or equivalent.

MTH 573. Functional Analysis. 3 Hours

The study of linear metric spaces with emphasis on Banach and Hilbert spaces. The Hahn-Banach theorem, the Banach fixed point theorem, and their consequences. Approximations and other selected advanced topics.

MTH 575. Differential Geometry. 3 Hours

Vector and tensor algebra; covariant differentiation. An introduction to the classical theory of curves and surfaces treated by means of vector and tensor analysis.

MTH 582. Vector & Tensor Analysis. 3 Hours

The differential and integral calculus of scalar and vector fields with emphasis on properties invariant under transformations to curvilinear coordinate systems. An introduction to tensor analysis via Cartesian tensors and then more general tensors. Derivation of the divergence, gradient, and curl in generalized coordinates. Prerequisite(s): (MTH 218, MTH 302) or equivalent.

MTH 583. Discrete & Continuous Fourier Analysis. 3 Hours

Fourier representations of complex-valued functions, rules for finding Fourier transforms, mathematical operators associated with Fourier analysis, fast algorithms, wavelet analysis, selected applications. Prerequisite(s): (MTH 219 or MTH 319) or equivalent; MTH 302 or equivalent.

MTH 590. Topics in Mathematics. 1-6 Hours

This course, given upon appropriate occasions, deals with specialized material not covered in the regular courses. May be taken more than once as topics change. Prerequisite(s): Permission of advisor.

Music

Sharon Gratto, Department Chairperson
Linda A. Hartley, Music Education Coordinator

The Department of Music offers courses in support of the Master of Science in education degree with a music education concentration. For specific degree requirements visit the Department of Teacher Education in Academic Information. The Department of Music is a member of the National Association of Schools of Music, which accredits its degree programs and curricula.

Courses

MUS 501. Graduate Seminar in Musicology. 2 Hours

Students will become familiar with selected general aspects of Western music: music notation, editions and performance, social contexts and meanings of musical works. This course explores the range of approaches and research methods in musicology, aiming for a comprehensive understanding and a critical knowledge of the sources and literature of music and musicology, and the rudiments of research and writing techniques.

MUS 503. Teaching World Music. 2 Hours

Methods and techniques for teaching music from representative cultures around the world, and their role and function in society.

MUS 505. Teaching Music with Technology I. 2,3 Hours

Provides a hands-on, introductory basis in 1) computer aided notation, 2) recording music with digital instruments, 3) developing multimedia presentations, and 4) utilizing the world wide web for connected learning.

MUS 506. Teaching Music with Technology II. 2,3 Hours

Provides an in-depth and hands-on study in 1) computer aided notation, 2) recording music with digital instruments, 3) developing multimedia presentations, and 4) utilizing the world wide web for connected learning. Permission of the instructor required.

MUS 511. Music Theory, Analysis, and Technology. 2-3 Hours

This course investigates music theory and compositional practice of the Western music tradition. Current techniques of tonal theory including linear analysis are explored. Students also apply music technology in the notation and analysis of music. Prior experience with music notation and web authoring software is expected.

MUS 531. Foundations & Current Issues in Music Education. 2-3 Hours

Topics include history, philosophy, and psychology of music education; special needs and inclusion; assessment; national and state music education standards; gifted identification; curriculum development; scheduling; Vision 2020; and learning theories.

MUS 535. Literature & Resources for Classroom Music. 1 Hour

Review, analysis and critique of standard and new literature for grades PreK - 8. Exploration and utilization of available teaching resources.

MUS 536. Literature & Resources for the Choral Ensemble. 1 Hour

Review, analysis and critique of standard and new literature for elementary, middle, and high school choral ensembles.

MUS 537. Literature & Resources for the Instrumental Ensembles. 1 Hour

Review, analysis and critique of standard and new literature for elementary, middle, and high school instrumental ensembles.

MUS 544. Advanced Techniques for Classroom Music. 2 Hours

Focuses on the development of teaching techniques and methods for grade levels PreK-8. Concentration on areas such as contemporary methodologies, learning theories, and utilization of the National Standards in music education.

MUS 545. Advanced Choral Conducting & Rehearsal Techniques. 2 Hours

Focuses on score study, comprehensive score analysis, performance practice study, ensemble conducting experience, and rehearsal techniques.

MUS 546. Advanced Instrumental Conducting & Rehearsal Techniques. 2 Hours

Focuses on score study, comprehensive score analysis, performance practice study, ensemble conducting experience, and rehearsal techniques.

MUS 560. Special Studies. 1-4 Hours

Special studies in Music.

MUS 581. Improvisation in the School Music Curriculum. 2 Hours

Emphasis on vocal and instrumental skill development and facilitation of improvisatory experiences suitable for individual students and groups.

MUS 599. Graduate Performance Studies. 1-2 Hours

Private lesson instruction, or performance in an approved ensemble (large group or chamber). Lessons (14, 30 minutes each or equivalent) offered in keyboard, strings, winds, percussion, and voice. Ensembles can include university ensembles as well as off-campus ensembles (must have approval of advisor). Fee for lessons.

Philosophy

William M. Richards, Department Chairperson

* There is no graduate program in philosophy at this time. Graduate courses offered support other graduate programs.

Courses

PHL 695. Directed Studies. 3 Hours

To augment the graduate student's previous training or to allow advanced study on a particular problem, philosopher, or historical era. Arrange through the department chair.

Physics

John Erdei, Department Chairperson

The Department of Physics, as part of the electro-optics program, offers graduate courses in support of the Master of Science and Doctor of Philosophy in Electro-Optics. For more details on the program requirements, see the Electro-Optics (EOP) (<http://catalog.udayton.edu/graduate/schoolofengineering/programsofstudy/electrooptics>) overview.

Assistantships

A limited number of graduate assistantships are available for graduate students in the electro-optics program. These generally carry a stipend and tuition remission for the courses required for the degree. Recipients are expected to complete the requirements for the Master's degree in two years. Detailed information and application forms may be obtained from the chair of the physics department or the director of the electro-optics program.

Courses

PHY 520. Solid State Physics. 3 Hours

Solid State Physics.

PHY 525. Quantum Mechanics I. 3 Hours

The physical basis of quantum mechanics, wave packets, free particle motion: Schrodinger's equation applied to potential problems; harmonic oscillator and the hydrogen atom; three-dimensional extrapolation and scattering.

PHY 599. Introduction to Lasers. 1-3 Hours

Laser theory; coherence; Gaussian beams; optical resonators; properties of atomic and molecular radiation; laser oscillation and amplification; methods of excitation of lasers; characteristics of common lasers; laser applications.

Political Science

- Master of Public Administration
- Accelerated BA+MPA Program
- Certificate, Non-Profit and Community Leadership

Grant W. Neeley, Interim Department Chairperson

Michelle Pautz, Master of Public Administration Program Director

Steven Neiheisel, Director of the Non-Profit and Community Leadership Certificate Program

The Department of Political Science offers one graduate degree, the Master of Public Administration. The Master of Public Administration is

a professional degree designed to prepare students for administrative careers in contemporary society.

Assistantships

The department offers three graduate assistantships each year. The graduate assistants perform research and administrative tasks for the faculty. Each assistant receives full tuition remission plus stipend. An assistantship, once granted, is renewable for a second year.

Master of Public Administration (PAD)

To receive the Master of Public Administration degree, the student must satisfactorily complete 39 semester hours of coursework with a cumulative grade point average of 3.0 or better.

The 39 hours of coursework must include:

MPA 500	Public Administration	3
MPA 504	State & Local Government	3
or MPA 551	Introduction to Public Policy	
MPA 510	Quantitative Methods in Public Administration	3
MPA 511	Applied Research Techniques	3
MPA 520	Organization Theory	3
MPA 526	Leadership in Building Communities	3
or MPA 524	Ethics in Public Administration	
MPA 530	Fiscal Administration	3
MPA 540	Public Sector Human Resource Management	3
MPA 599	Public Administration Capstone	3

The required courses may be waived for students with appropriate academic backgrounds.

The remainder of the 39 hours must consist of courses selected from the MPA curriculum. Exceptions may be made, on the determination of the program director, if the students career objectives make public management-related courses in other graduate programs particularly useful. No more than 6 semester hours outside the MPA curriculum may be taken.

Within the general requirements listed above, the student may select one of three options:

1. The student may take 33 to 36 semester hours of academic coursework and three to six semester hours of MPA 595 Government Internship. A student choosing this option is encouraged to begin the internship only after completing 18 semester hours of other courses.
2. The student, under certain conditions, may take 33 to 36 semester hours of academic coursework and three to six semester hours of MPA 597 Public Service Project. This option is available only to students employed in administrative positions other than internships in public or nonprofit agencies. Students should enroll in MPA 597 only after completing 18 hours of other courses.
3. The student may take the full 39 semester hours in regular academic courses.

Accelerated BA+MPA Program

UD undergraduate students within the College of Arts and Sciences with a cumulative GPA of 3.0 or better at the time of application are eligible to participate in the accelerated BA+MPA program leading to a Master of Public Administration degree.

Eligible undergraduate students are required to apply for admission to the accelerated BA+MPA program and to the Graduate School and may do so as early as the second semester of their junior year. At least 75% of the credit hours required for graduation within the student's undergraduate degree program must be completed before graduate admission can be approved.

Applicants who meet the admission requirements (see 1. above) will be conditionally admitted into the MPA degree program and permitted to enroll in graduate courses approved by both the student's undergraduate department and the MPA program.

Although the students in the accelerated BA+MPA program can take several approved graduate courses while enrolled as undergraduates, only two courses (a maximum of six semester hours) may be counted towards both the BA and MPA degrees. These two courses must be explicitly approved in writing by both the student's undergraduate department and the MPA program before they are taken.

Students admitted to the accelerated program will continue to be classified as undergraduate students until they complete all undergraduate degree requirements. These students need to take 12 or more semester hours per term to maintain full-time status, and will be charged the standard tuition and fee rates applicable to undergraduate students. Graduate courses taken for undergraduate credits will be assessed at the standard undergraduate tuition and fee rate. Under no circumstances will a student be charged tuition and fees in excess of the listed full-time tuition and fees amount (unless increased for overload hours as applicable). Upon successful completion of their undergraduate requirements, students will receive their BA degree.

At the completion of the undergraduate requirements, the accelerated program students may apply for admission into the Graduate School with regular status, after submission of all required admission materials and review by the MPA admission committee. Graduate students within the MPA program need to take a minimum of six semester hours per term to maintain status as full-time students.

Master's degree students are required to maintain a minimum cumulative grade point average of a B (3.0) in all graduate-level coursework, with no more than six semester hours of C. Students who fail to meet these standards are placed on academic probation or dismissed from the program.

The Master of Public Administration will be conferred upon successful completion of all appropriate graduate degree requirements.

Public Administration*

MPA 500	Public Administration	3
MPA 504	State & Local Government	3
MPA 510	Quantitative Methods in Public Administration	3
MPA 511	Applied Research Techniques	3
MPA 520	Organization Theory	3
MPA 526	Leadership in Building Communities	3
or MPA 524	Ethics in Public Administration	
MPA 530	Fiscal Administration	3
MPA 540	Public Sector Human Resource Management	3
MPA 599	Public Administration Capstone	3

Four MPA electives selected from the curriculum areas below **

MPA Curriculum

General Administration and Management

MPA 500 Public Administration

MPA 502	Intergovernmental Relations
MPA 504	State & Local Government
MPA 506	Urban Administration
MPA 508	Contemporary Issues
MPA 599	Public Administration Capstone
Analytic Tools	
MPA 510	Quantitative Methods in Public Administration
MPA 511	Applied Research Techniques
MPA 512	Computer Applications for Public Administration
MPA 514	Government Planning
Group and Organization Dynamics	
COM 517	Organizational Communication
COM 537	Conflict Management
MPA 520	Organization Theory
MPA 524	Ethics in Public Administration
MPA 526	Leadership in Building Communities
Fiscal Management	
MPA 530	Fiscal Administration
MPA 532	Governmental Fund Management & Reporting
Human Resources	
MPA 540	Public Sector Human Resource Management
MPA 542	Public Sector Labor Management Relations
Policy Studies	
MPA 551	Introduction to Public Policy
MPA 555	Selected Topics in Public Policy
MPA 556	Environmental Policy
The Non-Profit Sector	
MPA 524	Ethics in Public Administration
MPA 526	Leadership in Building Communities
MPA 561	Nonprofit & Community Leadership
MPA 562	Strategic Planning for Nonprofit & Community Organizations
MPA 563	NGO Management & Development
MPA 566	Nonprofit Community Relations
MPA 567	Building the Nonprofit Network
MPA 568	The Responsive Nonprofit
Public Law/Bureaucracy	
MPA 571	Administrative Law
Topical Seminars/Independent Study	
MPA 591	Seminar in Public Administration
MPA 593	Independent Study in Public Administration
MPA 595	Government Internship
MPA 597	Public Service Project

* The required courses may be waived for students with appropriate academic backgrounds.

** Exceptions may be made, on the determination of the program director, if the student's career objectives make public management-related courses in other graduate programs particularly useful. No more than six semester hours outside the MPA curriculum may be taken.

Certificate in Non-profit and Community Leadership (NPF)

Required Courses

MPA 561	Nonprofit & Community Leadership
MPA 562	Strategic Planning for Nonprofit & Community Organizations

Electives

MPA 526	Leadership in Building Communities
MPA 564	Overview of Grant Funding
MPA 566	Nonprofit Community Relations
MPA 567	Building the Nonprofit Network
MPA 568	The Responsive Nonprofit
MPA 569	Nonprofit Financial Management

Courses

MPA 500. Public Administration. 3 Hours

Study of administrative organization, systems, processes and methods as applied to government programs and operations, with a comparison of structural and behavioral approaches.

MPA 504. State & Local Government. 3 Hours

An in-depth examination of particular state-local institutional relationships with emphasis upon current issues.

MPA 508. Contemporary Issues. 3 Hours

An in-depth examination of a current management issue supported by recent literature in public administration and relevant to surrounding local governments. Analysis of root causes of the problem issue. Exploration of management approaches available to local governments. May be repeated once when course focus changes.

MPA 510. Quantitative Methods in Public Administration. 3 Hours

Introduction to research techniques involving quantitative methods and analysis applicable to the formation and implementation of public programs. Emphasis on basic statistics and research methodology. Aimed at understanding appropriate application and interpretation of quantitative methods rather than competence in practical or scholarly use.

MPA 511. Applied Research Techniques. 3 Hours

Introduction to statistical computing techniques, review of research design and inferential statistics, Ordinary Least Square techniques, violations of assumptions, multi-level modeling, and other topics.

Prerequisite(s): MPA 510.

MPA 513. Geographic Information Systems for Public Administration. 3 Hours

Concepts and implementation of project design and analysis in geographic information systems (GIS). Students will learn the practice of GIS as a tool for spatial analysis, and as it applies in public administration. The course will stress database design and present skills for data input, query analysis, and data output using GIS.

MPA 514. Government Planning. 3 Hours

Consideration of the planning function in the administrative process and the role of planning agencies in decision-making and problem solving. Evaluation of trends and changing planning characteristics in the United States.

MPA 515. Emergency Management. 3 Hours

Explores policy approaches and administrative response strategies related to various phases of disasters and security crises in the U.S. and international settings with attention to human rights issues.

MPA 520. Organization Theory. 3 Hours

Survey of current literature and research on the theory of complex organizations. Rationality in decision making; problems of authority; behavioral, political, and technical influences on organization.

MPA 524. Ethics in Public Administration. 3 Hours

This course stimulates an awareness of the moral dimension of public sector problems and decision making contexts. It provides students the tools and techniques they can use to meet demands for ethical judgments and decisive action in their public management careers.

MPA 526. Leadership in Building Communities. 3 Hours

Seminar class where teams are formed to learn about the processes of building a neighborhood and recommending supportive public policy and other strategic interventions. Participants will be encouraged to refine their notions of community and leadership and to recommend strategies which capitalize on neighborhood assets, improve outcomes, and build community.

MPA 530. Fiscal Administration. 3 Hours

Study of governmental expenditures and revenues, budgetary and financial reporting, fiscal policy, and other areas of fiscal management, with emphasis on current practices and problems.

MPA 540. Public Sector Human Resource Management. 3 Hours

Broad-based study of people management ranging from the development and integration of organizational policy, through the many personnel administrative processes, and the human and regulatory aspects affecting the contemporary public sector workforce.

MPA 551. Introduction to Public Policy. 3 Hours

This course is designed to introduce students to the study of public policy and public policymaking. The central concerns of the course involve competing models of the policy process, the policymaking process in the United States, the interplay between the political and economic systems in policymaking, and the processes of policy analysis and evaluation.

MPA 555. Selected Topics in Public Policy. 3 Hours

Policy process, policy outcomes, and policy impact in an area or areas of public policy varying among such topics as transportation, education, welfare, national defense, science, civil rights, and urban and community development. May be repeated when topic changes.

MPA 556. Environmental Policy. 3 Hours

Examines environmental policymaking and implementation in the U.S. and analyzes government responses to particular environmental issues.

MPA 561. Nonprofit & Community Leadership. 3 Hours

This course surveys the generalized body of knowledge common to all nonprofit and community organizations, distinguishing them from governmental and for-profit entities. Emphasis placed upon an overall understanding of the nonprofit and community sector and its emerging role in society.

MPA 562. Strategic Planning for Nonprofit & Community Organizations. 3 Hours

For nonprofit and community organizations to stay relevant and competitive in an increasingly complex environment, such organizations must continually vision, plan, develop, and implement long-range strategic plans. This course explores and analyzes, step-by-step, the various requirements, components, and challenges in developing a strategic plan for nonprofit and community organizations. Prerequisite(s): MPA 561.

MPA 563. NGO Management & Development. 3 Hours

This course examines the management and function of non-governmental organizations with human-rights advocacy, humanitarian, and/or development missions.

MPA 564. Overview of Grant Funding. 1 Hour

This course explores the grant writing environment that nonprofit and community organizations work in. Topics for discussion include an understanding of fundraising efforts and the grant writing continuum.

MPA 565. Grantwriting. 3 Hours

Explores the entire continuum of grant writing including the core components of a grant proposal, writing persuasive grant proposals, and proper formatting and submission of grant proposals.

MPA 566. Nonprofit Community Relations. 3 Hours

This course examines how nonprofit organizations build and maintain relationships with a wide network of stakeholders including governments, other nonprofits, private sector, citizens and clients. Prerequisite(s): MPA 561.

MPA 567. Building the Nonprofit Network. 1 Hour

Networks are vital to nonprofit organizations' survival using tactics and techniques that include social media to reach volunteers, board members and donors. This course examines strategies for coalition building and advocacy through partnerships, collaboration and mergers. Prerequisite(s): MPA 561, MPA 566.

MPA 568. The Responsive Nonprofit. 1 Hour

An examination of how nonprofits' communications respond to internal organizational changes and innovations in data availability. Prerequisite(s): MPA 561, MPA 566.

MPA 569. Nonprofit Financial Management. 3 Hours

An introduction to accounting and financial accounting as essential parts of an information system that supports economic and program decision making in nonprofit organizations.

MPA 571. Administrative Law. 3 Hours

Study of the judicial function and activities of federal agencies; formal and informal processes in administrative hearings; basic principles of administrative law; judicial interpretation; the question of increased judicialization of the administrative process.

MPA 591. Seminar in Public Administration. 3 Hours

No description available.

MPA 593. Independent Study in Public Administration. 1-6 Hours

Intensive independent research under the direction of a faculty member. Research paper. May be repeated when topic changes. Prior approval of formal project proposal required.

MPA 595. Government Internship. 1-6 Hours

Assignment to appropriate government agencies or units for the purpose of gaining wide experience with the administrative system through a program of work experiences. Internship includes a related academic requirement.

MPA 597. Public Service Project. 3-6 Hours

For students seeking experience with public or nonprofit organizations. Completion of an applied written project for an organization that relates theories and information from the field of public administration. Prior approval of formal project proposal required.

MPA 599. Public Administration Capstone. 3 Hours

Seminar course integrating professional development, critical analysis of current topics and trends, finalization of student portfolio, reflective essay, and integrative presentation to faculty panel. Corequisite(s): may be taken with MPA 511.

Psychology

- Master of Arts, Clinical Psychology
- Master of Arts, General Psychology

Keri Brown Klrshman, Department Chairperson

Catherine Lutz Zois, Graduate Program and Clinical Psychology Program Director

R. Matthew Montoya, General Psychology Program Director

The Department of Psychology offers two graduate programs leading to the Master of Arts:

- Clinical Psychology
- General Psychology

All programs emphasize the integration of theory and research with appropriate applied experience and competence in the development of relevant and original research. This is the product of individual supervision and a low student-to-faculty ratio. The aim of the department is to prepare the student for further graduate studies at the doctoral level, and/or work at the M.A. level in an applied/community, teaching, or research setting. Academic advisors and the department chair will direct students to faculty members who share their specific interests and areas of specialization. Graduate students are encouraged to work with these faculty members on a one-to-one basis.

Assistantships

Graduate assistantships are available on a competitive basis and include a stipend as well as tuition and fee remission. The Department of Psychology also offers a limited number of traineeships to students in the clinical psychology program. The traineeship placements are at local mental health agencies and vary in number and stipend from year to year depending upon the budgets and needs of the agencies participating in the traineeship program.

Master of Arts in Clinical Psychology (CLP)

The clinical psychology program is designed with the scientist-practitioner model as its foundation. In addition to a broad academic background and competence in the application of research methodology, this program provides the student with:

1. theoretical and practical knowledge in the areas of personality, psychopathology, and psychotherapy,
2. intensive training in the assessment of intelligence and personality,
3. supervised practice in interviewing and therapeutic intervention, and
4. the opportunity to emphasize work with either children or adults.

Through practicum experience in various community and clinical settings affiliated with the University, the student can translate classroom learning into practical experience. The clinical program is designed to prepare the student for employment in clinical positions at the master's level or for further study in clinical psychology at the doctoral level, and is accredited by the Masters in Psychology and Counseling Accreditation Council (MPCAC).

All students enrolled in any of the three programs leading to the Master of Arts with a major in Psychology are subject to the following general requirements of the Department of Psychology.

1. The number of semester hours and required courses described below.

2. Demonstration of satisfactory progress toward the degree that includes the requirement that students maintain a minimum average of B (3.00) in coursework. Students who fail to meet this requirement are either placed on academic probation or dismissed from the program.
3. Students are permitted no more than six semester hours with grades of C or lower. Students who fail to meet this requirement are dismissed from the program.
4. No more than six semester hours of 400-level courses may apply toward the master's degree, and normally no more than six semester hours of graduate work approved by the department chair may be transferred from other institutions.
5. Attendance is required at regularly scheduled extra-course seminars on selected issues in psychology and at occasional specialized programs.
6. Thesis must deal with an approved research problem, incorporating an appropriate review of theory and literature, and demonstrating competence in the application of research methodology.
7. Students are expected to conduct themselves in a professional and ethical manner in accordance with generally accepted standards for psychologists. Failure to do so may result in dismissal.
8. It is the student's responsibility to know and to meet the requirements of the University and of the graduate program.

The Master of Arts with a major in psychology (clinical) requires 46 semester hours consisting of 42 hours of academic coursework, including thesis, and 4 hours of practicum as specified below. Full-time students are expected to complete program requirements in two years.

Psychology Core Requirements

PSY 501	Experimental Design & Statistics	3
PSY 502	Experimental Design & Statistics II	3
PSY 510	History & Systems	3
PSY 599	Thesis	3

Clinical Core Requirements

PSY 550	Introduction to Clinical Psychology	3
PSY 551	Assessment of Intelligence	3
PSY 553	Theories and Research in Psychotherapy	3
PSY 555	Theories of Personality & Psychotherapy	3
PSY 556	Assessment of Personality	3
PSY 564	Individual Psychotherapy	3
PSY 565	Ethical & Cultural Issues in Clinical Assessment & Psychotherapy	3
PSY 569	Clinical Practicum	1
PSY 573	Developmental Psychology	3
PSY 560	Child Psychopathology & Psychotherapy	3
PSY 558	Group Psychotherapy	3
PSY 566	Marriage & Family Therapy	3
Total Hours		46

Notes:

1. Students complete either PSY 560 Chld Path & Therpy or PSY 558 Group Psychothrpy.
2. With approval of the Director of the Clinical Program, an elective may be substituted for PSY 558 Group Psychothrpy, PSY 566 FamilyMarrg Therapy, or PSY 560 Chld Path & Therpy.

Master of Arts in General Psychology (PSY)

The Master of Arts in general psychology is designed to accommodate a variety of goals and is structured so that the student gains a basic understanding across a broad spectrum of psychology. The program prepares students for work at the doctoral level and affords the opportunity to develop skills which are viewed positively by prospective employers. The program features empirical research, conceptual analysis and critical methodology in perception, learning, memory, language, problem solving, decision making, developmental, personality and social psychology. A student takes a minimum of two courses in the areas of cognitive, developmental, and social psychology. With the six elective hours, it is also possible to take courses in clinical and human factors, or develop interdisciplinary interests in computer science, education, business, engineering, communication, or biology. The student can concentrate in a particular area of research by working with an individual faculty mentor.

All students enrolled in any of the three programs leading to the Master of Arts with a major in Psychology are subject to the following general requirements of the Department of Psychology.

1. The number of semester hours and required courses described below.
2. Demonstration of satisfactory progress toward the degree that includes the requirement that students maintain a minimum average of B (3.00) in coursework. Students who fail to meet this requirement are either placed on academic probation or dismissed from the program.
3. Students are permitted no more than six semester hours with grades of C or lower. Students who fail to meet this requirement are dismissed from the program.
4. No more than six semester hours of 400-level courses may apply toward the master's degree, and normally no more than six semester hours of graduate work approved by the department chair may be transferred from other institutions.
5. Attendance is required at regularly scheduled extra-course seminars on selected issues in psychology and at occasional specialized programs.
6. Thesis must deal with an approved research problem, incorporating an appropriate review of theory and literature, and demonstrating competence in the application of research methodology.
7. Students are expected to conduct themselves in a professional and ethical manner in accordance with generally accepted standards for psychologists. Failure to do so may result in dismissal.
8. It is the student's responsibility to know and to meet the requirements of the University and of the graduate program.

The Master of Arts with a major in psychology (general) requires 36 semester hours, including thesis, as specified below. Full-time students normally complete program requirements in two years.

PSY 501	Experimental Design & Statistics	3
PSY 502	Experimental Design & Statistics II	3
PSY 510	History & Systems	3
PSY 599	Thesis	3

Select two of the following: *

PSY 457	Television & Its Effects on Children	
PSY 573	Developmental Psychology	
PSY 574	Cognitive Development in Children	

Select two of the following: *	6
PSY 522 Advanced Cognitive Processes	
PSY 524 Human Information Processing	
PSY 529 Perception	
Select two of the following: *	6
PSY 444 Environmental Psychology	3
PSY 537 Team & Group Processes	3
PSY 585 Experimental Social Psychology	3
Six hours of electives **	6
Total Hours	45

* In special cases, PSY 597 Readings or another course in one of the content areas (e.g., PSY 588 Interpersonal Process) may be substituted for one of the named courses.

** Six semester hours, some of which may be from other departments of the University, selected in consultation with the advisor.

Integrated Natural Science Courses

SCI 690. Special Topics in the Natural Sciences for Teachers. 1-4 Hours

Special topical courses covering a science topic for teachers and designed to increase a classroom teacher's content knowledge. This may be offered in the form of a workshop and/or academic year mentoring. 1-4 credit hours.

Psychology Courses

PSY 501. Experimental Design & Statistics. 3 Hours

Study of the logic of the design of experiments in psychology with special emphasis on the use of the analysis of variance. Students will be expected to perform statistical procedures on the computer using canned statistical packages. Prerequisite(s): Undergraduate statistics.

PSY 502. Experimental Design & Statistics II. 3 Hours

Further study of the logic of the design of experiments in psychology with special emphasis on the use of bivariate correlation and regression, and multiple regression. Students will be expected to perform statistical procedures on the computer using canned statistical packages. Prerequisite(s): PSY 501.

PSY 506. Selected Topics in Advanced Research Methodology. 3 Hours

Study of special topics in statistics, research design, behavior research methods, and computer technology. The specific topic will vary from one offering to the next. Possible topics include applied multivariate statistics, questionnaire design, evaluation research methods, program evaluation, and performance measurement. May be repeated. Prerequisite(s): Graduate student status in psychology or permission of instructor.

PSY 510. History & Systems. 3 Hours

An extensive survey of the theories and research paradigms that comprise the science of psychology. Topics include an historical overview of the field, the structure of the modern profession, and selected current areas of application and inquiry. Prerequisite(s): Graduate student status in psychology or permission of instructor.

PSY 515. Human Factors. 3 Hours

Treatment of theory, data, and methods that can be applied to improve the interface between humans and the systems and products that they use. Human capabilities and limitations are studied to support the design of systems and products for safe and efficient use by the human operator.

PSY 522. Advanced Cognitive Processes. 3 Hours

The study of cognition with attention to current methods, models, and theories. Topics include cognitive neuroscience, perception and pattern recognition, attention and consciousness, memory, knowledge representation, expertise, language, concept formation, problem solving, reasoning and decision making. Prerequisite(s): Graduate level status in psychology or permission of the instructor.

PSY 524. Human Information Processing. 3 Hours

Current psychological and artificial intelligence models of cognition. Topics include coding mechanisms in the central nervous system, simulation of sensory processes and recognition, computer models of human memory, semantic information processing by humans and machine, fast retrieval theories, recent theories of language comprehension and problem solving. Prerequisite(s): Graduate level status in psychology or permission of instructor.

PSY 525. Cognitive Neuroscience. 3 Hours

Treatment of cognitive neuroscience including its foundations and methodologies. Topics include methods of cognitive neuroscience, cellular mechanisms and cognition, neuroanatomy and development, sensation and perception, object perception, control of action/motor control, attention, learning and memory, language, consciousness, and hemisphere specialization. Prerequisite(s): PSY 522 or permission of instructor.

PSY 528. Psychophysiology. 3 Hours

Neurophysiology of attention, sensation, perception, emotion, learning, memory, and motor control. Emphasis on electrophysiological indicants and cybernetical analyses. Prerequisite(s): Graduate level status in psychology or permission of instructor.

PSY 529. Perception. 3 Hours

Systematic study of methods and research findings in the field of human perception, with an evaluation of theoretical interpretations. Prerequisite(s): Graduate student status in psychology or permission of instructor.

PSY 531. Human Factors in System Development. 3 Hours

Introduction to human factors during the system development process. Treats the design process from initial conceptual stages to final testing and evaluation. Emphasis is upon methods and techniques that permit development of data to support human factors functions throughout the process. Prerequisite(s): Graduate level status in psychology or permission of instructor.

PSY 532. Cognitive Systems. 3 Hours

Cognitive systems provides a framework for analysis and design of complex sociotechnical systems with the objective of supporting the capability of the human operator to perform the cognitive work demanded by such systems. Cognitive work includes functions such as decision making, planning, situation assessment, problem solving, integrating, and coordinating that are performed in a variety of complex systems, such as health care, air traffic control, and transportation.

PSY 533. Engineering Psychology. 3 Hours

Treatment of the relationship between problems in human factors engineering and theory-based research in experimental psychology and human performance. Topics covered include theory and research in such areas as decision-making, attention, perception, and motor performance and their potential application to the design of the person-machine interface in complex systems. Prerequisite(s): Graduate level status in psychology or permission of instructor.

PSY 534. Human Computer Interaction. 3 Hours

A critical review of human factors issues in the design of user interfaces of interactive computer systems. Emphasis will be placed on topics of cognitive engineering as they apply to user-centered systems design. Prerequisite(s): Graduate level status in psychology or permission of instructor.

PSY 535. Ergonomics. 3 Hours

Ergonomics, the study of work, emphasizes the physical aspects, capabilities, and limitations of humans. Students participate in an anthropometric measurement laboratory, employ computerized biomechanical models, and examine the literature in a specific area of interest. Prerequisite(s): Graduate level status in psychology or permission of instructor.

PSY 536. Training System Development. 3 Hours

Treatment of the systems approach to training program analysis, design, and evaluation. Topics covered include assessment of training objectives, development of training program content, selection of training media, application of simulation technology, and program evaluation procedures, including transfer of training methodology. Prerequisite(s): Graduate level status in psychology or permission of instructor.

PSY 537. Team & Group Processes. 3 Hours

Study of group processes and theories with special application to team training, communication, performance, and coordination in human factors settings and problems. Group decision making and leadership are also emphasized. Prerequisite(s): Graduate level status in psychology or permission of instructor.

PSY 538. Special Topics: Human Factors. 1-3 Hours

Special topics in human factors.

PSY 550. Introduction to Clinical Psychology. 3 Hours

Introduction to interviewing skills with adults and children. Academic and applied components include supervised practice interviews and documentation. Professional components addressed include diversity, ethics, and mental health systems. Prerequisite(s): Graduate student status in clinical program.

PSY 551. Assessment of Intelligence. 3 Hours

Theoretical rationale and techniques of individual mental testing, with emphasis on the Wechsler Scales (WAIS, WISC, WPPSI) and the Stanford-Binet. Major content areas include theories of intelligence, relevant psychometric principles, clinical interpretation, and current research. Prerequisite(s): Graduate student status in clinical program or permission of instructor.

PSY 553. Theories and Research in Psychotherapy. 3 Hours

Survey of mental disorders with respect to their characteristics, etiology, and treatment alternatives. Emphasis is on the process of expanding knowledge through research. Practice in the use of the current diagnostic classification system. Prerequisite(s): Graduate student status in clinical program or permission of instructor.

PSY 555. Theories of Personality & Psychotherapy. 3 Hours

Survey and critical analysis of the major current theories of personality and psychotherapy, integrating their contributions into a diversified, functional, and adaptable approach to therapy. Prerequisite(s): Graduate student status in clinical program or permission of instructor.

PSY 556. Assessment of Personality. 3 Hours

Survey of approaches to personality assessment as well as the techniques of administration and interpretation of specific instruments. Emphasis is on the MMPI-2, NEO-PIR, and MCMI-III. Strategies of test construction and evaluation, ethical issues, and research are discussed. Prerequisite(s): (PSY 551, PSY 553) or graduate student status in clinical program or permission of instructor.

PSY 558. Group Psychotherapy. 3 Hours

Survey of theories and techniques of group psychotherapy, including a review of the theoretical and empirical literature, as well as a training group experience. Prerequisite(s): PSY 555; graduate level status in clinical program or permission of instructor.

PSY 560. Child Psychopathology & Psychotherapy. 3 Hours

Current views of the etiology and differential diagnosis of psychopathological disorders of childhood and adolescence are examined. Relevant therapeutic approaches are presented and evaluated in relation to recent research. Prerequisite(s): (PSY 553, PSY 555; graduate student status in clinical program) or permission of instructor.

PSY 564. Individual Psychotherapy. 3 Hours

In-depth study of the principles and techniques of an integrated approach to individual psychotherapy (humanistic, dynamic, and cognitive-behavioral) as developed from clinical and empirical findings. Prerequisite(s): (PSY 555; graduate student status in clinical program) or permission of instructor.

PSY 565. Ethical & Cultural Issues in Clinical Assessment & Psychotherapy. 3 Hours

An examination of ethical theories and principles applied to clinical assessment and psychotherapy. Issues addressed include ethical frameworks, ethical codes, assessment practices, psychotherapy techniques, and common problems arising in clinical practice. Prerequisite(s): Graduate student status in clinical program or permission of instructor.

PSY 566. Marriage & Family Therapy. 3 Hours

Survey of the major therapeutic approaches to family and marital problems and related research findings. Prerequisite(s): (PSY 555; graduate student status in clinical program) or permission of instructor.

PSY 567. Special Topics in Clinical Psychology. 1-3 Hours

A variable topics course on issues relevant to the training of students preparing for work in clinical psychology. May be repeated with different topics. Prerequisite(s): Graduate level status in clinical program or permission of instructor.

PSY 569. Clinical Practicum. 1 Hour

Experience in interviewing, psychological testing and therapy is acquired through placement in approved mental health agencies. Prerequisite(s): Graduate student status in the clinical program.

PSY 573. Developmental Psychology. 3 Hours

The science of human development with emphasis on theory, research methods, findings and applications. Topics selected from but not limited to personality and social development, language acquisition, problem-solving, attachment, sex roles, children's rights, moral and prosocial behavior, family relations and extrafamilial influences such as television and schools. Prerequisite(s): Graduate student status or permission of instructor.

PSY 574. Cognitive Development in Children. 3 Hours

Major approaches to the study of cognitive development: attentional and mediational development as demonstrated in children's learning, memory, and problem solving; language development and Piaget's theory. Prerequisite(s): PSY 452; (graduate status or permission of instructor).

PSY 585. Experimental Social Psychology. 3 Hours

Designed to provide information and perspective about such social psychological topics as attitude change, interpersonal attraction, social influence, attribution, aggression, helping and intrinsic motivation. Prerequisite(s): Graduate student status.

PSY 588. Interpersonal Process. 3 Hours

Seminar in research in some prominent sub-areas of social psychology. Emphasis on critical skills and research ideas in topics such as non-verbal communication, self-disclosure, affiliation and attraction, and equity theory. Prerequisite(s): PSY 585 or permission of instructor.

PSY 595. Seminar in Special Topics in Psychology. 1-3 Hours

Various topics of special interest to faculty and students. An intensive critical evaluation of the appropriate literature. May be repeated. Prerequisite(s): Graduate student status or permission of instructor.

PSY 596. Experimental Research. 1-3 Hours

Individual graduate students explore particular research areas. Under guidance of the instructor, research projects are formulated and conducted. Project reports are required. May be repeated. Prerequisite(s): Permission of instructor.

PSY 597. Readings. 1-3 Hours

Designed for individual, student-faculty study in a specialized area of interest. Topic and criteria for evaluation to be specified prior to registration. May be repeated. Prerequisite(s): Permission of instructor.

PSY 599. Thesis. 3 Hours

An original research project incorporating an appropriate review of theory and literature and demonstrating competence in the application of research methodology. Required of all graduate students.

Religious Studies

- Doctor of Philosophy in Theology
- Master of Arts, Pastoral Ministry
- Master of Arts, Theological Studies
- Certificate, Pastoral Care

Daniel Speed Thompson, Chairperson

William Johnston, Masters Programs in Theological Studies and Pastoral Ministry Committee Chair

Vincent Miller, Doctoral Program in Theology Committee Interim Chair

Amy Doorley, Graduate Studies Coordinator

The Department of Religious Studies offers two graduate programs leading to the Master of Arts: theological studies and pastoral ministry. A third program leads to the Doctor of Philosophy in theology. The distinctive research focus of the doctoral program is the practices/praxis of Catholicism as it is inculturated in multiple ways in the United States context. Master's and doctoral students join with their professors to form an ecumenical community that integrates the study of the classical disciplines of Christian theology with attentiveness to the multicultural and interdisciplinary dimensions critical to the contemporary study of religion. Intensive study of Roman Catholic traditions remains central to each graduate program. Both the master's and doctoral programs include basic requirements and allow students flexibility in the remainder of their course selection to ensure that their graduate studies serve their

desired outcomes, whether in pursuing further academic work or securing placement in professional ministry.

Assistantships

Qualified applicants are eligible for financial assistance in the form of assistantships for master's students and assistantships or fellowships for doctoral students. Awards are determined on a competitive basis. Master's students receive tuition remission for 18 credit hours per year and an annual stipend. Doctoral students receive tuition remission for 18 to 30 credit hours per year and an annual stipend.

Advising

The M.A. program director functions as the advisor for all incoming master's students. No later than the completion of the tenth semester hour of graduate credit, a student must formally choose an academic advisor from among the full-time religious studies faculty members who teach in the master's program or formally agree to have the M.A. program director of graduate studies continue as her or his advisor.

The Ph.D. program director (or the director's designate) functions as the initial academic advisor for all Ph.D. students. The Ph.D. program director assists students in first semester course selection and provides initial guidance in scheduling general examinations and selecting the five members of the general examination committee. The Ph.D. program director and coordinator of graduate studies report on advising activities for each student to the Ph.D. committee once per semester.

Doctoral students also work with a five-member general examination committee. The committee must include a faculty member from each of the core disciplines: history of Christianity, biblical studies, and theology/ethics. The committee determines whether the student passes or fails the three general examinations.

As soon as doctoral students determine their dissertation topics, they should choose, in consultation with the Ph.D. program director, a dissertation director from among the religious studies faculty members who teach doctoral seminars. The doctoral student, with the dissertation director's guidance, chooses a candidacy examination/dissertation committee. In addition to the dissertation director, this committee ordinarily consists of three religious studies faculty members who teach doctoral seminars and one member outside the department. This committee determines whether the student passes or fails the candidacy examination and reads and evaluates the dissertation.

The composition of both examination committees is subject to the approval of the Ph.D. program director and the Ph.D. committee.

Facilities

Master's and doctoral students have access to distinctive University of Dayton resources such as the Center for Leadership and Community, the Center for Catholic Education, and the Institute for Pastoral Initiatives. The Consortium of Higher Education in Religious Studies offers interaction with area seminaries and other institutions, interchange of facilities, sharing of library resources, cooperative innovative programming, and cross-registration. Students have access not only to a greater variety of courses but also opportunities for even more flexible construction of their degree programs.

The University of Dayton also houses the International Marian Research Institute which administers a doctoral program in Theology (S.T.D.) sponsored by the Pontifical Marianum University in Rome. Religious studies master's students may take courses in the Institute. Interested students should consult with their academic advisor for further information.

Doctor of Philosophy in Theology (THE)

The Ph.D. in theology employs a unique approach to theological studies and research utilizing the methodologies associated with the academic study of religion, emphasizing strong interaction with the social sciences and humanities. The program's distinctive practice of integrating methodologies prepares students to work within a web of disciplines with theology at the center of research and writing. Using this integrative methodological approach, graduates are able to do theology that is rooted in discovering, analyzing, understanding, and proposing creative transformations in their current religious context, especially as found in the practices/praxis that reflect United States Catholic experience.

Doctoral students must complete a minimum of 90 semester credit hours beyond the bachelor's degree. Up to 30 credit hours from an accredited master's program in theology or religious studies can be counted toward the 90-credit requirement. The Ph.D. program director, in consultation with the religious studies Ph.D. committee, determines the number of credits accepted.

All students must complete the following courses or their equivalent:

REL 601	Seminar in Theological Research Methods: The Tradition	3
REL 602	Seminar in Theological Research Methods: Contemporary	3
REL 603	Seminar in Theological Research Methods: Historiography	3
REL 604	Seminar in Theological Research Methods: American Catholic Studies	3

Between 12 and 30 semester hours can be earned as dissertation hours; additional dissertation hours will ordinarily not count toward the minimum of 90 semester hours for the Ph.D. Students select doctoral seminars or reading courses to complete the remainder of the 90 credits.

Each student must be in full-time residence; i.e., taking the load of a full-time student, for a minimum of one year before attempting the qualifying examination.

Comprehensive Examinations

Each student, during the course of the program, must successfully complete three general examinations and a qualifying examination.

1. The three GENERAL EXAMINATIONS approximate the master's level comprehensive examinations. A student is expected to demonstrate basic knowledge in three core disciplinary areas of theology: biblical studies, history of Christianity, and systematic theology and ethics. The examinations serve two purposes. First, they provide a student with the background necessary for teaching most college-level introductory courses. Second, they equip the student with the broad knowledge base necessary for skillful theological work. The chair of the examination committee in cooperation with the Ph.D. program director oversees the proper administration of the three exams. Each examination consists of a written component followed by an oral examination. Ordinarily, the biblical studies examination must be completed before the student completes 36 hours beyond the bachelor's degree. Students will then ordinarily complete exams in historical theology, and systematic theology and ethics in that order. Students must pass all three examinations before proceeding to the qualifying examination. Students will be registered for the appropriate general examination in the term after which the bibliography is approved. The student may repeat any examination once. Failure to pass an examination

on a second attempt terminates the student from the program. Students who took comparable exams in an accredited master's program may petition for the waiver of any or all of the general examinations. A petition is submitted to the coordinator of graduate studies who presents it to the religious studies Ph.D. committee. The committee makes the final determination.

2. Each student must pass a CANDIDACY EXAMINATION before beginning the dissertation. Ordinarily, the student must complete 54-60 semester hours beyond the bachelor's degree before attempting this examination. Through the candidacy examination, students demonstrate their ability to do original research in the field of U.S. Catholic experience. It is, therefore, substantially more detailed and extensive than the three general examinations. The qualifying examination consists of three parts:
 - a. a written examination on U.S. Catholic experience broadly conceived and the student's area of research;
 - b. a completed dissertation prospectus covering the proposed dissertation area; and
 - c. an oral examination.

Upon successful completion of the written examination and submission of the prospectus, the student has an oral examination with her or his committee. The student must be prepared to respond to questions on U.S. Catholic experience as well as her or his dissertation prospectus. The chair of the examination committee in cooperation with the Ph.D. program director oversees the proper administration of the exam. Upon successful completion of the candidacy examination, students are considered candidates for the doctoral degree. A student may repeat all or part of the candidacy examination once if needed; a second failure terminates the student from the program.

Research Skills

By the time a student has completed 54 hours in the program (including any hours accepted from other institutions), the student is expected to demonstrate a minimum of three research skills that will enable the student to do primary research in an area of the U.S. Catholic experience.

1. Latin: A basic ability to read official ecclesiastical texts in Latin is ordinarily expected of all students. Proficiency is demonstrated by successful completion of an appropriate course in Latin or by passing an examination consisting of translating a short specific text (e.g., a section of an encyclical) and accurately responding to content questions on another Latin text. The examination is to be completed within a defined time period, aided by a dictionary and grammar guide. A qualified religious studies faculty member administers the exam.
2. Research Languages: All students are expected to demonstrate at least reading proficiency in one modern language other than English. Proficiency is normally demonstrated by the successful completion of a test administered by a qualified faculty member in either the Department of Languages or Religious Studies. Depending upon the precise area of research, the student may be required to demonstrate a higher level of competency in the main research language. Students who have established proficiency in a language in another graduate program within the last five years may petition the religious studies Ph.D. committee to waive the language examination.
3. Additional Research Languages or Analytical Skills: Depending on her or his precise area of research, each student will be required to demonstrate proficiency in at least one additional research skill. For those whose research focuses on texts, that skill may be an

additional language; for those whose research includes a significant component in biblical studies or classical theology, proficiency in biblical languages may be indicated; for those doing statistical or qualitative research, facility in an additional analytical area may be necessary (e.g., statistics, ethnography, participant-observation analysis, etc.). Successful completion of a graduate course in a given analytical skill serves as an acceptable indicator of a sufficient level of proficiency for future research purposes.

The specific additional research skills (both languages and analytical) required for the student's program will be determined by the student's dissertation committee in consultation with the Ph.D. program director and religious studies Ph.D. committee. With their approval, REL 604 may fulfill the additional research languages or analytical skills requirement. A student is notified in writing of specific research skills required of her or him.

Dissertation

The dissertation is a major research project in which the candidate demonstrates the ability to define a research question, develop a research plan, employ relevant research skills and methodologies, and conduct original theological research. The candidate, in close consultation with the dissertation director, determines the topic, methodologies, and pertinent resources. The research plan is outlined in the dissertation prospectus that is submitted as part of the candidacy examination. Passing the candidacy examination means that the prospectus is accepted. Candidates may apply no more than 30 semester hours of dissertation credit to the Ph.D. degree.

The student's dissertation director and committee will be constituted as described above. The dissertation is presented to the committee in a public defense no later than four weeks prior to graduation. The dissertation committee may accept the dissertation without revisions; with minor revisions to be reviewed by the dissertation director; with major revisions to be examined by the committee; or the committee may reject the dissertation (which requires the candidate to retake the dissertation area examination and proceed from that point, as above). Upon final acceptance of the dissertation, the candidate shall be awarded the Ph.D. degree.

Master of Arts in Pastoral Ministry (PAM)

The master's program in pastoral ministry integrates the study of theology with the general principles and effective practices of pastoral ministry. The program offers students an opportunity to prepare for a variety of service careers emerging in the contemporary Church, including pastoral positions in catechetics and religious education, hospital, family, parish, and campus ministry. Courses in religious education and telecommunications, family and parish ministries, and the social teachings of the Church ensure the vitality of the program.

Program Requirements for the M.A.

This program requires 36 credit hours for graduation. The majority of the student's coursework must be taken in the Department of Religious Studies. A 3.0 grade point average in departmental courses and in the student's overall program is required for graduation.

Master's students in both theological studies and pastoral ministry are required to successfully complete three two-credit courses: REL 500B, "Foundations of Biblical Studies," REL 500C, "Foundations of Church History and Historical Theology," REL 500D, "Foundations of Systematic and Moral Theology." Students may petition the religious studies graduate committee to waive from one to three of these requirements. The student must present clear evidence of equivalent coursework to

that completed in REL 500B, C, or D for the requirement to be waived. Students must complete REL 500B prior to taking specialized biblical courses, REL 500C prior to taking specialized historical courses, and REL 500D prior to taking specialized systematic or moral theology courses. Each student must complete at least one additional two- or three-credit course in each of the four core disciplinary areas: biblical studies, historical studies, systematic theology and moral theology.

Upon completion of the basic requirements, students must then draw up a specific program proposal based upon the projected course rotation. The selection of courses is done in consultation with the student's academic advisor and in light of the student's needs, interests, and background. This program proposal is submitted to the coordinator of graduate studies to be placed in the student's file.

The courses leading to the master's degree may be pursued in summer sessions with courses of one to three weeks duration, or be pursued full-time; i.e., throughout the year. There are opportunities for on-line course work as well. The master's degree must be completed seven calendar years from the time of matriculation.

Language Proficiency

There is no language requirement for the master's degree. For specialization in the biblical or historical areas, a working knowledge of the language employed in the area, e.g., Hebrew, Greek, or Latin, is encouraged. Students preparing for doctoral work should work toward proficiency in at least one modern language.

Pastoral Ministry Seminar

Students are required to enroll in this no credit seminar at least four semesters during their pursuit of the Pastoral Ministry master's degree. The seminar provides opportunities for students to engage in those practices critical for ongoing development as a minister. Among those practices are theological reflection at least twice each semester with other students (in addition to the theological reflection integrated into the other courses) and attendance of one to two workshops focusing on practical skills like the RCIA process, managerial skills, practices of faith formation, evangelization process, Bible study, managing a budget and interpersonal skills such as instruction in specific communication techniques in areas like group building, pastoral consultation, conflict management, ministering to youth, community organizing. Over the four semesters, students are to attend at least ten different workshops evenly distributed among the various skills needed for effective ministry.

Pastoral Ministry Formation

Students are required to attend human and spiritual formation sessions. Students meet individually and in groups with the coordinator of graduate studies to engage in those practices critical in formation as a minister. Among but not limited to those practices are opportunities for individual sessions with the coordinator, group spiritual formation (REL 583 - Spiritual Formation), and formation regarding human development and communication. Over the four semesters, students are to attend at least four individual sessions with the coordinator, at least six of the eight different group spiritual formation sessions, and at least two sessions on human development and communication.

Structure of the Master of Arts in Pastoral Ministry

This program is divided into three parts:

1. Theological foundations (12 to 15 hours including the six required credits);
2. Basic principles for effective ministry (six to nine hours); and

3. The practice and study of specific ministries (9 - 12 hours), including a practicum (3 hours) and the required pastoral ministry seminar (no credit).

REL 500B	Foundations of Biblical Studies	2
REL 500C	Foundations of Church History & Historical Theology	2
REL 500D	Foundations of Systematic & Moral Theology	2
Select one course from each area:		8-12
Biblical		
Moral		
Systemic		
Historical		
Pastoral Ministry courses including:		12
REL 581	Pastoral Ministry Seminar	
REL 583	Spiritual Formation	
REL 589	Practicum	
REL 580	Theology of Ministry	
or REL 586	Leadership in Parish Ministry	
or REL 585	Pastoral Counseling	
or REL 584	Canon Law	

Language Proficiency

There is no language requirement for the master's degree. For specialization in the biblical or historical areas, a working knowledge of the language employed in the area, e.g., Hebrew, Greek, or Latin, is encouraged. Students preparing for doctoral work should work toward proficiency in at least one modern language.

Certificate in Pastoral Care

A certificate in Pastoral Care is available for those Pastoral Ministry students who complete an additional thirteen semester credit hours through Counselor Education and Human Services. This certificate offers educational grounding in human development and counseling theory. It may be particularly helpful for ministers who will apply for the Certification of Lay Ecclesial Ministers.

EDC 531	Personality & Human Development Across the Lifespan	2
EDC 545	Counseling Techniques Lab	2
EDC 575	Counseling Diverse Populations	3
EDC 583	Theories & Techniques of Group Counseling	3
EDC 623	Foundations in Abnormal Psychology	3
EDC 635	Couples & Family Counseling	3

Master of Arts in Theological Studies (THL)

The master's program in theological studies offers a comprehensive approach to the study of theology and religion. Each student is expected to develop an understanding of biblical sources, historical developments in Christianity, and contemporary systematic and moral theologies, especially in the Roman Catholic tradition. Ecumenical perspectives among Christians and interfaith dialogue among the world religions provide another important matrix for study.

Program Requirements for the M.A.

This program requires 36 credit hours for graduation. The majority of the student's coursework must be taken in the Department of Religious

Studies. A 3.0 grade point average in departmental courses and in the student's overall program is required for graduation.

Master's students in both theological studies and pastoral ministry are required to successfully complete:

REL 500B	Foundations of Biblical Studies	2
REL 500C	Foundations of Church History & Historical Theology	2
REL 500D	Foundations of Systematic & Moral Theology	2

Students may petition the religious studies graduate committee to waive from one to three of these requirements. The student must present clear evidence of equivalent coursework to that completed in REL 500B, C, or D for the requirement to be waived. Students must complete REL 500B prior to taking specialized biblical courses, REL 500C prior to taking specialized historical courses, and REL 500D prior to taking specialized systematic or moral theology courses. Each student must complete at least one additional two- or three-credit course in each of the four core disciplinary areas: biblical studies, historical studies, systematic theology and moral theology.

Upon completion of the basic requirements, students must then draw up a specific program proposal based upon the projected course rotation. The selection of courses is done in consultation with the student's academic advisor and in light of the student's needs, interests, and background. This program proposal is submitted to the director of graduate studies for approval.

The programs leading to the master's degree may be pursued in summer sessions with courses of one to three weeks duration, or be pursued full-time; i.e., throughout the year. The master's degree must be completed seven calendar years from the time of matriculation.

Structure of the Master's Programs and Coursework

Three arrangements are possible:

1. 36 hours of coursework (including the seven required credits) plus submission of a research paper (completed in a course taken between the 15th and 24th hours of coursework) to the coordinator of graduate studies;
2. 33 hours of coursework (including the seven required credits) plus a three-hour comprehensive project with an oral defense; or
3. 30 hours of coursework (including the seven required credits) plus a 6-hour thesis with an oral defense.

Language Proficiency

There is no language requirement for the master's degree. For specialization in the biblical or historical areas, a working knowledge of the language employed in the area, e.g., Hebrew, Greek, or Latin, is encouraged. Students preparing for doctoral work should work toward proficiency in at least one modern language.

Concentration in Marian Studies

A concentration in Marian Studies is available for students who take between 12 and 16 semester credits in specially designated courses listed under the Marian studies concentration. The International Marian Research Institute at the University of Dayton offers these courses on a regular basis. All graduate students have access to the world-renowned resources of the Marian Library for their research.

Courses

REL 500B. Foundations of Biblical Studies. 2 Hours

This required course focuses on critical reading and discussion of representative texts from the field of biblical studies to introduce content and methods at a master's level. Passing a final examination completes the requirement.

REL 500C. Foundations of Church History & Historical Theology. 2 Hours

This required course focuses on critical reading and discussion of representative texts from the related fields of church history and historical theology to introduce content and methods at a master's level. Passing a final examination completes the requirement.

REL 500D. Foundations of Systematic & Moral Theology. 2 Hours

This required course focuses on critical reading and discussion of representative texts from the related fields of systematic and moral theology to introduce content and methods at a master's level. Passing a final examination completes the requirement.

REL 501. Biblical Hebrew I. 3 Hours

Introduction to the morphology and syntax of biblical Hebrew to facilitate the handling of basic tools and the reading of simple prose texts.

REL 502. Biblical Greek I. 3 Hours

Introduction to Hellenistic Greek. Vocabulary, grammar, and syntax. Selective readings of New Testament texts.

REL 503. Biblical Hebrew II. 3 Hours

Introduction to the morphology and syntax of biblical Hebrew to facilitate the handling of basic tools and the reading of simple prose texts.

REL 504. Biblical Greek II. 3 Hours

Introduction to Hellenistic Greek. Vocabulary, grammar, and syntax. Selective readings of New Testament texts.

REL 511. Contemporary Biblical Criticism. 2-3 Hours

Introduction to the principal methodological approaches to the Hebrew Bible and New Testament, with an emphasis on introductory matters, content, and cultural heritage. Will include a survey of the major results of contemporary biblical scholarship. Prerequisite(s): REL 500B.

REL 513. Old Testament Exegesis. 2-3 Hours

Critical study of selected writings of the Old Testament. (1) Pentateuch, (2) Historical Books, (3) Prophets, (4) Psalms, (5). Wisdom Literature, (6) Apocalyptic Literature. Prerequisite(s): REL 500B.

REL 518. New Testament Exegesis. 2-3 Hours

Critical exegetical study of selected writings of the New Testament. (I) Synoptics: Matthew and Mark, (2) Luke/Acts, (3) John, (4) Pauline Corpus, (5) Pastoral Epistles, (6) Book of Revelation. Prerequisite(s): REL 500B.

REL 519. New Testament Theology. 2-3 Hours

A thorough study of one theme in the theology of the New Testament. May be taken more than once. Prerequisite(s): REL 500B.

REL 520. History & Theology of the Early and Medieval Church. 2-3 Hours

Early Medieval foundations, the Carolingian Renaissance, the preparation of the 11th and 12th centuries, as well as the post-13th century movement toward nominalism, to give perspective to the High Scholasticism of the 13th century. Prerequisite(s): REL 500C.

REL 523. Trent to Vatican II. 2-3 Hours

Historical account of Christianity's theological response to the major reformers and of further theological developments of Christianity in the context of philosophy, science, and political revolutions up to Vatican II. Prerequisite(s): REL 500C.

REL 524. Protestant Christianity. 2-3 Hours

Survey of the development of Protestant thought from the Reformation to the present. Analysis, in their own writings and historical context, of selected Protestant theologians, such as Luther, Calvin, Knox, Cranmer, Schleiermacher, Ritschl, Harnack, and Barth. Prerequisite(s): REL 500C.

REL 525. Augustine. 2-3 Hours

The life and work of Augustine of Hippo (354-430), a major theologian of Western Christianity, whose influence in both Protestant and Catholic traditions includes sexual ethics, church-state relations, Trinitarian and sacramental theology. Prerequisite(s): REL 500C.

REL 528. US Catholicism. 2-3 Hours

Examination of the experiences and contributions of the people who formed the Catholic Church in the United States. A focus on the influence of Catholicism on American culture, politics, intellectual life, education, and religion and an investigation of how Catholic faith has informed the attitudes and actions of U.S. Catholics regarding culture, politics and social justice. Topics include religious liberty, lay movements in the U.S., anti-Catholicism, contributions of U.S. Catholic women, African American Catholics, and Hispanic/Latino[a] Catholics. Prerequisite(s): REL 500C.

REL 529. African-American Religions. 2-3 Hours

Investigation of how religion has shaped African American identity, culture and community. Addresses the religious experience of African Americans through their theology, literature, music, history, and creative arts in the forms of the slave narratives, the spirituals and Gospel music, black homiletics, and other writings. Prerequisite(s): REL 500C.

REL 535. God & Human Experience. 2-3 Hours

A survey of Christian theologies of God, traditional and modern, and the viewpoints they represent on the nature and purpose of human existence. Prerequisite(s): REL 500D.

REL 537. Christology. 2-3 Hours

An examination of the approaches taken by contemporary theologians in discussing Jesus and his significance for Christian faith. Prerequisite(s): REL 500D.

REL 540. Ecclesiology. 2-3 Hours

Study of the nature and mission of the church, with an emphasis on Catholic perspectives. Topics include the church as mystery, models of the church, ecumenism, authority, laity, and the church-world relationship. Prerequisite(s): REL 500D.

REL 543. Sacramental Theology. 2-3 Hours

Detailed study of the principle of sacramentality and of the individual sacraments, stressing the historical development of each and its contemporary renewal. Prerequisite(s): REL 500D.

REL 544. Selected Catholic Doctrines. 2-3 Hours

An examination from several perspectives (biblical, historical, and systematic) of Catholic doctrines and dogmas, including the notion of dogma, its development, Scripture and Tradition, Papal Infallibility, Freedom of Conscience, the Marian Dogmas, and the Salvation of non-Christians. Prerequisite(s): REL 500D.

REL 545. Contemporary Theologians. 2-3 Hours

An examination of several contemporary approaches to theological method. Beginning with an overview of revolutionary challenges to theology in the nineteenth century, the course will examine the lives and contributions of such influential and diverse religious thinkers as Lonergan, Gutierrez, Ruether, Schillebeeckx, Rahner, and Kung and explore Feminist, Latin American, Asian, and African theologies. Prerequisite(s): REL 500D.

REL 546. Liturgy & Sacraments. 2-3 Hours

Study of ritual, theological, and pastoral dimensions of constitutive features of Christian liturgy, and of the Eucharist and selected other sacraments. Prerequisite(s): REL 500D.

REL 548. Theology of Prayer. 2-3 Hours

Study of the meaning of prayer, focusing on prayer in the Hebrew and Christian Scriptures, prayer as reflected in selected classical mystical writers, and contemporary approaches to prayer. Prerequisite(s): REL 500D.

REL 549. Aquinas. 2-3 Hours

Theology of Aquinas including Trinity, human nature, providence, grace, virtue, Christ, and sacraments with attention to historical context and contemporary interpretation. Main focus is study of the Summa. Prerequisite(s): REL 500D.

REL 550. Feminist Theology. 2-3 Hours

An examination of the emergence and development of feminist theology (a form of liberation theology), the nature of its discourse and methodology, and the ways in which feminist insights are transforming the study of scriptures, systematic theology, spirituality, and church history. The interfaith character of religious feminism will also be studied. Prerequisite(s): REL 500D.

REL 551. Theology & World Religions. 2-3 Hours

An examination of the reality, challenges, and opportunities confronting faith communities in our multicultural and religiously pluralistic societies. Students explore the spiritual resources of several of the world's religions, the ways in which these religions view one another, and the impact of interreligious dialogue and collaboration on the development of Christian theology today. Prerequisite(s): REL 500D.

REL 561. Catholic Moral Theology. 2-3 Hours

This course introduces students broadly to Catholic moral theology, by discussing the changing contexts of Catholic moral theology from the manualist tradition to the present, and by engaging some of the contemporary debates present in both magisterial and theological works. Prerequisite(s): REL 500D.

REL 562. Theo-Ethical Reasoning. 2-3 Hours

Students of this course will learn to distinguish reasoning from rhetoric in the artful science of analyzing and constructing theo-ethical arguments by means of repeated utilization of technical notions (such as claims, reasons, warrant and backing) within a theological framework. Prerequisite(s): REL 500D.

REL 563. Theology of Christian Discipleship. 2-3 Hours

Study of Christian ethics through the lens of discipleship, drawing particularly on the theological reflection on scripture within Church traditions. Topics may include citizenship, evangelization, martyrdom, warfare, marriage, prayer, and economic practice. Prerequisite(s): REL 500D.

REL 571. Mary & New Testament. 2 Hours

Study of the principal New Testament texts with reference to Mary as Mother of the Redeemer, as figure of the Church, and with reference to her role in the history of salvation. Prerequisite(s): REL 500B.

REL 572. Mary: Patristic Period. 2 Hours

Initial development of Marian doctrine and devotion in Greek, Latin, and Oriental patristics (first six centuries). Prerequisite(s): REL 500C.

REL 573. Mary: Medieval Period. 2 Hours

Study of the development of Mariology from the 7th century to the Renaissance: Marian doctrines, Marian devotions, Mary in art and liturgy, Marian feasts, and principal Marian works. Prerequisite(s): REL 500C.

REL 574. Mary: Modern Period. 2 Hours

Study of the development of Mariology from the Renaissance to the 20th century: principal Marian questions/controversies, Marian devotions, Marian shrines, Mary in art and liturgy, Marian feasts, and principal Marian works. Prerequisite(s): REL 500C.

REL 575. Mary: Contemporary Period. 2 Hours

Study of the teaching of Vatican II about the Blessed Virgin Mary, especially in chapter VIII of LUMEN GENTIUM and its implications and developments in contemporary Marian doctrine and devotion. Recent encyclicals on Mary. Prerequisite(s): REL 500C.

REL 577. Spirituality of Mary. 2-3 Hours

Study of the spirituality of Mary: e.g., Mary and the Holy Spirit; Mary's virtues; Mary as first disciple of the Lord, as Servant of the Lord, and as model of the Church. Prerequisite(s): REL 500D.

REL 578. Special Marian Topics. 2 Hours

Study of issues and subjects pertinent to Mariology. Prerequisite(s): REL 500D.

REL 579. IMRI Directed Study. 1-3 Hours

Courses studying, analyzing, or investigating a specific area of Mariology.

REL 580. Theology of Ministry. 2-3 Hours

Study of ministry as the right and responsibility of all Christians; Jesus' dying and rising as the unifying thread linking the description, division, and chief aspects of ministry to evangelization and the kingdom; pastoral implications of the foregoing.

REL 581. Pastoral Ministry Seminar. 0-3 Hours

Study of the practices critical for ongoing development as a minister with a focus on engaging in theoretical reflections. Those seeking the pastoral ministry degree are required to enroll at least four times during their course of studies.

REL 582. Introduction to Spiritual Direction & Pastoral Care. 2-3 Hours

Introduction to the basic principles and practices of spiritual direction and pastoral care for those working in various pastoral settings, including parishes and health care facilities.

REL 583. Spiritual Formation. 0 Hours

Study of the practices critical for ongoing development as a minister with a focus on engaging theoretical reflections. Those seeking the pastoral ministry degree are required to enroll at least four times during the course of their studies.

REL 584. Canon Law. 2-3 Hours

Study of those sections of canon law especially relevant to the lay ecclesial minister serving in a Roman Catholic context. Required of those seeking the pastoral ministry degree.

REL 585. Pastoral Counseling. 2-3 Hours

Brief study of the methods of counseling with emphasis on those modes most in practice today. Concentration on the major problems faced by counselors in the pastoral area.

REL 586. Leadership in Parish Ministry. 2-3 Hours

Study of the traditional parish structure as seen against the background of biblical and historical perspectives on the local church. An examination of the forces for change in the contemporary parish with an effort, out of the theoretical framework of leadership and administration, to assist the student in developing a philosophy and strategy of leadership.

REL 589. Practicum. 3-6 Hours

Approved supervised pastoral involvement coupled with theological reflections.

REL 590. Selected Questions. 1-3 Hours

Study of specific questions and developments in biblical, historical, systematic, or catechetical theology.

REL 591. Special Topics. 1-6 Hours

Graduate workshop and/or seminar investigating and analyzing a specific area of theology and interdisciplinary scholarship concerning contemporary issues.

REL 592. Contemporary Issues. 1-6 Hours

Study of issues and subjects pertinent to theological studies and pastoral ministry.

REL 593. Directed Study. 1-3 Hours

Directed study of a particular theologian, problem, or historical period.

REL 594. Foundations of Leadership For Comprehensive Youth Ministry. 3 Hours

Broad exploration of the competencies necessary for youth ministry leaders serving as coordinators or directors of youth ministry in parishes and/or other Catholic institutions.

REL 595. Leadership Skills for Comprehensive Youth Ministry. 3 Hours

Broad exploration of vital leadership capabilities for effective and fruitful pastoral ministry with adolescents.

REL 598. Comprehensive Project. 3 Hours

No description available.

REL 599. Thesis. 6 Hours

No description available.

REL 601. Seminar in Theological Research Methods: The Tradition. 3 Hours

Examination of the methods and practices that comprise the most influential traditions of Christian theology. Students will gain a basic understanding of the theological approaches, methods, and practices as they have developed over time. Required of all entering doctoral students; open with permission to advanced master's students.

REL 602. Seminar in Theological Research Methods: Contemporary. 3 Hours

Examination of methods and practices that exemplify the most influential contemporary theological work in the Christian tradition. Students will gain a basic understanding of theological approaches, methods, and practices currently shaping the theological disciplines with a focus on theology as the center of a network of disciplines. Required of all entering doctoral students; open with permission to advanced master's students.

REL 603. Seminar in Theological Research Methods: Historiography. 3 Hours

Examination of various historical accounts of U.S. Catholicism to gain familiarity with key events, persons, and movements in U.S. Catholicism and the historiography of the subject. Students will gain an understanding of the theological dimensions of U.S. Catholic history and historiography. Required of all entering doctoral students; open with permission to advanced master's students.

REL 604. Seminar in Theological Research Methods: American Catholic Studies. 3 Hours

Examination of the most influential contemporary work in American Catholic Studies to highlight the interdisciplinary nature of the theology doctoral program. Students will gain a basic understanding of methods and practices currently shaping American Catholic Studies and its impact upon theological work. Required of all entering doctoral students; open with permission to advanced master's students.

REL 610. General Examination of Biblical Studies. 0 Hours

Examination in Biblical Studies for Ph.D. students in Theology.

REL 611. General Examination of Historical Theology. 0 Hours

Examination in Historical Theology for Ph.D. students in Theology.

REL 612. General Examination of Systematic Theology and Ethics. 0 Hours

Examination in Systematic Theology and Ethics for Ph.D. students.

REL 615. Candidacy Exam. 0 Hours

Candidacy examination for Ph.D. students in Theology. D. program. Thirty semester hours may be from a MA in Theology or equivalent degree. Thirty semester hours of doctoral-level course work and language and additional research requirements. Prerequisite(s): 60 semester hours in the Ph.

REL 620. Seminar: United States Catholic Experience in Historical Perspective. 3 Hours

Examinations of the complex interactions between European-formed, medieval and post-Tridentine Catholic spiritualities, theologies and communities, in the early contact period with indigenous cultures and the later U.S. national context. A focus upon specific people, movements, thought, practices, and institutions prior to Vatican II will provide the content for considering enduring influences or decisive moments in shaping the contemporary U.S. Catholic experience. The seminars consider social, cultural, economic, political as well as the religious and theological influences that comprise the multiplicity of the U.S. Catholic experience.

REL 623. Seminar: United States Catholic Experience in Theological Perspective. 3 Hours

Examinations of the complex interaction between U.S. Catholic experience and theologies. Foci may include specific people, movements (e.g., ecumenism, ethnicity, feminism, pluralism, restorationism, etc.), issues, theologies, practices, or institutions. Elective for doctoral students; open with permission to advanced master's students.

REL 633. Seminar: United States Catholic Experience in Historical Perspective. 3 Hours

Examinations of specific people, movements, thought, practices, and institutions in US Catholic history. Seminars consider social, cultural, economic, political as well as religious and theological influences that comprise the multiplicity of the U.S. Catholic experience. Elective for doctoral students; open with permission to advanced master's students.

REL 640. Seminar: United States Catholic Experience in Cultural Perspective. 3 Hours

Focused examination of interdisciplinary scholarship on Catholicism, with an emphasis on theological engagement with cultural methods of study. Elective for doctoral students; open with permission to advanced master's students.

REL 645. Seminar: United States Catholic Experience in Theological Perspective. 3 Hours

Examinations of the complex interaction between U.S. Catholic experience and theologies after Vatican II and social, cultural, economic, and political movements which influence and are influenced by contemporary theologies. Foci may include specific people, movements (e.g., ecumenism, feminism, ecological issues, multi-culturalism, restorationism, etc.), theologies, practices, or institutions.

REL 653. Seminar: United States Catholic Experience in Ethics, Practice & Contemporary Society. 3 Hours

Examination of the complex interaction between US Catholic experience and theological-ethical/moral thought broadly understood. Possible foci include philosophical and theological moral frameworks and their changes over time; people and movements; communal practices such as evangelization, catechesis, and liturgy; and contemporary social questions. Elective for doctoral students; open with permission to advanced master's students.

REL 660. Seminar: Ethics, Practice & Contemporary Society. 3 Hours

Examinations of specific foundational or applied questions in contemporary Christian ethics, especially in patterns of communal practices such as evangelization, catechesis, liturgy, etc. Issues with particular relevance for North America will be the focus of research in these seminars. Differing perspectives from diverse methodological traditions will be highlighted.

REL 671. Special Topics: History. 3 Hours

Specialized examination of topics in history, including those outside US Catholic contexts and time periods. Elective for doctoral students; open with permission to master's students.

REL 672. Special Topics: Theology. 3 Hours

Specialized examination of theologies, including those outside US Catholic context. Elective for doctoral students; open with permission to advanced master's students.

REL 673. Special Topics: American History. 3 Hours

Examination of theology in relation to US history, with particular attention to non-Catholic voices, movements, events, periods, and concerns. Elective for doctoral students; open with permission to advanced master's students.

REL 674. Special Topics: Cultural Perspectives. 3 Hours

Specialized examination of specific questions related to cultural studies and other interdisciplinary methods. Elective for doctoral students; open with permission to advanced master's students.

REL 675. Special Topics: Ethics and Moral Theology. 3 Hours

Examination of specific foundational or applied questions in contemporary Christian ethics. Elective for doctoral students; open with permission to advanced master's students.

REL 676. Special Topics: Scripture. 3 Hours

Specialized examination of specific questions in scriptures and related texts. Elective for doctoral students; open with permission to advanced master's students.

REL 697. Directed Readings. 1-3 Hours

Designed for individual, student-faculty study in a specialized area of interest. Topic and criteria for evaluation to be specified prior to registration. Students may take no more than two directed readings per term.

REL 699. Dissertation. 3-12 Hours

Research for an original research project for the doctoral degree, incorporating an appropriate review of theory and literature and demonstrating competence in the application of research methodology.

School of Business Administration

Paul M. Bobrowski, Dean
 Harvey G. Enns, Associate Dean
 John E. Gentner, Director, MBA Program
 Tel. 937-229-3733
 Web site: <http://business.udayton.edu/mba>

We are a learning community committed in the Marianist tradition to educating the whole person and to connecting learning and scholarship with leadership and service within an innovative business curriculum designed to prepare students for successful careers in the contemporary business environment.

Academic Awards

Each semester a "Certificate for Outstanding Academic Achievement" is awarded to those graduating students who have achieved a GPA of 3.8 or higher. The certificates are mailed to the students approximately one month following graduation.

The Reverend Raymond A. Roesch, S.M., Award of Excellence for outstanding academic achievement is awarded each May to the MBA graduate from the preceding calendar year who, based on the judgment of the faculty, has demonstrated the highest level of academic achievement and contributions in his or her MBA program. The award consists of a plaque which is presented to the student plus an engraved plate displayed in the School of Business.

Academic Standards

The faculty of the University of Dayton School of Business Administration is committed to a rigorous learning environment which challenges MBA students to achieve high levels of performance. This environment fosters the development of contemporary business skills and abilities among students.

Theory & Practice in the MBA

Foundation courses present fundamental knowledge about various business functions and provide a solid base for moving to higher-level MBA core classes. Core and elective courses expand students' knowledge and enhance their abilities to apply this knowledge. For these latter courses, the faculty use teaching methods that act to advance students' understanding of practical business situations. While students are exposed to the relevant concepts and theory in each course, experiences that complement this material engage students as active participants in the learning process. These may take the form of case analyses, teamwork, business simulations, projects and consulting experiences with practicing business executives.

Expectations & Evaluation

Grading

The faculty maintains high expectations of students. By creating and maintaining a climate of challenge, faculty help students to demonstrate significant academic achievement. These expectations are shared with students early in each semester and those challenging goals are then reinforced as the term progresses. The faculty then carefully examines student performance in light of these objectives and will use the full range of possible grades below to evaluate that performance. A GPA of 3.0 or higher must be maintained and is the minimum required for graduation.

Grading is based on a point system in which corresponding letter and quality points are the following:

A Excellent (4.000 quality points)
 A- (3.667 quality points)
 B+ (3.333 quality points)
 B Average (3.000 quality points)
 B- (2.667 quality points)
 C Poor (2.000 quality points)
 F Failing (0 quality points)

If an "F" grade is received in a Foundation, Core or Capstone class, the student must repeat the class and earn a passing grade. All retaken classes, including the original attempt, are shown on the student's transcript and in most cases the grades for both the original course and all retake attempt(s) are included in cumulative quality-point average calculations. Consistent with University policy, however, graduate students may retake a single course one time only during the course of their program and exclude the lower grade from the calculation of their cumulative quality-point average, although both attempts will be shown on the transcript. Please refer to the Graduate Retake Policy for more details.

Other Possible Grades Assigned

W (Withdrawal) - During the fall and spring terms, a student may withdraw from a full-semester course without record during approximately the first three weeks of the term. During the accelerated summer sessions, withdrawal without record may take place during approximately the first two weeks. Thereafter, a student in a full-semester course may withdraw with record through approximately the eleventh week of a regular term or the fourth week of a summer session. For half-semester courses, contact the MBA Office

I (Incomplete) - A student in good standing in a course may, after the official withdrawal deadline, petition to the professor for an "I" grade. This grade is appropriate only if extraordinary conditions beyond the control of the student have led to an inability to complete course requirements. This must be documented and approved by an instructor who may then assign an "I" grade if a) the reasons presented by the student are deemed acceptable, b) the student has completed a sufficient amount of coursework to justify this grade in anticipation of completion of the work, and c) the professor and student agree to a one-term plan of action for completing the coursework.

In the School of Business Administration, the additional coursework must be completed and graded within one regular (non-summer) academic term from the date listed on the grade report or that "I" grade will automatically change to an "F" on the student's transcript.

X (Audit) - The "X" grade indicates that the student has registered to audit the course. No credit hours or quality points are awarded. Any course taken for audit may not be retaken at a later date for credit. Therefore, a course required for graduation may not be audited.

N (No grade) - The "N" grade indicates that no grade was reported by the instructor. Questions should be directed to the instructor.

Academic Probation

A student will be placed on probationary academic status if his or her cumulative grade point average falls below 3.0 (see University Academic Standards Policy). While on probation, a student may not transfer any coursework from another university or college and may not receive financial assistance administered by the School of Business Administration. That student must complete a written academic recovery contract, approved by their graduate program director. This plan will

specify goals, expectations, and a timeline for achieving good academic standing. It must also specify the duration of the probationary period, which may not be shorter than one academic semester nor longer than one calendar year.

A student on academic probation will be returned to good academic standing if their cumulative grade point average reaches 3.0 or better at the end of the probationary period. If a student remains below a 3.0 upon completion of the academic probation period, they will be dismissed from the program. Finally, a student who has returned to good academic standing, but whose GPA again falls below 3.0, must complete a plan to return to good standing and have it approved by the program director if they wish to continue in the program. In no circumstances, however, will students be permitted to take more than 9 credits beyond initial degree requirements in order to return to good standing. Likewise, all must be eligible to graduate within the five-year limit for post-foundation credits. Failing this, a student will be dismissed.

Grade Appeals

A grade appeal may be initiated, provided that it is done within 30 calendar days following the end of that academic term in which the grade was assigned and provided further that one of the following three criteria is met:

1. That the grade received appears to be inconsistent with the performance of the work required and recorded for that course;
2. The grade is inconsistent with what has been recorded for the course;
3. The grade received was explicitly determined by criteria other than the stated criteria system for that course.

The appeal process must be initiated by consulting directly with the faculty member involved. No appeal will be further considered if this first step is not followed. If agreement is not reached at that point, however, the appeal may be submitted in writing by the student to the department chairperson(s) with fully supporting facts and documentation for review.

Accreditation

The University of Dayton's business programs, including undergraduate, accounting and MBA, are fully accredited by the most rigorous accrediting body for business education programs, AACSB International - the Association to Advance Collegiate Schools of Business.

Financial Assistance

Graduate Assistantships

Graduate Assistants work in an academic department in exchange for part or all of their tuition. Graduate Assistants also receive a stipend. A typical Graduate Assistant will work 20 hours a week. If you are interested in applying for a Graduate Assistant position, please contact the MBA Office at (937) 229-3733 or visit the MBA website at <http://business.udayton.edu/mba>. Students must be fully accepted into the MBA program in order to qualify for a possible Graduate Assistantship position.

The usual appointment is for a period of nine months. Renewal may be awarded for a second year, contingent upon satisfactory performance. Assistantships are limited each year; therefore, competition is keen.

Individual Research

Students who have an interest in doing an in-depth study of a particular business topic can elect individual research with the approval of a faculty

advisor. Individual research can qualify for one to six semester hours of credit; most studies are three semester hours. Typically, a student may take MBA 695 when 12 core hours (after foundation requirements) have been met.

Approval is obtained by completing a project proposal form, available online or from the MBA Office. A student works with a faculty member to agree on a topic and a project proposal. The faculty advisor and the MBA Director review and approve the proposal prior to registration. The student is expected to maintain close contact with the faculty member who will provide guidance and evaluation. Individual research projects are to be completed within one term.

MBA Multilateral Transfer Agreement

The University of Dayton is a member of a select group of AACSB-accredited AJCU business schools who have jointly agreed to a special transfer arrangement. A student may transfer up to half of the post-Foundation coursework to or from another MBA program at one of these universities. These programs are located in many major cities such as Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, Milwaukee, New Orleans, Portland, St. Louis, San Diego, San Francisco, Santa Clara, Scranton and Spokane. Please contact the MBA Office for more information.

Mission

The School of Business Administration offers an MBA curriculum that is multidisciplinary, integrative and flexible. The faculty and administrators in collaboration with the local business community believe that developing technologies, globalization, and workforce diversity have created a demand for change in higher education. Thus, UD has created an MBA program that better prepares students to solve complex business problems that straddle functional boundaries.

The mission of the Master of Business Administration (MBA) program is to develop students' business knowledge and skills to address critical business issues faced by enterprises. Through integrated and multidisciplinary educational experiences that place significant emphasis on critical thinking, our graduates become excellent candidates for key leadership roles within their organizations.

The MBA program develops graduates who have:

- An in-depth understanding of the functional areas of business
- An understanding of functional integration in the business enterprise
- An ability to visualize and conceptualize business opportunities, and provide effective leadership in pursuit of those opportunities
- An understanding of the relations between the firm and its stakeholders as well as balancing their needs
- An understanding of a commitment to ethical decision making

Post Master's Business Certification Program

The University of Dayton has designed a unique Post-Master's Business Certificate Program designed to enable business leaders to keep pace with today's changing business demands. The program allows professionals who have already achieved a master's degree in business to further advance their career development by earning a professional graduate certificate in an approved concentration field.

A Post-Master's Business Certificate may be earned in Cyber-Security, Finance or Marketing. In addition, students may choose any three electives to earn a certificate in contemporary topics. To attain a certificate, a student must complete a minimum of nine semester hours of approved graduate elective credit at the University of Dayton in the chosen area of concentration. Additional prerequisite credits may be required via academic course work or placement exams if graduate studies were completed more than four years ago.

Students have three years to fulfill the required credits. Upon completion, a Post-Master's Business Certificate noting professional competency in the chosen academic discipline is issued. For more information on how you may keep your professional skills updated and earn the recognition you are seeking, please contact the MBA Office at (937) 229-3733 or visit our website at <http://business.udayton.edu/mba>.

Transfer Credit

A maximum of six semester hours of appropriate graduate credit earned at another accredited graduate school may be applied toward the post-foundation requirements of the MBA Program at the University of Dayton. This transfer credit may be applied if the student graduates from the UD MBA Program within a maximum of four years from the date such courses were completed.

In some cases, the credit will have been completed at another university prior to matriculation in the MBA Program. To transfer this credit, a letter of request must be initiated by the student and sent with course descriptions to the MBA Office. Official transcripts must accompany the letter. The request should be initiated during the first term of enrollment. If approved, the credit will be transferred upon completion of nine semester hours of UD MBA coursework and if the student is in good academic standing.

In other cases, a student, having started the UD MBA Program, will seek to transfer credit from another university to satisfy academic requirements. In these cases, the student must obtain approval for transfer credit for the course(s) prior to enrollment. The catalog descriptions or syllabi of the intended course(s) should be submitted to the MBA Office. Consultation with an MBA advisor is also recommended. After course approval and completion, official transcripts are required. Transfer credit coursework must be of "B" quality or better. Quality points are not transferred.

Programs of Study

To learn more about the available programs in the School of Business Administration, explore the programs of study:

- Master of Business Administration
- Certificate in Business Systems Analysis and Design
- Certificate in Business Analytics
- Certificate in Business Intelligence
- Certificate in Cyber-Security Management
- Certificate in Project Management

Master of Business Administration

The MBA Program is a 30 semester credit hour program for the student with a recent undergraduate degree in business. For the student with a non-business degree, or who lacks coursework in key areas of undergraduate business study, foundation courses are required.

Eleven courses are required of all students consisting of eight Core courses (12 semester hours) and two Capstone courses (6 semester hours). The final required course is entitled "The Principled Organization Integrating Faith, Ethics and Work" (3 semester hours). Additionally, three Elective courses (9 semester hours) are required of all students. Three MBA Elective courses may be chosen in any area.

Foundation Courses

Students who need coursework in basic business knowledge and skills are required to take the appropriate course(s) from the following foundation courses. The Foundation courses consists of a variety of courses up to a maximum of 15 hours. All foundation courses are accelerated, half-semester courses.

A student applying to the MBA program may have foundation courses waived if appropriate undergraduate studies with earned grades of C or better have been completed within four years. Grades earned from undergraduate coursework will not be calculated in the cumulative MBA grade point average. However, grades earned from MBA foundation courses will be calculated into the cumulative MBA grade point average. When foundation courses are required, they must, when offered, be completed before proceeding to core, elective, or capstone courses. For information on appropriate undergraduate courses to waive foundation requirements, contact the MBA office.

Placement exams, which waive foundation courses, are also available to students who can demonstrate experience or knowledge in a particular area. All placement exams should be taken prior to the second term of enrollment, and are offered at no cost to the student. They can be scheduled by calling the MBA Office at (937) 229-3733.

Foundation Courses (15 semester hours):

Foundation courses required by students without a recent undergraduate business degree.

MBA 600A	Introduction to Financial Accounting	1.5
MBA 601A	Introduction to Managerial Accounting	1.5
MBA 611	Statistical Technique for Decision Analysis	1.5
MBA 612	Principles of Operations Management	1.5
MBA 620	Principles of Finance	3
MBA 630	Principles of Marketing	1.5
MBA 640	Principles of Economics	1.5
MBA 660	Information Technology & Systems	1.5
MBA 670	Organizational Theory & Behavior (Foundations)	1.5
Total Hours		15

Core Courses (12 semester hours):

The core portion of the program consists of eight 1.5 credit hour required courses:

MBA 790	Managerial Economics	1.5
MBA 791	Modeling & Analysis for Business Analytics	1.5
MBA 792	Performance Measurement & Control Systems Perspective	1.5
MBA 793	Operational Effectiveness	1.5
MBA 794	Information Systems & Business Decisions	1.5
MBA 795	Organizational Behavior	1.5
MBA 796	Corporate Finance	1.5
MBA 797	Marketing Management	1.5
Total Hours		12

Capstone Courses (6 semester hours):

The Capstone sequence consists of two 3.0 credit hour required courses completed over two semesters:

MBA 798	Business Strategy	3
MBA 799	Integrative Project	3
Total Hours		6

Required Course: MBA 758

The University of Dayton recognizes the critical significance of Business Ethics and Corporate Social Responsibility in graduate business education. To better equip our students to meet the challenges of ethical decision-making in the workplace and to enable developing solutions that demonstrate corporate social responsibility, a new curriculum emphasis in ethics was introduced Fall 2008. The following course is now required of all MBA students: MBA 758 **The Principled Organization, Integrating, Faith, Ethics And Work Requirement** (3 semester hours):

Elective Courses:

Nine semester hours of elective courses are required. They may be selected to obtain program breadth or depth in a particular area by choosing an optional concentration. The student may choose from among the MBA courses offered, or with approval by the MBA director, students may elect up to six semester hours of graduate courses from other programs at the University when these are appropriate to their education plans.

Electives 9

MBA 602A	Information Assurance
MBA 602B	Fraud Examination
MBA 603A	Advanced Financial Accounting
MBA 604A	Taxes & Business Strategy
MBA 604B	Advanced Issues in Accounting
MBA 605A	Contemporary Issues in Accounting
MBA 605B	International Accounting
MBA 605C	International Accounting-IFRS Certificate and Research (UD Students Only)
MBA 605D	International Accounting-IFRS Certificate and Research (Non UD Students Only)
MBA 606A	Financial Statement/Risk Analysis
MBA 607A	Cost Management Lean Principle & Application
MBA 608A	Accounting Information Systems
MBA 609A	Special Topics in Accounting
MBA 609B	Individual Research in Accounting
MBA 616	Project Management for Professionals
MBA 617	Business Process Improvements
MBA 618	Operations Management Research Seminar
MBA 619	Special Topics in Operations Management
MBA 622	Advanced Corporate Finance
MBA 627	Financial Derivatives & Risk Management
MBA 625	Investments & Finance Marketing
MBA 628	Fixed Income Analysis
MBA 629	Special Topics in Finance
MBA 634	Consumer Behavior
MBA 635	Market Analysis & Research
MBA 638	Product Planning Development
MBA 639	Special Topics in Marketing

MBA 652	Social Responsibility & Ethical Dimensions of Management
MBA 656	International Culture & Management (Study Abroad)
MBA 659	Special Topics: Organizations & Their Environments
MBA 661	E-Commerce
MBA 662A	Security Management for Informational Systems
MBA 662B	Managing Telecommunications & Network Systems
MBA 662C	Managing Internet Security
MBA 663	Management of Information Resources
MBA 664	Database Management
MBA 665	System Analysis & Design
MBA 667A	Business Intelligence
MBA 667B	Data Warehousing
MBA 668	Advanced Website Development
MBA 669	Special Topics in Management Information Systems
MBA 679	Special Topics in Management & Entrepreneurship
MBA 680	Entrepreneurship & The Family Firm
MBA 682	New Venture Management
MBA 695	Individual Research

Certificate in Business Systems Analysis and Design (BAD)

The certificate in Systems Analysis and Design provides career-switching preparation for individuals interested in system analysis and design, but do not have the required undergraduate coursework. It also provides preparation for individuals whose expertise is in other areas (e.g. marketing, finance, accounting, health care, manufacturing, etc.) to become knowledgeable contributors to teams that are responsible for developing information systems to support their primary area of expertise.

The free-standing Certificate Program is comprised of nine graduate credit hours consisting of MBA 664, MBA 665, and one of two electives: MBA 668 or MBA 619. Note that the nine credit hours do not include any prerequisites that must be satisfied for specific courses. Prerequisites that do not count toward the credits for the Certificate Program have equivalent courses offered at the undergraduate level. Transfer hours may be used toward such prerequisites but not toward any of the nine credit hours required for the Certificate Program.

MBA 619	Special Topics in Operations Management (Project Management for Professionals)	3
MBA 664	Database Management	3
MBA 665	System Analysis & Design	3
MBA 668	Advanced Website Development	3

Certificate in Business Analytics (BAN)

The certificate in Business Analytics is for students interested in moving into this high-demand career area. Business Analytics represents a growing need both in the Dayton area and nationally with employment opportunities readily available. Business, government, and society in the U.S. and throughout the world depend to an ever increasing extent on the effective use of data through sophisticated analytical techniques. This certificate program includes both technical and managerial aspects of Business Analytics, including statistics, optimization and simulation.

Students learn the key elements of the analytics process and are exposed to successful real-world applications in analytics that they emulate through case studies.

This free-standing certificate is comprised of nine graduate credit hours consisting of three required courses: MBA 611 (1.5 credit hours), MBA 791 (1.5 credit hours), and MBA 615 (3 credit hours). In addition, the student will select one of two electives: MBA 617 (3 credit hours) or MBA 667A (3 credit hours). Note that the nine credit hours do not include any prerequisites that must be satisfied for specific elective courses. Transfer hours may be used toward such prerequisites but not toward any of the nine credit hours required for the Certificate Program.

MBA 611	Statistical Technique for Decision Analysis (Required)	1.5
MBA 615	Advanced Topics and Applications in Business Analytics (Required)	3
MBA 791	Modeling & Analysis for Business Analytics (Required)	1.5
MBA 617	Business Process Improvements	3
MBA 667A	Business Intelligence	3

Certificate in Business Intelligence (BIN)

The certificate in Business Intelligence (BI) is intended for students interested in the organizational architecture for building information systems in support of decision making. Individuals with BI qualifications are in high demand for positions in large organizations such as dunnhumby (BI provider to Kroger and Home Depot among others), 5/3 Bank, GE Appliances, Teradata, Sogeti, and Reinsurance Group of America.

The free-standing Graduate Certificate Program is comprised of the following nine (9) semester hours of course work. Note that the nine semester hours do not include any prerequisites that must be satisfied for specific courses. Prerequisites that do not count toward the credits for the Certificate Program have equivalent courses offered at the undergraduate level. Transfer hours may be used toward such prerequisites but not toward any of the nine credit hours required for the Certificate Program.

https://www.udayton.edu/business/academics/master_of_business_administration/graduate_certificates/business_intelligence.php

MBA 664	Database Management	3
MBA 667A	Business Intelligence	3
MBA 667B	Data Warehousing	3
Total Hours		9

Certificate in Cyber-Security Management (CSM)

The focus of the coursework is on both management and technical aspects to secure computer information systems and networks. It also focuses on aspects of information warfare that may be relevant to Department of Defense and other government entities, although skill sets acquired in the program are also useful in private industry (in particular for entities who work in defense and government-related industries and as well banks and credit unions, among others).

MBA 662A	Security Management for Informational Systems	3
MBA 662B	Managing Telecommunications & Network Systems	3
MBA 662C	Managing Internet Security	3

Certificate in Project Management (PJM)

The certificate in Project Management will prepare students to be effective contributors and leaders in today's contemporary business world. Project-oriented work makes up the bulk of managerial activity in today's organizations with multi-dimensional and increasingly complex projects being the norm. This certificate program will be of interest/value to students and employees of all business functions as project improvement initiatives are prevalent in all business disciplines (finance, accounting, marketing, operations, MIS, etc.).

The free-standing Certificate Program is comprised of nine graduate credit hours consisting of MBA 619, MBA 665, and one of two electives: MBA 617 or MBA 695. Note that the nine credit hours do not include any prerequisites that must be satisfied for specific courses. Prerequisites have equivalent courses offered at the undergraduate level. Transfer hours may be used toward prerequisites but not toward any of the nine credit hours required for the Certificate Program.

MBA 617	Business Process Improvements	3
MBA 619	Special Topics in Operations Management (Project Management for Professionals)	3
MBA 665	System Analysis & Design	3
MBA 695	Individual Research (Project Management Experiential Application)	3

Cyber-Security Management

- Certificate, Cyber-Security Management

The focus of the coursework is on both management and technical aspects to secure computer information systems and networks. It also focuses on aspects of information warfare that may be relevant to Department of Defense and other government entities, although skill sets acquired in the program are also useful in private industry (in particular for entities who work in defense and government-related industries and as well banks and credit unions, among others).

Certificate in Cyber-Security Management (CSM)

The certificate program is comprised of the following three courses:

MBA 662A	Security Management for Informational Systems	3
MBA 662B	Managing Telecommunications & Network Systems	3
MBA 662C	Managing Internet Security	3

Master of Business Administration

- Master of Business Administration

The MBA Program is a 30 semester credit hour program for the student with a recent undergraduate degree in business. For the student with a non-business degree, or who lacks coursework in key areas of undergraduate business study, foundation courses are required.

Eleven courses are required of all students consisting of eight Core courses (12 semester hours) and two Capstone courses (6 semester hours). The final required course is entitled "The Principled Organization Integrating Faith, Ethics and Work" (3 semester hours). Additionally, three Elective courses (9 semester hours) are required of all students. Three MBA Elective courses may be chosen in any area.

Foundation Courses

Students who need coursework in basic business knowledge and skills are required to take the appropriate course(s) from the following foundation courses. The Foundation courses consists of a variety of courses up to a maximum of 15 hours. All foundation courses are accelerated, half-semester courses.

A student applying to the MBA program may have foundation courses waived if appropriate undergraduate studies with earned grades of C or better have been completed within four years. Grades earned from undergraduate coursework will not be calculated in the cumulative MBA grade point average. However, grades earned from MBA foundation courses will be calculated into the cumulative MBA grade point average. When foundation courses are required, they must, when offered, be completed before proceeding to core, elective, or capstone courses. For information on appropriate undergraduate courses to waive foundation requirements, contact the MBA office.

Placement exams, which waive foundation courses, are also available to students who can demonstrate experience or knowledge in a particular area. All placement exams should be taken prior to the second term of enrollment, and are offered at no cost to the student. They can be scheduled by calling the MBA Office at (937) 229-3733.

Master of Business Administration (MBA)

Foundation Courses (15 semester hours):

Foundation courses required by students without a recent undergraduate business degree.

MBA 600A	Introduction to Financial Accounting	1.5
MBA 601A	Introduction to Managerial Accounting	1.5
MBA 611	Statistical Technique for Decision Analysis	1.5
MBA 612	Principles of Operations Management	1.5
MBA 620	Principles of Finance	3
MBA 630	Principles of Marketing	1.5
MBA 640	Principles of Economics	1.5
MBA 660	Information Technology & Systems	1.5
MBA 670	Organizational Theory & Behavior (Foundations)	1.5
Total Hours		15

Core Courses (12 semester hours):

The core portion of the program consists of eight 1.5 credit hour required courses:

MBA 790	Managerial Economics	1.5
MBA 791	Modeling & Analysis for Business Analytics	1.5
MBA 792	Performance Measurement & Control Systems Perspective	1.5
MBA 793	Operational Effectiveness	1.5
MBA 794	Information Systems & Business Decisions	1.5
MBA 795	Organizational Behavior	1.5
MBA 796	Corporate Finance	1.5

MBA 797	Marketing Management	1.5
Total Hours		12

Capstone Courses (6 semester hours):

The Capstone sequence consists of two 3.0 credit hour required courses completed over two semesters:

MBA 798	Business Strategy	3
MBA 799	Integrative Project	3
Total Hours		6

Required Course: MBA 758

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Elective Courses:

Nine semester hours of elective courses are required. They may be selected to obtain program breadth or depth in a particular area by choosing an optional concentration. The student may choose from among the MBA courses offered, or with approval by the MBA director, students may elect up to six semester hours of graduate courses from other programs at the University when these are appropriate to their education plans.

Electives		9
MBA 602A	Information Assurance	
MBA 602B	Fraud Examination	
MBA 603A	Advanced Financial Accounting	
MBA 604A	Taxes & Business Strategy	
MBA 604B	Advanced Issues in Accounting	
MBA 605A	Contemporary Issues in Accounting	
MBA 605B	International Accounting	
MBA 605C	International Accounting-IFRS Certificate and Research (UD Students Only)	
MBA 605D	International Accounting-IFRS Certificate and Research (Non UD Students Only)	
MBA 606A	Financial Statement/Risk Analysis	
MBA 607A	Cost Management Lean Principle & Application	
MBA 608A	Accounting Information Systems	
MBA 609A	Special Topics in Accounting	
MBA 609B	Individual Research in Accounting	
MBA 616	Project Management for Professionals	
MBA 617	Business Process Improvements	
MBA 618	Operations Management Research Seminar	
MBA 619	Special Topics in Operations Management	
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MBA 629	Special Topics in Finance	
MBA 634	Consumer Behavior	

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MBA 668	Advanced Website Development
MBA 669	Special Topics in Management Information Systems
MBA 679	Special Topics in Management & Entrepreneurship
MBA 680	Entrepreneurship & The Family Firm
MBA 682	New Venture Management
MBA 695	Individual Research

Time Limitation

All coursework, exclusive of foundation courses, must be completed within five calendar years of enrollment.

Program Concentrations

Students may choose their electives to earn a program concentration. Specific concentrations are offered in:

- Cyber Security
- Finance
- Marketing

Selection of an area of concentration is the option of the student; however, it is the responsibility of the student to notify the MBA Office to "declare" the concentration. The area of concentration is noted on the student's transcript. A minimum of nine semester hours of concentration-based elective credit is required for each concentration selected.

Courses

MBA 590. Coaching for Success. 1 Hour

This course will provide additional English language and academic support for non-native speakers of English students who are admitted into the MBA program. Prerequisite(s): Permission of MBA Department.

MBA 600A. Introduction to Financial Accounting. 1.5 Hour

An introduction to the concepts and procedures underlying financial accounting and the use of financial statement & other financial accounting information for decision making.

MBA 601A. Introduction to Managerial Accounting. 1.5 Hour

An introduction to the concepts underlying the preparation and use of accounting data by managers as they plan, control, and make decisions within the organization. Prerequisite(s): MBA 600A.

MBA 602A. Information Assurance. 3 Hours

Study of current and emerging auditing and assurance standards and professional developments through case study, readings, and research projects. Prerequisite(s): ACC 401 or permission of instructor.

MBA 602B. Fraud Examination. 3 Hours

Study of topics related to the detection, investigation, and prevention of accounting fraud within a legal and ethical environment. This course will concentrate on occupational fraud and financial statement fraud. Prerequisite(s): MBA 600A, MBA 601A.

MBA 603A. Advanced Financial Accounting. 3 Hours

Satisfies the accounting capstone requirement for accounting majors and serves as evidence of the culmination of the Common Academic Program. Study of advanced financial accounting topics including consolidated financial statements and accounting for business combinations, multinational subsidiaries, and foreign currency transactions. A case based practical role play experience as an accountant and a case based analysis addressing fraud and the consequences of unethical behavior and the important role accountants play in protecting the public interest and serving society in general are integrated into the course. Prerequisite(s): ACC 306 with a minimum grade of C or permission of Department Chairperson; Senior standing.

MBA 604A. Taxes & Business Strategy. 3 Hours

Primary emphasis is given to developing a framework that articulates how effective tax planning affects business decisions. An advantage of the framework over a strictly rules-based course is that it can be applied to current and future tax regimes, as well as across tax jurisdictions. Significant emphasis is given to understanding how to account for income taxes for financial statement purposes. Although not primarily a rules-based course, application of the effective tax planning framework to cases and problem-solving exercises will increase students' knowledge of U.S. Tax rules and the factors that shape them. Prerequisite(s): ACC 305, ACC 420.

MBA 604B. Advanced Issues in Accounting. 3 Hours

Study of the current federal income tax code and its application to individuals and business entities. Emphasis is placed on the technical issues and planning opportunities that businesses face. Prerequisite(s): ACC 420, MBA 600A, MBA 601A.

MBA 605A. Contemporary Issues in Accounting. 3 Hours

Seminar covering emerging or controversial accounting issues for the student who has a strong accounting background. Topics include the business and financial situations that underlie accounting problems and controversies, alternative accounting techniques which are accepted or proposed, and the consequences of various accounting practices. Prerequisite(s): ACC 306 or permission of instructor.

MBA 605B. International Accounting. 3 Hours

Study of current topics in international accounting. This course will typically include a week or more of study outside of the U.S. that will include lectures and relevant site visits. In addition to normal tuition, there may be travel and other costs or fees. Foreign locations, countries, topics, and duration may vary. Prerequisite(s): ACC 306 or permission of instructor.

MBA 605C. International Accounting-IFRS Certificate and Research. 3 Hours

This class includes a comprehensive study of International Financial Reporting Standards (IFRS). Students will complete the Institute of Chartered Accountants in England and Wales' (ICAEW) IFRS learning and assessment program and upon successful completion earn an IFRS certificate from this globally recognized professional accountancy body. Prerequisite(s): ACC 408 / MBA 603A or permission of the instructor.

MBA 605D. International Accounting-IFRS Certificate and Research. 3 Hours

This class is for NON-UD degree seeking students. The class includes a comprehensive study of International Financial Reporting Standards (IFRS). Students will complete the Institute of Chartered Accountants in England and Wales' (ICAEW) IFRS learning and assessment program and upon successful completion earn an IFRS certificate from this globally recognized professional accountancy body. Prerequisite(s): ACC 408 / MBA 603A or permission of instructor.

MBA 606A. Financial Statement/Risk Analysis. 3 Hours

Study of the tools and techniques of financial statement analysis with an emphasis on earnings management. Prerequisite(s): ACC 306 or permission of instructor.

MBA 607A. Cost Management Lean Principle & Application. 3 Hours

The design and use of performance measurement and control systems from an integrated systems view of an organization. An important aspect of the course is to 'think out of the box' in terms of how to design more flexible and adaptive cost management and performance measurement systems to help organizations become more flexible and responsive in meeting customer needs. Performance measurement and control are discussed in light of an integrated systems view of an organization, the principles of the Toyota Way, the Toyota Production System, and Lean Accounting. Or permission of instructor Prerequisite(s): MBA 792.

MBA 608A. Accounting Information Systems. 3 Hours

Study of accounting information systems and their impact on management decision making and control. Emphasis on the systems approach to the collection and reporting of accounting data, system internal controls, and computer applications for managerial and financial accounting. Prerequisite(s): (ACC 341; MBA 660) or permission of instructor.

MBA 609A. Special Topics in Accounting. 3 Hours

Advanced and current topics in accounting. Topics vary. Prerequisite(s): Permission of instructor.

MBA 609B. Individual Research in Accounting. 1-6 Hours

Individual research in accounting subjects under the guidance and direction of an accounting faculty member. A formal proposal must be completed and approved by the faculty member, Department Chair, and MBA Director prior to registration. Prerequisite(s): Permission of instructor; strong academic and/or professional background in accounting.

MBA 611. Statistical Technique for Decision Analysis. 1.5 Hour

This course is an introduction to descriptive and inferential statistics for MBA students. The overall purpose is for students to develop skills in (1) describing/summarizing sample data sets, (2) using probability distributions, (3) drawing conclusions about the properties of large groups when only sample information is available, and (4) investigating relationships among several properties based on a sample of those properties.

MBA 612. Principles of Operations Management. 1.5 Hour

An introduction to both traditional and modern manufacturing and service systems, including operating philosophies that drive these systems and the important tools and techniques used therein. Prerequisite(s): MBA 611.

MBA 615. Advanced Topics and Applications in Business Analytics. 3 Hours

Overview of value of analytics and the analytics process. Review of primary tools from three broad areas of analytics: descriptive, predictive and prescriptive. Advanced topics in statistical analysis, optimization and simulation, and their integration through case studies of industry applications of analytics. Prerequisite(s): MBA 611 (or equivalent), MBA 791.

MBA 616. Project Management for Professionals. 3 Hours

Project-oriented work makes up the bulk of managerial activity in organizations and consequently knowledge of project management principles is valued highly. This course offers a broad review of issues and approaches to contemporary professional project management useful for any MBA student and future manager. Graduate Standing.

MBA 617. Business Process Improvements. 3 Hours

Study of the concepts and techniques of business process analysis and improvements as building blocks for all operations improvement strategies, using a range of tools from simple process-mapping to computer-based process-modeling. Balancing technical/analytical and organizational/behavioral aspects of business process improvements are highlighted. The class will include a business process analysis/improvement project using a process modeling software. Prerequisite(s): MBA 611, MBA 612.

MBA 618. Operations Management Research Seminar. 3 Hours

Individual research effort in conjunction with a faculty member. The seminar will meet several times during the term for research progress presentations. Prerequisite(s): One OPM elective.

MBA 619. Special Topics in Operations Management. 3 Hours

Advanced or special topics in the analysis, design, operation, and maintenance of manufacturing and service systems. Topics vary. Prerequisite(s): Permission of instructor.

MBA 620. Principles of Finance. 3 Hours

An overview of finance to include time value of money, risk and return, valuation concepts, financial statement analysis, capital budgeting, cost of capital and capital structure, and working capital management. Prerequisite(s): MBA 600A.

MBA 622. Advanced Corporate Finance. 3 Hours

This course is focused upon interesting corporate finance issues addressing short term financial management, long term capital budgeting, and long term financing choices. The course requires that the students understand these issues through a series of cases and projects. A significant amount of spreadsheet modeling together with both individual and group work will be required to examine the cases and projects. Prerequisite(s): MBA 796.

MBA 625. Investments & Finance Marketing. 3 Hours

Study of investment principles and techniques used by both individual and institutional investors. Topics include bond and stock markets, security valuation methods, portfolio theory and management, and investment institutions. Prerequisite(s): MBA 620A & MBA 620B.

MBA 627. Financial Derivatives & Risk Management. 3 Hours

This course provides a theoretical foundation for the pricing of contingent claims and for designing risk-management strategies. It covers option pricing models, hedging techniques, and trading strategies. It also includes portfolio insurance, value-at-risk measure, multistep binomial trees to value American options, interest rate options, and other exotic options. Prerequisite(s): FIN 301 or MBA 625.

MBA 628. Fixed Income Analysis. 3 Hours

This class will expose students to a variety of fixed income instruments that are traded in the financial markets, their investment characteristics, the state-of-art technology for valuing them, technique for quantifying their interest rate risk, and portfolio strategies for using them. Great course for CFA candidates, Fund Managers, Credit Risk Managers, Commercial Bankers and anyone interested in investing in fixed income securities as alternatives to stocks. Prerequisite(s): MBA 620A, MBA 620B.

MBA 629. Special Topics in Finance. 3 Hours

In-depth application of financial principles to selected areas. Topics vary. Emphasis may be on working capital management, capital budgeting, applied portfolio management, mergers and acquisitions, corporate restructuring, or selected topics. Prerequisite(s): Permission of instructor.

MBA 629A. Valuation. 3 Hours

No description available.

MBA 630. Principles of Marketing. 1.5 Hour

Fundamentals of marketing, including macro and micro concepts that affect marketing management. An introduction to marketing terminology, definitions, theories, concepts, and practices. Emphasis on decision variables used by marketing managers, both at the domestic and global level.

MBA 633. Sales Management. 3 Hours

Study of the basic principles and practices of sales management. Rather than viewing sales management as containing separate functions and activities, (such as staffing, training, motivation), this course views them as having systemic relationships with each other. All functions and activities will be viewed as a dynamic process, composed of numerous interrelated parts; all aimed at helping the organization reach its sales objectives. Analyzes the structure of the sales organization, determination of sales policies, selection, training, and motivation of salesperson, and establishing sales territories, and quotas. Prerequisite(s): MBA 630.

MBA 634. Consumer Behavior. 3 Hours

Consumer Behavior is the study of those actions directly involved in obtaining, consuming, and disposing of products and services, including the decision processes that precede and follow these actions. Consumer behavior is of particular interest to those who, for various reasons, desire to influence or change that behavior, including those whose primary concern is marketing, consumer education and protection, and public policy. Consumer behavior is studied within the context of marketing strategy, and market segmentation. Prerequisite(s): MBA 630.

MBA 635. Market Analysis & Research. 3 Hours

The purpose of marketing research is to provide decision makers with useful consumer and customer information to reduce uncertainty about alternative courses of business action, and aid in marketing management decision making and planning. To make the wisest decisions and accomplish the best, this course focuses on showing decision makers how to effectively use information provided by marketing research. Prerequisite(s): MBA 611, MBA 630.

MBA 638. Product Planning Development. 3 Hours

Integration of various product management processes and concepts as customer-focused problem solving. Using projects or simulations, provides an opportunity to practice skills in developing and introducing a new product in a competitive environment. Emphasis on how various techniques can be interpreted to answer questions about performance. Prerequisite(s): MBA 630.

MBA 639. Special Topics in Marketing. 3 Hours

Advanced and current topics in marketing, such as product management, consumer behavior, services marketing, sales, and advertising. Prerequisite(s): MBA 797.

MBA 639A. Marketing Intelligence. 3 Hours

No description available.

MBA 639B. Special Topics: Digital Marketing. 3 Hours

Special topic on digital marketing.

MBA 640. Principles of Economics. 1.5 Hour

Basic microeconomic principles and their applications. Topics include consumer behavior, production theory, and the interaction of buyers and sellers in various kinds of markets. Prerequisite(s): MBA 640.

MBA 652. Social Responsibility & Ethical Dimensions of Management. 3 Hours

Study of ethical responsibility in the business setting. Topics include the relationship of management to society, ethical issues in management, the virtues of leaders, strategic management for social responsiveness, management styles in the global marketplace, and the stakeholder management concept. Prerequisite(s): MBA 670.

MBA 656. International Culture & Management (Study Abroad). 3 Hours

Study of international culture and business operations. This course will typically include a week or more of study outside of the U.S. that will include lectures and relevant site visits. In addition to normal tuition, there will be travel and other expenses. Locations, countries, and topics may vary. Prerequisite(s): Completion of all foundation courses or permission of Instructor.

MBA 659. Special Topics: Organizations & Their Environments. 3 Hours

Advanced and current topics in organizations and their environments. Topics vary. Prerequisite(s): Permission of instructor.

MBA 660. Information Technology & Systems. 1.5 Hour

An introduction to the basic technology underlying information systems and to the concepts and techniques needed to analyze, design, and manage those systems.

MBA 661. E-Commerce. 3 Hours

This course provides an understanding of the information technologies that enable business-to-business and business-to-consumer electronic commerce while focusing on the strategic, operational, management, and societal issues associated with such technology-based commerce. Business cases, experiential exercises, and guest speakers are utilized. This is a required course for the Technology-Enhanced Business/E-Commerce (TEB) concentration. Prerequisite(s): MBA 660.

MBA 662A. Security Management for Informational Systems. 3 Hours

Addresses issues relevant to creating and managing a systematic security process in organizations. Information security policy, assets, physical and logical information resource security, business continuity, and compliance with relevant security standards are covered. Prerequisite(s): MBA 660 or equivalent.

MBA 662B. Managing Telecommunications & Network Systems. 3 Hours

Introduction to management of computer-based communication networks. Includes underlying concepts; basic hardware components and operating systems; network architectures and protocols; data integrity and security; message routing; network resource management. Prerequisite(s): MBA 662A or instructor permission; U.S. Department of Defense Interim Secret Clearance or higher.

MBA 662C. Managing Internet Security. 3 Hours

This course provides managers with an understanding of both defensive and offensive issues surrounding the security of computer-based information networks. The course includes instruction on theory about information security, psychological operations, hacking, viruses, and network systems management, and security for e-commerce on the Internet. Prerequisite(s): MBA 662B; U.S. Department of Defense Interim Secret Clearance or higher.

MBA 663. Management of Information Resources. 3 Hours

Study of the strategic and management issues associated with the effective organizational use of information technology. Role of the chief information officer; strategic planning, impacts and alliances; information technology assimilation; information technology architectures, functional organization, and operational control; information systems project management. Cases and readings. Prerequisite(s): MBA 660. MBA 794 recommended.

MBA 664. Database Management. 3 Hours

Introduction to databases and their management. File organization and data structures; database management systems; major data models; conceptual, logical, and physical database design; data definition and manipulation with SQL; data administration; and client/server and distributed databases. SQL-based software tool for database project. Prerequisite(s): MBA 660.

MBA 665. System Analysis & Design. 3 Hours

Introduction to object-oriented concepts and techniques for analyzing and designing systems. Activities performed and models created during the different phases of the development life cycle. Systems development project using a CASE tool. Prerequisite(s): MBA 660.

MBA 667A. Business Intelligence. 3 Hours

This course is about developing a program for Business Intelligence in an organization. Will cover the framework, concepts, methods, people skills, and technologies necessary for making effective decisions fast. Also addresses issues from the capture of facts to the delivery of information and decision support systems, including data quality, data warehousing, business intelligence success factors and impact on organizations, business performance management (dashboards and scorecards), multi-dimensional data analysis and online analytic processing, data visualization, and applications of Business Intelligence. Prerequisite(s): MBA 611, MBA 660, and some SQL query language.

MBA 667B. Data Warehousing. 3 Hours

This course will emphasize the purpose, design, implementation, and effective use of data warehouses and data warehousing technologies. Various schemas for the design of a data warehouse, modeling time in a data warehouse, data quality management for building a data warehouse from operational data stores and legacy applications, and technologies to populate and retrieve information from data warehouses will be covered. Related topics of data marts, analytical processing, data mining, and active data warehousing will also be addressed. Prerequisite(s): MBA 660. MBA 664 also required unless student has database management coursework or relevant database management experience.

MBA 668. Advanced Website Development. 3 Hours

This course covers issues involved in developing Web sites for business usage. Issues covered or investigated include: site layout, implementation and management, good site design practices, connecting Web sites to company data, and processing secure transactions across the Web. Prerequisite(s): HTML and a high-level programming language required or Instructor permission.

MBA 669. Special Topics in Management Information Systems. 3 Hours

Advanced and current topics in management information systems. Topics vary. Prerequisite(s): Permission of instructor.

MBA 670. Organizational Theory & Behavior. 1.5 Hour

An introduction to management topics conceptualized at the organization and subunit levels of analysis with primary focus on how organizations generate capacities for change in response to their environments. Emphasis on organizational design as a means of adaptation.

MBA 679. Special Topics in Management & Entrepreneurship. 3 Hours

Analysis and interpretation of research studies as applied to management and entrepreneurship. Coverage of issues such as leadership, interpersonal conflict resolution, competitive analysis, new venture issues, resistance to change, managerial development, organizational growth, effects of technology, and emergence of new control systems. Role playing, small group exercises and applications. Prerequisite(s): Permission of instructor.

MBA 680. Entrepreneurship & The Family Firm. 3 Hours

Covers phases in the life span of the owner-managed enterprise and ending with succession to a next generation of management through any of a variety of means. Major topic areas include startup issues, business planning, financing, marketing, managing the growing firm, and succession in a family business context. Prerequisite(s): Completion of all foundation courses.

MBA 682. New Venture Management. 3 Hours

Study of entrepreneurship and development of opportunities in new or renewed businesses. Focus is on identifying and analyzing business opportunities, locating and obtaining venture capital, developing a business plan, managing growth in the enterprise, and the decision-making, risk-taking, and leadership styles of entrepreneurs. Prerequisite(s): MBA 620A, MBA 620B and MBA 630.

MBA 695. Individual Research. 1-6 Hours

Individual research in subjects encompassed by the MBA curriculum under the guidance and direction of a faculty member. Research may be undertaken on completion of 12 hours of post-foundation coursework. A formal proposal must be completed and approved by the faculty advisor and the MBA Director prior to registration. Prerequisite(s): Permission of faculty advisor and MBA Director.

MBA 758. Principled Organization: Integrating Faith, Ethics & Work. 3 Hours

Students draw on our Catholic Social Teaching and Marianist Heritage to explore issues related to the role of business as a high calling, a critical profession for the good of society and its citizens. Besides the importance of contributing and acting ethically, we delve into the benefit of integrating these values with current issues in business and its relationship to society. To do so extensive conversations with active business people and reflections on relevance of ideas discussed to personal goals and beliefs are central to the course.

MBA 790. Managerial Economics. 1.5 Hour

Application of economic models to managerial decision making. Topics include basic estimation techniques, demand analysis and forecasting, production and cost estimation, profit maximization in competitive markets and in markets where firms have market power, and game theory basics with attention to strategic decision-making in oligopoly market and duopoly models.

MBA 791. Modeling & Analysis for Business Analytics. 1.5 Hour

This course examines the role of analytic thinking and analytic models/techniques in providing support and insight for business decisions. An overall framework for quantitative analysis within business decision-making is presented. Both optimization and descriptive modeling are studied. Analysis techniques such as linear programming, integer and nonlinear optimization, and simulation modeling are covered. The course will emphasize the application of analytic techniques to business decisions with cases and executive partners from the business community. Prerequisite(s): MBA 611.

MBA 792. Performance Measurement & Control Systems Perspective. 1.5 Hour

This core MBA course addresses the important cost management and measurement issues relevant to any organization. The competitive and rapidly changing environment faced by most organizations has rendered most traditional cost management, accounting control systems, and methods of performance measurement and analysis ineffective and in some cases even dysfunctional. Prerequisite(s): MBA 600A, MBA 601A.

MBA 793. Operational Effectiveness. 1.5 Hour

Operational effectiveness is a multidimensional concept that industry has approached in a variety of ways. This course focuses on the underlying principles that drive operational improvements. These principles are used as a basis to develop skills in identifying improvement opportunities, analytical tools to quantify the problem and solution set, and quantitative and policy approaches to maintaining performance once improved. Prerequisite(s): MBA 612.

MBA 794. Information Systems & Business Decisions. 1.5 Hour

Information is a key organizational asset. Information systems and technology are pervasive in organizations with the goal of enabling efficiency, effectiveness, and adaptability. Through the analysis of case studies, this course covers what general managers need to know: 1) to make decisions about information systems to achieve organizational goals and 2) to fulfill their role in managing information assets in organizations. It emphasizes the role of information and technology in organizational decision-making. Prerequisite(s): MBA 660.

MBA 795. Organizational Behavior. 1.5 Hour

The Organizational Behavior course focuses on what makes a workplace effective, efficient, positive, and pleasant. Topics covered include how people make decisions, how employees work together, and how employers can manage employees for maximum productivity. Students will learn about employee compensation and motivation, team dynamics, and what makes a good leader. Students will also learn how norms, values, incentives, and rewards shape behavior in organizations. The course also includes topics such as organizational behavior in the world of the internet, and how the globalization of business impacts communication within an organization. Organizational Behavior is interdisciplinary, involving the fields of psychology, sociology, gender studies, labor economics, business, human resources, management, and many others. As such, the course will study theories in many interdisciplinary fields. Ultimately, the course focuses on how managers become effective leaders by addressing the human side of enterprise. Prerequisite(s): MBA 670.

MBA 796. Corporate Finance. 1.5 Hour

Advanced discussion of financial markets, models, cost of capital computations, valuing real assets, capital budgeting, raising capital, incentives and corporate control, and risk management. Prerequisite(s): MBA 620A and MBA 620B.

MBA 797. Marketing Management. 1.5 Hour

Effective marketing is a customer-focused process that pervades an organization. This course focuses on strategic decision making and explores marketing opportunities through product development, pricing strategies, customer communications and channel management. Students learn how to assess business opportunities, research a market, segment markets, and position a firm's offerings in order to create long-term customer and shareholder value. Prerequisite(s): MBA 630.

MBA 798. Business Strategy. 3 Hours

First of a two-course set of capstone integrative experiences which explores the process of creating, sustaining, and growing successful businesses in an era of change. The course deals with strategic decision making and stakeholder management related to competitive, economic, political, social, cultural, and technological environments in small, medium, and large companies in service and manufacturing settings. Prerequisite(s): MBA 790, MBA 791, MBA 792, MBA 793, MBA 794, MBA 795, MBA 796, MBA 797.

MBA 799. Integrative Project. 3 Hours

Second of the two-course set of capstone integrative experiences that explores the process of creating, sustaining, and growing successful businesses in an era of change. Students work in teams to analyze the strategic environment of a firm and develop a series of recommended actions. Students gain experience in working in a team environment in a non-academic setting, and experience the pressure of delivering a high-quality product to company leaders. The approach taken is tailored to the specific needs of the business as well as the talents of the particular student team. Prerequisite(s): MBA 798 and completion of all eight core courses, or permission of MBA Office.

School of Education and Health Sciences

Kevin R. Kelly, Dean

Barbara M. De Luca, Associate Dean for Graduate Education and Research

The basic mission of the graduate programs in the School of Education and Health Sciences (SEHS) is to prepare competent and compassionate professionals in several fields. Specifically, the mission is to prepare teachers and education leaders, exercise scientists, human service specialists, and health science professionals. The School is further committed to preparing scholar-practitioners at the Ph.D. level in the area of educational leadership, both P-12 and Higher Education. The SEHS programs leading to graduate degrees are designed primarily to meet the following purposes:

1. to develop advanced proficiency in early, middle and secondary school teachers who have completed recognized baccalaureate teacher education programs;
2. to enable individuals to qualify for licensure as principals and superintendents;
3. to prepare school counselors; school psychologists who will be working in state, county, local school systems; and counselors who will work in community and other agency settings to be highly competent and exemplary in their chosen profession;
4. to develop personnel for student services in higher education;
5. to prepare educational research specialists;
6. to enable students with nonprofessional education baccalaureate degrees and above-average academic records to gain teacher licensure; and
7. to prepare professionals in the Health Science fields of Exercise Science, Physical Therapy and Physician Assistant.

In implementing these graduate programs, faculty members are committed to help students:

- understand the knowledge base that integrates their field of interest;
- apply their knowledge base to practice;
- value the relationship of theory to practice;
- reflect mindfully upon professional practice;
- value community and collaboration;
- appreciate the moral dimensions of their work; and
- commit themselves to improving the quality of life within schools and the larger community.

In working to address the mission, faculty and staff members in all departments endeavor to:

- create a supportive environment for learning;
- respond to individual students' program needs;
- draw upon the knowledge base of their field in providing quality instruction;
- maintain high academic standards;
- provide students the opportunity to choose a research or a practice emphasis in their academic programs;
- contribute to the knowledge base of their field;
- assist the community in translating the knowledge base of their field to everyday practice;

- serve as responsible social critics;
- demonstrate collaborative teaching and inquiry behaviors; and
- engage in professional activity focused on the improvement of school and community life.

Most graduate programs lead to the Master of Science in Education degree. Other programs lead to the Master of Physician Assistant Practice, Doctorate of Physical Therapy, the Educational Specialist degree, and the Ph.D. in Educational Leadership.

The University of Dayton maintains an off-campus center for graduate study in Education and Health Sciences (Columbus). Several programs are taught online as well as in face-to-face settings. All programs and courses are closely supervised by the Dean of Education and Health Sciences and the Associate Provost for Graduate Academic Affairs. Most of these courses are taught by the faculty member teaching the same course on the main campus.

Assistantships

The School of Education and Health Sciences offers a limited number of assistantships. For information about these assistantships contact Barbara Scanlan at (937) 229-3137, email: bscanlan1@udayton.edu or Gina Seiter at (937)229-3103, email: gseiter1@udayton.edu.

Authorizations and Accreditations

The Ohio Board of Regents authorizes the University of Dayton's Graduate offerings leading to several different degrees. Students graduating in Educational Administration, Teacher Education, Counselor Education and Human Services, and Health and Sport Science receive the Master of Science in Education degree. Those graduating from a more advanced program earn an Educational Specialist degree in School Psychology or Educational Leadership. Physician Assistant graduates receive the Master of Physician Assistant Practice degree, while Physical Therapy students earn a Doctorate of Physical Therapy. Ph.Ds. are granted in both P-12 Educational Leadership and Higher Education Administration.

All educator preparation programs are accredited by the National Council for Accreditation of Teacher Education (NCATE). The Council for Accreditation of Counseling & Related Educational Programs (CACREP) accredits counselor preparation programs. The Physician Assistant Program is accredited (provisionally) by the Accreditation Review Commission on Education for the Physician Assistant, Inc. (ARC-PA). The Commission on Accreditation of Physical Therapy Education (CAPTE) has accredited the Doctorate of Physical Therapy Program.

General Requirements

Transcript Evaluations for Licensure

Teacher Education License - Prospective students holding a bachelor degree and wishing to have transcripts evaluated for a teaching license or endorsement, please contact the Graduate Program Specialist, Ms. Gina Seiter at gseiter1@udayton.edu.

School Counseling License - Prospective students wishing to earn a school counseling license, please contact Ms. Gina Seiter at gseiter1@udayton.edu.

School Administrator License - Prospective students wishing to earn a school administrator license, please contact Ms. Gina Seiter at gseiter1@udayton.edu.

Academic Standing

To qualify for graduation, a student must maintain a grade point average of 3.0 (B) in all work undertaken toward the degree.

Employed Graduate Students

The maximum course load permitted for any graduate student who is fully employed is six semester hours for the Fall and Spring terms and for the first half of the Summer term. Adjustments to this policy are made by the department chair of the specific program on an individual basis in the case of applicants who are not employed or employed part-time.

Workshop Credit

No more than six semester hours of workshop credit may be applied toward a degree and must be approved by the department chair of the specific program.

"I" and "IP" Grades

The "I" (incomplete) grade may stand for a period of no more than one year from the end of the term in which the "I" was posted. If the "I" is unchanged after one year, it becomes an "F" and the student must re-register to re-take the course, and the "F" becomes permanent on the transcript.

The "IP" (in progress) grade is used in lieu of a grade for courses which have not terminated at the end of a semester.

Programs of Study

To learn more about the available programs in the School of Education and Health Sciences, explore the departments:

- Counselor Education and Human Services (p. 104)
- Educational Administration (p. 115)
- Health and Sport Science (p. 117)
- Physician Assistant Education (p. 123)
- Teacher Education (p. 125)
- Physical Therapy (p. 119)
- Doctor of Philosophy in Educational Leadership (p. 111)

Counselor Education and Human Services

- Educational Specialist, School Psychology
- Master of Science in Education, Clinical Mental Health Counseling
- Master of Science in Education, College Student Personnel
- Master of Science in Education, Higher Education Administration
- Master of Science in Education, Human Services
- Master of Science in Education, Leadership in Educational Systems
- Master of Science in Education, School Counseling
- Master of Science in Education, School Psychology
- Certificate, Pastoral Counseling for Enhancement

Alan D. Demmitt, Department Chairperson

The goals of the Department of Counselor Education and Human Services are:

1. To prepare elementary and secondary school counselors; student service personnel in higher education; school psychologists; and counselors for community, mental health and other agency settings to reflect the human service practitioner as a facilitator of individual and community growth.
2. To provide teachers and other helping professionals with specific course offerings designed to build skills and develop understanding relative to identified professional functions within the learning communities. These two missions are conducted at the University of Dayton campus, Columbus, and other sites as approved.

The department offers seven programs at the graduate level:

1. College Student Personnel
2. Clinical Mental Health Counseling
3. Higher Education Administration
4. Human Services
5. School Counseling
6. School Psychology
7. Leadership in Educational Systems

In addition, selected courses in behavioral and social science and other related disciplines lead to certification/licensure as a school counselor or school psychologist, as well as to Professional Counselor licensure and Professional Clinical Counselor licensure for social agency personnel. True to Marianist ideals, the faculty are committed to developing the human service practitioner as a skilled facilitator of individual and community growth and as a person knowledgeable of self and children, and youth and adults from varying socioeconomic backgrounds.

Educational Specialist in School Psychology (ESP)

Master of Science in Education in School Psychology (ESP)

The purpose of the NASP-approved school psychology program is to train school psychologists to assist educators and parents in problem-solving efforts to meet the educational and mental health needs of children and youth in Ohio schools. The program prepares school psychology practitioners to use intervention-based consultation and assessment approaches in the specialist-level training.

Program and licensure standards require completion of both the master's degree and specialist-level training. Students pursue studies leading first to a master's degree and then to an educational specialist degree. The degree programs are not offered separately. The full-time program includes two years of full-time study followed by a ten-month, full-time supervised internship. The part-time track includes three years of part-time study followed by a ten-month, full-time supervised internship. Students on both tracks complete a master's degree in the course of their program and an educational specialist degree at the conclusion of their program.

General Requirements

Master of Science (30 semester hours)

1. Successful completion of specified 30 semester hours
2. Successful completion of practica
3. Successful completion of comprehensive examination

Ohio Licensure and Completion of Specialist-Level Training (52 semester hours; 82 semester hours total with completion of master's program)

1. Successful completion of specified 52 semester hours.
2. Successful completion of internship
3. Successful completion of thesis
4. Development, presentation and approval of professional portfolio

School Psychology

EDC 508	Theories of Learning & Human Development	3
EDC 510	Consultation Schools	3
EDC 511	School Psychology Practicum: Consultation	1
EDC 512	Cognitive Assessment for Intervention	1-6
EDC 513	School Psychology Practicum: Cognitive AFI	1
EDC 514	Academic Assessment for Intervention	3
EDC 515	School Psychology Practicum: Academic AFI	1-6
EDC 516	Academic & Behavioral Assessment Instruments	1-6
EDC 517	Sch Psy Prac: Shdwng	1-6
EDC 537	Statistics	3-4
EDC 538	Child & Adolescent Psychopathology	3
EDC 541	Curriculum & Instruction for Diverse Learners	3
EDC 542	Crisis Intervention & Prevention in Educational Settings	2
EDC 543	Theories & Techniques of Counseling	3
EDC 548	Counseling Children & Adolescents	2
EDC 568	Research & Evaluation in Human Services	3
EDC 571	Biological Bases of Behavior	1-3
EDC 572	Role & Function of the School Psychologist	3
EDC 573	Orientation to the Educational Process & Technology	1
EDC 575	Counseling Diverse Populations	3
EDC 583	Theories & Techniques of Group Counseling	3
EDC 593	Early Childhood Development & Assessment	3
EDC 610	Social Behavior Assessment for Intervention	3
EDC 611	School Psychology Practicum: Social/Behavioral AFI	1
EDC 612	Assessment for Intervention & Accountability	3
EDC 613	School Psychology Practicum: Assessment for Intervention & Accountability	1-6
EDC 615	School Psychology Culminating Seminar	3
EDC 710	Internship in Psychology	1-5
EDC 711	Internship in School Psychology	5
EDC 712	Internship in School Psychology	1-6
EDC 800	Thesis	1-6

Master of Science in Education in College Student Personnel (ECP)

The 39 hour master's degree program in college student personnel is designed to assist students in gaining the practice, theoretical perspectives, and appropriate integration to be successful in working on college and university campuses in a variety of positions. The program follows CAS Standards as established by our professional organizations. Coursework emphasizes the development of the professional, working with individual and groups of students, and designing campus environments. Students complete three internships at surrounding colleges and universities. Many of our students hold graduate assistantships in Student Development at the University of Dayton.

College Student Personnel

Foundational Studies		3
EDC 540	Perspectives in Higher Education	
Professional Studies		12
EDC 550	Student Development's Role in Learning	
EDC 557	Learning in Community	
EDC 560	Leadership in College & University Environment	
EDC 568	Research & Evaluation in Human Services	
Advanced Studies		9
EDC 551	Student Cultures & Development	
EDC 555	Administration & Organization of College Student Personnel Programs	
EDC 562	Learning Design	
Supervised Practice *		2
EDC 553	Internship in College Student Personnel *	
Electives **		6
Culmination ***		3
EDC 569	Scholarly Project in CSP/HE ***	

* Students may begin taking internships in their second semester. Must be taken three times for a total of 6 semester hours.

** Electives may be selected from graduate courses in other programs with approval by advisor.

*** To be taken during final term.

Master of Science in Education in Clinical Mental Health Counseling (ECC)

The 60 semester hour master's program in clinical mental health counseling prepares students pursuing counseling licensure. In Ohio, licensure as a professional counselor requires a master's degree in counseling with clinical coursework totaling 60 semester hours. Traditional counseling will be the focus of 40 of the hours, while 20 hours will emphasize clinical counseling with persons who have a diagnosed mental disorder. The master's degree includes all of the traditional coursework and clinical requirements. Upon completing the 60 semester hour requirement and passing the required test by the Counselor, Social Worker and Marriage and Family Therapy Board, the candidate receives the Professional Counseling License (PC). After completing two additional years of supervised experience, the counselor is licensed as a Professional Clinical Counselor (PCC).

The following course outline does not reflect the order in which classes are to be taken. To develop a program of study please consult your advisor.

Clinical Mental Health Counseling

EDC 521	Introduction to Clinical Mental Health Counseling	3
EDC 529	Career Counseling	2
EDC 531	Personality & Human Development Across the Lifespan	2
EDC 535	Assessment in Counseling	2
EDC 543	Theories & Techniques of Counseling	3
EDC 545	Counseling Techniques Lab	2
EDC 571	Biological Bases of Behavior	1-3
EDC 575	Counseling Diverse Populations	3

EDC 583	Theories & Techniques of Group Counseling	3
EDC 623	Foundations in Abnormal Psychology	3
EDC 631	Diagnosis of Emotional & Mental Disorders	3
EDC 635	Couples & Family Counseling	3
EDC 568	Research & Evaluation in Human Services	3
EDC 584	Practicum in Clinical Mental Health Counseling	2
EDC 598	Internship in Clinical Mental Health Counseling *	2-6
EDC 600	Culminating Seminar	1-3
EDC 630	Evaluation of Emotional & Mental Conditions	3
EDC 681	Integrative Approach to Clinical Counseling	3
EDC 683	Treatment of Mental & Emotional Disorders	3
EDC 686	Addictions Counseling	3
Electives		4
EDC 605	Professional Seminars with Clinical Implications	1-6
EDC 548	Counseling Children & Adolescents	2

* Must be taken three times for a total of 600 total clock hours.

Certificate in Pastoral Counseling for Enhancement (PCE)

Must include Master's Degree in Clinical Mental Health Counseling.

REL 500B	Foundations of Biblical Studies	2
REL 500C	Foundations of Church History & Historical Theology	2
REL 500D	Foundations of Systematic & Moral Theology	2
REL 540	Ecclesiology	2-3
or REL 543	Sacramental Theology	
REL 561	Catholic Moral Theology	2-3
or REL 562	Theo-Ethical Reasoning	
REL 581	Pastoral Ministry Seminar *	0-3
REL 582	Introduction to Spiritual Direction & Pastoral Care	2-3
REL 584	Canon Law	2-3
Total Hours		14-21

* Pastoral Ministry Seminar - Students are required to enroll in this no credit seminar at least four semesters during their pursuit of the Pastoral Ministry master's degree. The seminar provides students to engage in those practices critical for ongoing development as a minister. Among those practices are theological reflection at least twice each semester with other students (in addition to the theological reflection integrated into the other courses) and attendance of one to two workshops focusing on practical skills like the RCIA process, managerial skills, practices of faith formation, evangelization process, Bible study, managing a budget and interpersonal skills such as instruction in specific communication techniques in areas like group building, pastoral consultation, conflict management, ministering to youth, community organizing. Over the four semesters students should attend at least ten different workshops evenly distributed among the various skills needed for effective ministry.

Strongly Recommended/Regularly Available

- Mentor/Internship (no credit)
- Faith Sharing in Small Groups (no credit)
- Spiritual Direction (no credit)

Master of Science in Education in Higher Education Administration (EAH)

The 39 hour master's program in higher education administration consists of coursework that integrates theory and research with practice. The program is designed to prepare students for a variety of academic and non-academic positions in higher education. The curriculum includes historical perspectives, law, finance, student issues, and organization and governance. Students complete a practicum and a culminating scholarly project. This program accommodates students holding full-time jobs.

Higher Education Administration

Foundational Studies		3
EDC 540	Perspectives in Higher Education	
Professional Studies		12
EDC 550	Student Development's Role in Learning	
EDC 557	Learning in Community	
EDC 560	Leadership in College & University Environment	
EDC 568	Research & Evaluation in Human Services	
Advanced Studies		9
EDC 556	Administration & Organization in Higher Education	
EDC 561	Finance in Higher Education	
EDC 563	Law & Ethics in Higher Education	
Supervised Practice *		3
EDC 564	Practicum in Higher Education	
Electives **		6
Culmination ***		3
EDC 569	Scholarly Project in CSP/HE	

* For those students in full-time professional positions in higher education. All others must complete six hours of internship.

** Electives may be selected from graduate courses in other programs with approval by advisor.

*** To be taken during final term.

Master of Science in Education in Human Services (EHU)

This master's degree program is designed for persons who do not hold a teaching license and who do not wish to pursue licensure as a counselor, but who are interested in enhancing their human service skills for employment in other settings. The program is appropriate for persons in the clergy, nursing, criminal justice and other related fields.

Note: This degree does not lead to obtaining Ohio's Professional Counseling license, Professional Clinical Counseling license, or School Counseling license. Students who intend to obtain these credentials must enroll in the clinical mental health counseling master's degree program with clinical coursework totaling 60 semester hours. To obtain Ohio's School Counseling license students must enroll in the 48 hour school counseling master's degree program.

Human Services

Foundational Courses		11
EDC 531	Personality & Human Development Across the Lifespan	
EDC 568	Research & Evaluation in Human Services	
EDC 575	Counseling Diverse Populations	

EDC 525	Human Services Administration	
Human Development Services Core		13
EDC 529	Career Counseling	
EDC 543	Theories & Techniques of Counseling	
EDC 545	Counseling Techniques Lab	
EDC 583	Theories & Techniques of Group Counseling	
EDC 635	Couples & Family Counseling	
Electives* May include other EDC coursework approved by advisor.		6
EDC 605	Professional Seminars with Clinical Implications	
Total Hours		30

Master of Science in Education Leadership in Educational Systems (ESY)

The leadership for educational systems concentration is designed to provide students with a thorough understanding of the United States system of education and to develop leadership skills to administer educational systems. The program addresses the growing need that international students have to study the United States educational systems and yet are not interested in, nor qualify for, licensure. This program will feature an interdisciplinary approach; however, the degree is awarded through the Department of Educational Administration. Courses in the program will be provided by the Department of Educational Administration (EDA), the Department of Counselor Education (EDC) and the Department of Teacher Education (EDT), and will guide students through critical analyses of leadership issues, promote rational problem-solving and decision-making regarding issues facing educational systems from preschool to higher education (P-16).

Required Teacher Education Coursework:

EDT 500	Models of Teaching	3
EDT 501	Introduction to American Education	3
EDT 505	School, Self and Society	3
EDT 659	Special Topics in Teaching (Scholarly Study in Education)	3
EDT 667	Educational Research Seminar ¹	3

Required Educational Leadership Coursework:

EDA 505	Educational Leadership	3
EDA 510	Instructional Leadership	3
EDA 511	Curriculum	3
EDA 551	Research ¹	3

Required Counselor Education Coursework:

EDC 540	Perspectives in Higher Education	3
EDC 560	Leadership in College & University Environment	3
EDC 568	Research & Evaluation in Human Services ¹	3

¹ Students must select one of the these courses.

Master of Science in Education in School Counseling (EDC)

The school counseling degree provides preparation for individuals who desire to be school counselors. Prerequisites for school counselor licensure include either: (1) a master's degree in counseling and two years of successful teaching experience under a standard teacher certificate or provisional or professional teacher license, and successful completion of internship consisting of six hundred contact hours in

a school setting, or (2) a master's degree in counseling, successful completion of an internship consisting of six hundred contact hours in a school setting, and a one-year induction under the supervision of a licensed school counselor. Upon completion of the master's degree, the Ohio Department of Education requires the PRAXIS specialty examination in school counseling. Beginning September 1, 2013, the Ohio Assessment for Educators exam will replace the Praxis II series as the required Ohio educator licensure assessment. The Praxis II exam successfully completed with a passing score before September 1, 2013 will be honored by the University of Dayton and the State of Ohio. More information about the Ohio Assessment for Educators exam can be found online at <http://www.oh.nesinc.com/>. The degree program consists of 30 semester hours of coursework aligned with the CACREP eight common core areas and 18 semester hours of coursework in school counseling.

General Requirements

1. 48 semester hours
2. 600 clock hour internship

The following course outline does not necessarily reflect the order in which classes are to be taken. To develop a program of study please consult your advisor.

School Counseling

Professional Orientation and Ethical Practice		2
EDC 544	Philosophical, Professional, Ethical & Legal Aspects in Counseling	
Social and Cultural Diversity		3
EDC 575	Counseling Diverse Populations	
Human Growth and Development		2
EDC 531	Personality & Human Development Across the Lifespan	
Career Development		2
EDC 529	Career Counseling	
Helping Relationships		5
EDC 543	Theories & Techniques of Counseling	
EDC 545	Counseling Techniques Lab	
Group Work		3
EDC 583	Theories & Techniques of Group Counseling	
Assessment		2
EDC 535	Assessment in Counseling	
Research and Program Evaluation		3
EDC 568	Research & Evaluation in Human Services	
School Counseling		17
EDC 522	Introduction to School Counseling	
EDC 532	Special Education and the School Counselor	
EDC 542	Crisis Intervention & Prevention in Educational Settings	
EDC 546	School Counseling Program Development & Implementation	
EDC 547	Consultation & Leadership in School Counseling	
EDC 548	Counseling Children & Adolescents	
EDC 548L	Cns Cldrn&Adlsnts Lb	
Clinical Experience		9
EDC 585	Practicum in School Counseling	
EDC 599	Internship in School Counseling *	

* Must be taken three times for a total of 600 total clock hours.

At the beginning of the first term of enrollment in the program, students will be oriented to the program requirements and will develop a planned program of study as part of the EDC 522 Intro to School Counseling.

Courses

EDC 500. Orientation to Community Counseling. 1 Hour

This course will introduce students to the expectations and requirements of the community counseling program and give them an introduction to the profession of counseling. A holistic approach to counseling will be used.

EDC 501. Orientation to School Counseling. 1 Hour

This course will introduce master's degree students to the University of Dayton's school counseling program including program study requirements and expectations. Issues related to professional identity development will also be addressed.

EDC 508. Theories of Learning & Human Development. 3 Hours

The purpose of this course is to increase knowledge and understanding of the theories, principles, and research about learning and development of school-age youth.

EDC 510. Consultation Schools. 3 Hours

The role of the school psychologist as a consultant in a school setting is examined with emphasis on acquiring effective consultation skills. A school-based, problem-solving model is presented that requires development of appropriate consultant skills. (Practicum is EDC 511).

EDC 511. School Psychology Practicum: Consultation. 1 Hour

Practicum for EDC 510.

EDC 512. Cognitive Assessment for Intervention. 1-6 Hours

Development of proficiency in administration, scoring, and interpreting intelligence tests to be used in conjunction with other assessment information for completing multifactorial evaluations and developing interventions for assisting children and youth, birth through age 21. (Practicum is EDC 513).

EDC 513. School Psychology Practicum: Cognitive AFI. 1 Hour

Practicum for EDC 512.

EDC 514. Academic Assessment for Intervention. 3 Hours

This course provides students with the knowledge and skills necessary for the effective evaluation of the academic strengths. The emphasis is on the completion of a case study within the context of the Response to Intervention model of practice. (Practicum is EDC 515).

EDC 515. School Psychology Practicum: Academic AFI. 1-6 Hours

Practicum for EDC 514.

EDC 516. Academic & Behavioral Assessment Instruments. 1-6 Hours

School psychology graduate students learn to administer, score and interpret academic and behavioral instruments. The instruments are limited to those that can be used with pre-school to 12th grade children and adolescents.

EDC 517. School Psychology Practicum: Shadowing. 1-6 Hours

Practicum for EDC 516.

EDC 521. Introduction to Clinical Mental Health Counseling. 3 Hours

Examines the historical, philosophical and theoretical underpinnings of the mental health field and the role and function of mental health counselors within that context.

EDC 522. Introduction to School Counseling. 3 Hours

This course is designed to assist graduate students in building skills and developing an understanding relative to the guidance and counseling role of human service practitioners. Essentially, this role consists of assisting children, youth, and adults from diverse backgrounds in reaching their maximum academic and personal development within various educational and community settings.

EDC 523. Delinquents & Juvenile Court. 1 Hour

This course examines (1) the juvenile court system, (2) underlying ideologies and current debates concerning treatment and/or punishment decisions, and (3) children and families at risk of juvenile court involvement.

EDC 525. Human Services Administration. 3 Hours

This course will help graduate students increase knowledge, theory, and skills in the administrative aspects of the human services delivery system. Students will gain knowledge and understanding of community, environmental, and institutional opportunities that enhance, as well as barriers that impede, overall leadership in human services administration.

EDC 529. Career Counseling. 2 Hours

Focuses on theories, strategies, information, assessment, and resources to be used in the career counseling of children, youth, and adults.

EDC 529L. Career Counseling Lab. 1 Hour

Course content focuses on theories, strategies, information, assessments, and resources to be used in the career counseling of children and youth in the K-12 setting.

EDC 531. Personality & Human Development Across the Lifespan. 2 Hours

Individual growth and development across the lifespan with emphasis on the dynamic of personal behavior. This course emphasizes the integrating theme that cognitive structure is an important director of human behavior, and that the understanding of personality requires that we understand the role of cognitive structure personality. While this cognitive perspective is emphasized, the course covers a wide range of concerns to the student of personality across the lifespan. It discusses a representative selection of personality theories, personality structure, development, dynamics, maladaptive behavior, and personality change.

EDC 532. Special Education and the School Counselor. 3 Hours

Designed to provide an overview of the range of handicapping conditions for which educational program standards have been developed. Emphasis is given to the cognitive and affective impact upon the individual and family.

EDC 535. Assessment in Counseling. 2 Hours

Understanding of the individual through the appraisal techniques of individual and group testing and case study. Tests include a wide range of educational and psychological instruments. Individual differences influenced by elements such as ethnic, cultural, and gender factors are considered.

EDC 537. Statistics. 3-4 Hours

This course provides an introduction to descriptive and inferential statistics and to SPSS. Much of the course learning activities are computer and Web based.

EDC 538. Child & Adolescent Psychopathology. 3 Hours

This course provides an overview of the normal and abnormal development of child and adolescent personality. Distinctions between disorders and special education disabilities are made. Each of the several aspects of child and adolescent psychopathologies are examined and prevention approaches are introduced.

EDC 540. Perspectives in Higher Education. 3 Hours

This course provides an in depth study of the philosophy guiding higher education, a directed study of the history of higher education, and examination of the ethical and philosophical foundations of student affairs practice within current higher education structures.

EDC 541. Curriculum & Instruction for Diverse Learners. 3 Hours

This course provides students with the foundation knowledge necessary for understanding the diverse learning needs of children and adolescents. Topics include types of handicapping conditions, gifted and talented, instructional settings, curriculum and instructional methods, and classroom management techniques.

EDC 542. Crisis Intervention & Prevention in Educational Settings. 2 Hours

This course will review crisis counseling theory and basic crisis prevention and response skills. The concept of crisis will be considered broadly. The focus will be on the promotion of health and mental health in schools and the enhancement of student competence following a crisis event. The course will explore specific examples of techniques and programs designed to intervene before, during and after a crisis event. Also covered will be policy questions, evaluation issues, and systems change. Specific attention will be given to concepts of stress, coping, and resiliency.

EDC 543. Theories & Techniques of Counseling. 3 Hours

Through analysis of varied theoretical models, skills in counseling will be developed in an integrated approach for modifying the behavior of children, youth, and adults through individual and system change.

EDC 544. Philosophical, Professional, Ethical & Legal Aspects in Counseling. 2 Hours

Study of philosophical assumptions of the various theories of counseling and psychotherapy. Treatment of counseling ethics and professional practices; laws and court decisions pertaining to counseling.

EDC 545. Counseling Techniques Lab. 2 Hours

Supervised experience in counseling. Both group and individualized instruction and supervision.

EDC 546. School Counseling Program Development & Implementation. 3 Hours

Course content focuses on the development, implementation and evaluation of comprehensive developmental school counseling programs, including the knowledge, skills and practices necessary for engaging in an ongoing process of needs assessment, program development and implementation and program evaluation geared toward promoting the academic achievement, career planning and personal/social development of all PreK-12 students. Prerequisite(s): EDC 522, EDC 543, EDC 545.

EDC 547. Consultation & Leadership in School Counseling. 3 Hours

Course content focuses on preparing school counseling candidates to become effective educational leaders, advocates and collaborators through exposure to current educational leadership and advocacy models and through active involvement in relevant skill building exercises. School counseling candidates will learn to lead and consult effectively with diverse students, parents, teachers, administrators, and various other educational stakeholders. Prerequisite(s): EDC 522, EDC 543, EDC 545.

EDC 548. Counseling Children & Adolescents. 2 Hours

This course is intended to provide foundational knowledge and skill development for counseling children and adolescents. Foundational knowledge will include historical and current trends of counseling children and adolescents, multicultural and ethical considerations, expressive techniques, solution focused therapy, play therapy, REBT therapy, reality therapy, counseling at-risk children, crisis counseling, working with parents and family systems. Skills will include general counseling skills, crisis counseling skills, and collaboration skills.

EDC 548L. Counseling Children & Adolescents Laboratory. 1 Hour Laboratory.**EDC 550. Student Development's Role in Learning. 3 Hours**

The study of basic theoretical perspectives underlying college student development and assessment of development to the practice of college student personnel.

EDC 551. Student Cultures & Development. 3 Hours

In-depth study and critique of selected student and adult development theories, assessment of students' development on those theories, and application to the practice of College Student Personnel. Prerequisite(s): EDC 550.

EDC 553. Internship in College Student Personnel. 2 Hours

Participate as a professional to gain significant practical experience in a student affairs office under the supervision of a practicing professional. The student is required to take a total of six semester hours over three semesters. Each internship experience must be at a different site.

EDC 555. Administration & Organization of College Student Personnel Programs. 3 Hours

This course deals with issues related to the administration of student personnel programs in colleges and universities and examines the organizational structures associated with the delivery of these programs in the context of current higher education administrative environments. Prerequisite(s): EDC 540.

EDC 556. Administration & Organization in Higher Education. 3 Hours

This course deals with the administration of broad areas of colleges and universities by examining the organizational structure and culture associated with the delivery of programs and services. Prerequisite(s): EDC 540.

EDC 557. Learning in Community. 3 Hours

In-depth study of college student cultures and their impact on the individual college student experience. Particular attention will be paid to understanding the student culture in student personnel work.

EDC 558. Advising Across The Post-Secondary Curriculum. 3 Hours

This course is designed to provide an opportunity for you to become familiar with the important theories, concepts, models, issues, applications, and other factors involved in the administration of academic advising in different higher education settings. Assignments toward this goal include short papers, participation in class and on-line discussions, and submission of a cumulative portfolio.

EDC 559. International and Global Higher Education. 3 Hours

International and global higher education.

EDC 560. Leadership in College & University Environment. 3 Hours

Study of the concepts, literature, and research in leadership and their relationship to the development and maintenance of the organization. Higher education and college student personnel examples will be emphasized.

EDC 561. Finance in Higher Education. 3 Hours

Study and analysis of the planning, methodologies, financial strategies, and evaluative systems for university systems and subsystems. Prerequisite(s): EDC 554.

EDC 562. Learning Design. 3 Hours

Theories and practice of group interventions in student personnel settings; conceptualization and assessment of interventions appropriate to human and organizational student personnel settings. Course includes development of intervention skills.

EDC 563. Law & Ethics in Higher Education. 3 Hours

Through study and reflection in the fields of law and ethics, students are asked to consider the kinds of administrative actions that lead people and institutions into court and to develop alternative approaches and attitudes.

EDC 564. Practicum in Higher Education. 3 Hours

Supervised experience in higher education administration with faculty and on-site supervisor. Topics and requirements will vary with experience and placement area. Designed for students working in full-time positions in higher education settings.

EDC 565. Educational Structures in Post Secondary Education. 3 Hours

A study of federal, state, and local public policy and its impact on public and private higher education. Specific attention will be paid to financial aid, admission, and accreditation issues.

EDC 566. Case Studies in Higher Education. 3 Hours

Case studies in higher education.

EDC 568. Research & Evaluation in Human Services. 3 Hours

This course provides professionals in the public schools, higher education institutions, and community agencies with the basic quantitative and qualitative tools of inquiry and when to use them to answer research questions. Emphasis also includes critiquing research studies and applying research results to practice. College Student Personnel and Higher Education Administration students must have 21 Hours.

EDC 569. Scholarly Project in CSP/HE. 3 Hours

A culminating course in which students in their final term integrate, synthesize, and apply the academic work and professional experiences gathered during their program. Students will complete a project designed with the assistance of faculty and campus administrators and present it along with their peers in a supportive learning community. Taken toward the end of the program. Prerequisite(s): EDC 568.

EDC 571. Biological Bases of Behavior. 1-3 Hours

Survey of three biological bases of behavior, including neuropsychology, genetics, and psycho-pharmacology.

EDC 572. Role & Function of the School Psychologist. 3 Hours

Topics of significance in the profession of school psychology, with emphasis on history and foundations of school psychology, legal and ethical issues, professional issues and standards, roles and functions of the school psychologist. Students are expected to develop knowledge and skills in using APA format in the context of a literature review.

EDC 573. Orientation to the Educational Process & Technology. 1 Hour

Directed observation of and participation in the normal school process under supervision within the school. Required of all school psychology candidates who do not have a teaching certificate.

EDC 574. Independent Studies in Counseling. 1-3 Hours

Independent study.

EDC 575. Counseling Diverse Populations. 3 Hours

Designed to develop sensitivity and awareness in human diversity; introduce multicultural concepts, competencies, and research; and provide an experiential component.

EDC 583. Theories & Techniques of Group Counseling. 3 Hours

Course content focuses on the stages, theories, strategies, and applications of the group counseling process. Prerequisite(s): EDC 543.

EDC 584. Practicum in Clinical Mental Health Counseling. 2 Hours

Supervised practice and observation in group and individual counseling techniques. Prerequisite(s): EDC 521, EDC 529, EDC 531, EDC 535, EDC 545, EDC 575, EDC 583, EDC 623, EDC 631.

EDC 585. Practicum in School Counseling. 3 Hours

Supervised practice and observation in group and individual counseling techniques. Prerequisite(s): EDC 522, EDC 545, EDC 548, and EDC 583.

EDC 593. Early Childhood Development & Assessment. 3 Hours

The purpose of this course is to provide graduate students in school psychology with knowledge in developmental norms for students in early childhood and implications for assessment and instruction. Students will review several early childhood assessment instruments and methodologies and understand how to use them as appropriate in a variety of settings in accordance with legal guidelines and best practice.

EDC 598. Internship in Clinical Mental Health Counseling. 2-6 Hours

Directed experience in professional functions within cooperating social and clinical agencies in the community. Must be taken three times. Prerequisite(s): EDC 584.

EDC 599. Internship in School Counseling. 2-6 Hours

Extensive directed experience in professional functions within cooperating schools and community organizations. Must be taken three times. Prerequisite(s): EDC 547, EDC 585.

EDC 600. Culminating Seminar. 1-3 Hours

This course prepares students to take a comprehensive examination covering the course content of their masters degree program. In addition for students who will seek certification as school counselors or licensure as professional counselors or professional clinical counselors, the course serves as a preparation for the competency exams related to these credentials.

EDC 602. Counseling Seminars. 1-6 Hours

A series of specific courses designed to present topics of unique interest to students in a variety of professional areas. Areas often include state-of-the-art assessment and intervention methods presented by community experts.

EDC 605. Professional Seminars with Clinical Implications. 1-6 Hours

Learner-oriented courses in which a group of students focus on a specific topic related to the professional, ethical, or practical applied aspects of clinical counseling as implemented in a clinical setting.

EDC 610. Social Behavior Assessment for Intervention. 3 Hours

This course and its practicum (EDC 611) provide instruction and practice in the data-based, problem-solving, intervention-based assessment of the social and behavioral functioning of preschool children and of school-age children and adolescents. Course content includes various models and methods of assessment, sources of assessment data, and intervention planning.

EDC 611. School Psychology Practicum: Social/Behavioral AFI. 1 Hour

Practicum for EDC 610.

EDC 612. Assessment for Intervention & Accountability. 3 Hours

The focus of this course is accountability in the schools with emphases on legal bases, standards of practice, individual and group accountability, and program evaluation. Students complete program evaluation project in this course. (Practicum is EDC 613).

EDC 613. School Psychology Practicum: Assessment for Intervention & Accountability. 1-6 Hours

Practicum for EDC 612.

EDC 615. School Psychology Culminating Seminar. 3 Hours

This course employs a seminar format to discuss current issues in the practice of school psychology.

EDC 623. Foundations in Abnormal Psychology. 3 Hours

Description of the specific aspects of personality theory and cultural and biological factors that lead to an understanding of abnormal behavior and psychopathology as it affects a wide range of individuals from children through the aged. The relevance of these concepts and theories to clinical counseling is explored. This course incorporates theory (quantitative) and group exercises (qualitative and performative knowledge).

EDC 630. Evaluation of Emotional & Mental Conditions. 3 Hours

Includes the use of assessment procedures in diagnosis, treatment planning, and outcome measurement. Methods of administering and interpreting individual and group standardized tests of mental ability interest and personality are emphasized. Prerequisite(s): EDC 623, EDC 631.

EDC 631. Diagnosis of Emotional & Mental Disorders. 3 Hours

Presentation of the mental status exam and other means of developing a diagnosis as described in the current edition of the 'Diagnostic and Statistical Manual for Mental Disorders.' Special problems including mental retardation, psychosexual disorders, substance abuse, and addiction are also considered. This course incorporates theory (quantitative knowledge) and case studies (qualitative and performative knowledge). The use of the diagnosis in developing treatment plans will be emphasized.

EDC 635. Couples & Family Counseling. 3 Hours

This course is designed to introduce students to systems theory, the dynamics of human relationships, theories and techniques of marital and family counseling, and professional and legal issues in marital and family counseling. Students will acquire skills and understanding relative to the role of the counselor in assisting families to develop new strategies, solve problems, and facilitate individual and family growth.

EDC 673. Counseling Multi-Ethnic Populations. 3 Hours

Counseling multi-ethnic populations.

EDC 681. Integrative Approach to Clinical Counseling. 3 Hours

Assistance for the students in selecting that theory or those aspects of various theories of clinical counseling that best characterize their approach to clients. Emphasis is on the integration of theories with the counselor's personal characteristics and experience. This includes emphasis on self reflection (qualitative knowledge), theory (quantitative knowledge), and counseling exercises (performative knowledge). Prerequisite(s): EDC 584 or EDC 598.

EDC 683. Treatment of Mental & Emotional Disorders. 3 Hours

Presentation of methods used in treatment and management of mental disorders including treatment planning, counseling techniques, record keeping, referral procedures, and use of psychotropic medication. Prerequisite(s): EDC 631.

EDC 686. Addictions Counseling. 3 Hours

Course content focuses on theories, strategies, information, assessments, and resources to be used in addictions counseling of persons over the lifespan.

EDC 700. Scholarly Project. 3 Hours

To familiarize the student with the scientific literature of the counseling profession in a more focused way and utilize their research of the literature in one of three specific alternatives: (1) Thesis - literature search and inquiry; (2) Project of Excellence - literature search and counseling competence; (3) Transformative project - literature search and social action application.

EDC 710. Internship in Psychology. 1-5 Hours

Semester I of a nine month, 1200-hour field experience under the direct supervision of certified school psychologists as well as the supervision of university faculty.

EDC 711. Internship in School Psychology. 1-5 Hours

Semester II of a nine month, 1200-hour field experience under the direct supervision of certified school psychologists as well as the supervision of university faculty.

EDC 712. Internship in School Psychology. 1-6 Hours

Semester III of a nine month, 1200-hour field experience under the direct supervision of certified school psychologists as well as the supervision of university faculty.

EDC 800. Thesis. 1-6 Hours

This 2 semester course series provides support to students who are completing their school psychology thesis.

Doctor of Philosophy in Educational Leadership

- Doctor of Philosophy in Educational Leadership

Charles J. Russo, Program Director

The Ph.D. Program in Educational Leadership is designed for educators who are committed to providing leadership at elementary, secondary, and collegiate levels. The program seeks to prepare scholar-practitioners, leaders who:

1. value both speculative and practical knowledge and engage in continuous inquiry on professional concerns;
2. deliberate with colleagues upon organizational purposes and the means for achieving them;
3. work selflessly with others; and
4. commit themselves to improving the quality of life within society.

The Ph.D. Program in Educational Leadership offers a choice of two different concentration areas:

- P-12 School Administration - The concentration in school administration is designed to prepare educators for the following types of positions: administrative roles in elementary and secondary education, educational researchers, consultants, or professor of school administration. Students pursuing this concentration may opt to take additional courses to meet the requirements for a principal's license and a superintendent's license.

Concentration Coordinator - Dr. Theodore Kowalski

- Higher Education - The higher education Ph.D. specialization consists of a seven-course sequence that introduces students to important literature, concepts, and practices in higher education. Using reflective

inquiry to generate questions, moral inquiry to ground decisions, and action inquiry to guide praxis, this program models an on-going transformative process.

Concentration Coordinator - Dr. Michele Welkener

Coursework

Formal coursework in the program is organized around the concepts of research, foundations, and organizational behavior. Coursework in an academic field outside of education is also completed through a cognate. Minimum requirements are listed below.

Doctor of Philosophy in Educational Leadership (EDL)

Research	12
EDU 990	Research Methods & Design
EDU 991	Qualitative Research
EDU 992	Quantitative Research & Analysis
EDU 993	Advanced Research, Statistics & Data Analysis
Dissertation	9
EDU 904	Dissertation
Foundations	3
EDU 908	Ideas that Shape American Education
Core	9
EDU 914	Ethics in Educational Leadership
EDU 921	Organizational Theory
EDU 922	Organizational Change & Development
Select one program concentration from:	21
Higher Education Administration:	
EDU 941	History, Philosophy & Curriculum of Higher Education
EDU 942	Student Choice in Higher Education
EDU 943	Critical Reflection in Higher Education Leadership
EDU 944	Building Learning Communities in Higher Education
EDU 945	Finance & Policy in Higher Education
EDU 946	Legal Issues in Higher Education
EDU 947	The Professoriate
PK-12	
EDA 810	Curriculum Evaluation & Instruction
EDA 811	Curriculum Development & Leadership
EDA 812	Program & Staff Development
EDA 818	Superintendency
EDA 833	Internship III
EDA 852	Assessment & Instruction for School Improvement
EDA 859	Law of Special Education
EDA 860	Seminar: District Level Management
EDA 861	Seminar: District Level Leadership
EDA 862	Seminar: Policy, Politics & Decision Making
Cognate	9
Total Hours	63
Residency	

Residency is completed during the first three consecutive terms (fall, spring, summer) following admission to the program; a minimum of six semester hours of coursework must be completed in each of these terms.

Comprehensive Examination

In addition to completing coursework and residency requirements, students will successfully complete written examinations.

Education - Doctoral Studies Courses

EDU 808. Ideas that Shape American Education. 3 Hours

Provides students the historical bases for policy decisions. The primary expectation is that students learn to use the history of education as a foundation for policy making. Also offered as EDU 908.

EDU 821. Organizational Theory. 3 Hours

Organizational theory.

EDU 841. History, Philosophy & Curriculum of Higher Education. 3 Hours

This course examines the evolution of higher education in the United States from the colonial era to the present. Particular attention is given to the purpose(s) and curriculum of higher education as they evolved in American society. Also offered as EDU 941.

EDU 842. Student Choice in Higher Education. 3 Hours

This course examines the factors that influence student choice in higher education, including decisions about attending college, which college to attend, program of study, persistence, and graduate education. The ways in which student choice research can inform the development and refinement of enrollment management, student support services, and academic program development will also be analyzed and discussed. Also offered as EDU 942.

EDU 843. Critical Reflection in Higher Education. 3 Hours

This course examines the convergence between the literature on reflective practice, leadership theory, and leadership in higher education. Particular attention is given to the role of critical reflection in improving the practice of leadership in higher education. Also offered as EDU 943.

EDU 844. Building Learning Communities in Higher Education. 3 Hours

This graduate course will explore concepts and theories related to increasing responsibility and productivity in administrative and academic units in colleges and universities through the development, administration, and assessment of learning communities.

EDU 845. Finance & Policy in Higher Education. 3 Hours

This course examines the literature on public policy, public finance of higher education, and critical social issues in higher education. It will explore the role of government agencies in the funding and regulation of financial and social issues in higher education. Also offered as EDU 945.

EDU 846. Legal Issues in Higher Education. 3 Hours

This course examines the literature on the law and higher education. It will provide a perspective on what active higher education administrators need to know about legal issues. Also offered as EDU 946.

EDU 847. The Professoriate. 3 Hours

This course explores the historical development and cultural foundations of the faculty role especially the socialization process, values, work styles, career patterns, and the labor market. Research on the issues that impact faculty at all types of academic institutions is discussed. Also offered as EDU 947.

EDU 904. Dissertation. 1-8 Hours

Course is designed to provide each Ph.D. candidate the opportunity to pursue, with faculty guidance and support, inquiry on a topic of personal significance which also promises to add to the knowledge base of the profession. Prerequisite(s): Successful completion of comprehensive examination.

EDU 908. Ideas that Shape American Education. 3 Hours

Provides students the historical bases for policy decisions. The primary expectation is that students learn to use the history of education as a foundation for policy making. Also offered as EDU 808.

EDU 914. Ethics in Educational Leadership. 3 Hours

In this doctoral seminar, students carefully examine the moral dimension of decision-making in educational leadership. Particular attention is given to the development of a model for the articulation of moral views and its application to case situations.

EDU 919. Independent Study. 0-5 Hours

By permission of the program director only.

EDU 921. Organizational Theory. 3 Hours

Development of organizational concepts that will help educational leaders become skilled organizational diagnosticians. Emphasis will be centered upon organizational behavior and how the leader can use the theories and research of the field in dealing with problems involving people.

EDU 922. Organizational Change & Development. 3 Hours

Development of the fundamental concepts and procedures relative to effective planning. Applications of these concepts will also be made to program development and evaluation.

EDU 941. History, Philosophy & Curriculum of Higher Education. 3 Hours

This course examines the evolution of higher education in the United States from the colonial era to the present. Particular attention is given to the purpose(s) and curriculum of higher education as they evolved in American society. Also offered as EDU 841.

EDU 942. Student Choice in Higher Education. 3 Hours

This course examines the factors that influence student choice in higher education, including decisions about attending college, which college to attend, program of study, persistence, and graduate education. The ways in which student choice research can inform the development and refinement of enrollment management, student support services, and academic program development will also be analyzed and discussed. Also offered as EDU 842.

EDU 943. Critical Reflection in Higher Education Leadership. 3 Hours

This course examines the convergence between the literature on reflective practice, leadership theory, and leadership in higher education. Particular attention is given to the role of critical reflection in improving the practice of leadership in higher education. Also offered as EDU 843.

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This course explores the historical development and cultural foundations of the faculty role especially the socialization process, values, work styles, career patterns, and the labor market. Research on the issues that impact faculty at all types of academic institutions is discussed. Also offered as EDU 847.

EDU 990. Research Methods & Design. 3 Hours

This course is designed to cover understanding and evaluating, as well as methods involved in undertaking both qualitative and quantitative research in an education setting beginning with identification of the research problem and continuing through writing the final report.

EDU 991. Qualitative Research. 3 Hours

This course emphasizes the design of studies and the issues faced by researchers using qualitative methods. Focus is on fieldwork methods in educational settings, specifically observation, interviewing, collecting written documents, using questionnaires, and data reduction and analysis. Pre-requisite(s): EDU 990.

EDU 992. Quantitative Research & Analysis. 3 Hours

Course is designed to provide an introduction to the methods and techniques used in quantitative research methodology. Prerequisite(s): EDU 990.

EDU 993. Advanced Research, Statistics & Data Analysis. 1,3 Hours

This course is designed to extend the focus of EDU 992 with particular emphasis on experimental design methodology and the use of computer programs in analyzing research data. Prerequisite(s): EDU 990, EDU 991, EDU 992.

Educational Leadership Courses

EDA 505. Educational Leadership. 3 Hours

The focus of this course is leadership within schools and the role of the educational leader as scholar/practitioner emphasizing excellence in the educational organization through the effective integration of theory and practice.

EDA 507. Internship I. 3 Hours

This course provides opportunities for the student to experience administrative responsibilities. Emphasis is placed on practicing the skills learned in the master's program, receiving feedback on efforts, and relating practice to theory. Prerequisite(s): EDA 551.

EDA 509. Supervision & Professional Development. 3 Hours

This course in the theory and practice of supervision is designed to explore essential concepts and skills necessary in providing leadership in the area of formative and summative evaluation for the improvement of teaching and learning. Emphasis will be placed on concepts and means of the scholar-practitioner providing leadership in the supervisory task areas and building learning communities through critical reflection.

EDA 510. Instructional Leadership. 3 Hours

The course focus is on developing knowledge, skills, attitudes, and values essential in helping others to expand/refine their instructional effectiveness. Emphasis is placed on helping teachers use alternating models of instruction, diagnosing learner needs, prescribing appropriate learner instructional strategies, and accommodating learner needs based upon the concept of diversity.

EDA 511. Curriculum. 3 Hours

The focus of this course is on the development of an understanding of the history, purposes, and practices of the school curriculum. Within the course, emphasis is placed on helping students personally integrate the scholarly and practical dimensions and on demonstrating that integration.

EDA 515. School Law. 3 Hours

This course addresses legal issues pertinent to teacher, administrator, and student legal rights and responsibilities in the school building. The legal process, structures of the law, legislation/litigation, and practices to avoid legal infringements are addressed.

EDA 551. Research. 3 Hours

This course will equip school leaders with the tools of research. Emphasis will be placed on becoming frequent and knowledgeable users of research on schools, developing skills in critiquing research, and applying the tools of research to address issues that face school leaders. This course is a prerequisite for EDA 507.

EDA 555. Community Relations for School Leaders. 3 Hours

This course is designed to assist school administrators in refining their communication skills and political understanding. Provisions are made for the development of guidelines, techniques, and practices that facilitate wholesome relationships between school and community.

EDA 556. Leadership in Diverse Communities. 3 Hours

This course will promote understanding of differences in race, gender, social class, religious affiliation, and sexual orientation and the implications of these differences for leadership in the school setting. Emphasis will be on promoting understanding and managing diversity within schools as learning organizations.

EDA 557. School Finance. 3 Hours

This course addresses topics such as equity, adequacy, efficiency in school funding; local, state, and federal funding sources; funding methods; and budgeting emphasizing features unique to Ohio.

EDA 607. Internship II. 3 Hours

The internship is intended to provide the participant an opportunity to relate the coursework, research, simulation, and independent study in which he/she has engaged to actual problems encountered in administering the elementary or secondary school building/program.

EDA 611. Assessment & Instruction for School Improvement. 3 Hours

This course focuses on the role of educational leaders with setting and attaining high academic goals for the primary purpose of maximized student learning outcomes, thus improving the practices of instruction and assessment. Educational leaders need an understanding of the best practices for enhancing teaching, curriculum, supervision, assessment and professional development. Educational leaders also need to know how to collect, interpret and analyze what's been assessed and to use this data with reporting to various constituents of the learning community. The focus of this course is the integration of theory with the practices of instruction and assessment for improving the teaching/learning process.

EDA 614. Variable Topics. 1-6 Hours

Variable topics workshop.

EDA 626. Staff Personnel. 3 Hours

This course emphasizes the systematic selection, evaluation, assignment and development of both professional and classified school personnel. Scholar-practitioners participating in this class will develop an understanding of the associated task areas.

EDA 654. School Finance. 3 Hours

This course addresses topics such as equity, adequacy, efficiency in school funding; local, state, and federal funding sources; funding methods; and budgeting emphasizing features unique to Ohio.

EDA 655. Principalship. 3 Hours

This course centers on the application of leadership and management principles to the elementary, middle, and secondary school settings. Emphases include developing vision and mission statements, reflecting on the leadership role of the principal, and reviewing the process for the daily administration of the total school program.

EDA 710. Curriculum Evaluation & Instruction. 3 Hours

This course is designed to refine participant understanding of the realms of meaning, characteristics of effective programs, research findings on effective instruction, and curriculum management.

EDA 711. Curriculum Development & Leadership. 3 Hours

The major focus of the course will be how an educational leader at the district level designs and implements curriculum based upon philosophical, psychological, and historical underpinnings of curriculum theory. A recurring focus in the course is the relationship of practice and scholarship and practice and theory as the educational leader creates a learning community.

EDA 712. Program & Staff Development. 3 Hours

This course is designed to strengthen student competence with program development and evaluation processes. Major emphasis is focused on staff development planning, program implementation, and program assessment.

EDA 718. Superintendency. 3 Hours

This course addresses the duties and responsibilities of central office administrators, especially those of the superintendent. Emphasis is placed on board of education relations, communication, and an analysis of the political structures within which the superintendent operates.

EDA 733. Internship III. 3 Hours

This internship provides significant opportunities for candidates to synthesize and apply the knowledge and practice and develop the skills identified in the ELCC standards through, substantial, sustained, standards-based work in real setting, planned and guided cooperatively by the institution and school district personnel. This course is intended to provide the participants with an opportunity to relate the coursework, research, simulation, and independent study in which they have engaged in real problems encountered in administration, supervision and instructional programs primarily in a district level/central office setting.

EDA 759. Law of Special Education. 3 Hours

A review of pertinent legislation and litigation and litigation impacting on the rights of parents, students, and teachers involved in the process of providing a free appropriate public education for children with disabilities. Emphasis is placed on how teachers can, through an understanding of the law, facilitate active parent participation in the developmental progress of students. Teachers' specific responsibilities are described in relation to current requirements for development of appropriate educational programs.

EDA 760. Seminar: District Level Management. 3 Hours

This course is intended to provide the participants with the knowledge and understanding of practical issues necessary for school superintendents to successfully manage a school district. These issues include matters relevant to managing a school district as an organization, managing the various operational components of the district, and managing district resources. Prerequisite(s): Admitted to Superintendent licensure program or permission of department chairperson.

EDA 761. Seminar: District Level Leadership. 3 Hours

This course addresses current topics related to district level issues including curriculum and instruction leadership (planning, goals, alignment, staff development), technology, accreditation, staff-personnel (hiring and supervision of district and building level administrators), community partnerships, capacity building, contract issues, ethics, and legal issues (focusing on special education) appropriate to each section along with other related areas associated with successful instructional leadership at the district level. Emphasis is placed on meeting the needs of each group of students in the district and the relationships that must be developed in order to achieve these ends.

EDA 762. Seminar: Policy, Politics & Decision Making. 3 Hours

The curriculum is both explanatory and exploratory and includes the following general topics: recommending, enforcing, and evaluating school district policy; political dimensions of district administration in the context of representative democracy; and, the application of problem solving and decision making paradigms in district administration. Focused attention is given to local stakeholder involvement in policy development and problem solving.

EDA 807. EDS Project Seminar. 3 Hours

Completion of the research project is an integral part of this degree program. Students earn three semester hours of credit for the completion of their research project. This project will relate to the individual's coursework, interest, and work responsibilities.

EDA 810. Curriculum Evaluation & Instruction. 3 Hours

See EDA 710.

EDA 811. Curriculum Development & Leadership. 3 Hours

See EDA 711.

EDA 812. Program & Staff Development. 3 Hours

See EDA 712.

EDA 818. Superintendency. 3 Hours

See EDA 718.

EDA 833. Internship III. 3 Hours

This experience is intended to provide the participant with an opportunity to relate the coursework, research, simulation, and independent study in which he/she has engaged to actual problems encountered in administration.

EDA 851. Research. 3 Hours

This course is designed to provide practical application and issues in research as they relate to the educational leader. The objective of the course is the development of a proposal to conduct a research project which the student will finish prior to completion of the Educational Specialist degree program.

EDA 852. Assessment & Instruction for School Improvement. 3 Hours

This course focuses on the role of educational leaders with setting and attaining high academic goals for the primary purpose of maximized student learning outcomes, thus improving the practices of instruction and assessment. Educational leaders need an understanding of the best practices for enhancing teaching, curriculum, supervision, assessment and professional development. Educational leaders also need to know how to collect, interpret and analyze what's been assessed and to use this data with reporting to various constituents of the learning community. The focus of this course is the integration of theory with the practices of instruction and assessment for improving the teaching/learning process.

EDA 855. Legal Issues in School Leadership. 3 Hours

This course addresses the statutes and judicial decisions which relate to schools and the responsibilities of boards of education, teachers, and administrators. Emphasis is placed on understanding the legal framework as it relates to providing quality education.

EDA 859. Law of Special Education. 3 Hours

A review of pertinent legislation and litigation and litigation impacting on the rights of parents, students, and teachers involved in the process of providing a free appropriate public education for children with disabilities. Emphasis is placed on how teachers can, through an understanding of the law, facilitate active parent participation in the developmental progress of students. Teachers' specific responsibilities are described in relation to current requirements for development of appropriate educational programs.

EDA 860. Seminar: District Level Management. 3 Hours

See EDA 760.

EDA 861. Seminar: District Level Leadership. 3 Hours

This course addresses current topics related to district level issues including curriculum and instruction leadership (planning, goals, alignment, staff development), technology, accreditation, staff-personnel (hiring and supervision of district and building level administrators), community partnerships, capacity building, contract issues, ethics, and legal issues (focusing on special education) appropriate to each section along with other related areas associated with successful instructional leadership at the district level. Emphasis is placed on meeting the needs of each group of students in the district and the relationships that must be developed in order to achieve these ends.

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Educational Administration

- Educational Specialist, Educational Leadership
- Master of Science in Education, Educational Leadership
- Master of Science in Education, Leadership in Educational Systems
- Licensure, Curriculum, Instruction and Professional Development
- Licensure, Principal
- Licensure, Superintendent
- Concentration, Instructional Leadership in Catholic Schools

David Dolph, Department Chairperson

Please visit our department website (https://udayton.edu/education/departments_and_programs/eda).

Through its Marianist traditions and principles, the mission of the Department of Educational Administration at the University of Dayton is threefold. The first charge is to prepare scholar-practitioners to serve effectively in administrative roles and other leadership positions in PK-12 public, Catholic and other non-public schools. The second task is to contribute to the knowledge base in school administration. The third responsibility is to provide service to PK-12 public, Catholic and other non-public schools.

The Department of Educational Administration is committed to providing quality instruction and support to individuals who (1) have demonstrated leadership potential within an educational setting and have expressed interest in pursuing a master's degree in educational leadership, or (2) hold a master's degree and wish to pursue a specific administrative licensure program, or (3) are interested in earning the Educational Specialist degree or the Ph.D., or (4) wish to improve their educational leadership knowledge and skills.

Advising

Upon acceptance into the program, the student will be assigned a faculty advisor who will be available to assist the student with information relative to their course of study. Students needing registration or program evaluation information should contact the department office.

Curriculum, Instruction, and Professional Development Licensure (ELC)

A total of 45 semester hours is required to obtain the curriculum, instruction, and professional development licensure. Students may earn this licensure by completing the Educational Leadership master's degree, or its approved equivalent, plus 15 additional semester hours of coursework as listed below. Beginning September 1, 2013, the Ohio Assessments for Educators will replace the Praxis II series as the required Ohio educator licensure assessment. The Praxis II exam successfully completed before September 1, 2013 will be honored by the University of Dayton and the State of Ohio. More information about the Ohio Assessments for Educators exam can be found online at <http://www.oh.nesinc.com/>. The Curriculum, Instruction and Professional Development (CIPD) license is a five year license and requires two years teaching experience.

Required Courses

EDA 852	Assessment & Instruction for School Improvement	3
EDA 710	Curriculum Evaluation & Instruction	3
EDA 733	Internship III	3
EDA 761	Seminar: District Level Leadership	3

Electives

select 1 from the following		3
EDA 711	Curriculum Development & Leadership	
EDA 712	Program & Staff Development	

Total Hours 15

Educational Specialist in Educational Leadership (EDS)

The Educational Specialist degree is offered jointly by the Graduate Schools of the University of Dayton and Wright State University.

This post-master's educational specialist degree, Ed.S., program is designed to enhance individual capabilities for educational leadership. The areas of staff/organizational development, curriculum development, program development and evaluation, law/finance/facilities, public relations, assessment and research are included. Emphasis is given to preparing individuals for central office positions.

The planned program of study requires a minimum of 33 semester hours of designated graduate work beyond the master's degree. The program may be completed either at the University of Dayton or at Wright State University. Previous post-master's coursework may be transferred into

the program if it supports the objectives of the overall program and is in accordance with the university transfer credit guidelines.

Required Courses

EDA 807	EDS Project Seminar	3
EDA 812	Program & Staff Development	3
EDA 818	Superintendency	3
EDA 833	Internship III *	3
EDA 851	Research	3
or EDU 990	Research Methods & Design	
EDA 852	Assessment & Instruction for School Improvement	3

Prereq: EDA 851 or other approved research course. Project must be completed within 12 months of starting date. Students who have taken EDA 551 or its equivalent should take EDU 990.

Educational Specialist Electives

Select five of the following:		15
EDA 810	Curriculum Evaluation & Instruction	
EDA 811	Curriculum Development & Leadership	
EDA 855	Legal Issues in School Leadership	
EDA 859	Law of Special Education	
EDA 860	Seminar: District Level Management	
EDA 861	Seminar: District Level Leadership	
EDA 862	Seminar: Policy, Politics & Decision Making	

Total Hours 33

Master of Science in Education in Educational Leadership (EDA)

To earn a master's degree in educational administration, the student is required to successfully complete a minimum of 30 semester hours from the courses listed below and achieve a grade point average of 3.0 or better. Students have the opportunity to pursue coursework via the Internet or by combining distance learning and traditional courses in pursuit of the Master's Degree.

The Department of Educational Administration offers an online master's degree with a Catholic school leadership concentration. Tuition scholarships are available to teachers and administrators working full time in Catholic schools or diocesan offices. For further program and scholarship information, contact David Dolph, Chairperson at ddolph1@udayton.edu. A three summer traditional program is also available for Catholic school educators.

EDA 505	Educational Leadership	3
EDA 507	Internship I *Prereq EDA 551	3
EDA 509	Supervision & Professional Development	3
EDA 510	Instructional Leadership	3
EDA 511	Curriculum	3
EDA 515	School Law	3
EDA 551	Research	3
EDA 555	Community Relations for School Leaders	3
EDA 556	Leadership in Diverse Communities	3
EDA 557	School Finance	3

Total Hours 30

Master of Science in Education, Leadership in Educational Systems (ESY)

The leadership for educational systems concentration is designed to provide students with a thorough understanding of the United States system of education and to develop leadership skills to administer educational systems. The program addresses the growing need that international students have to study the United States educational systems and yet are not interested in, nor qualify for, licensure. This program will feature an interdisciplinary approach; however, the degree is awarded through the Department of Educational Administration. Courses in the program will be provided by the Department of Educational Administration (EDA), the Department of Counselor Education (EDC) and the Department of Teacher Education (EDT), and will guide students through critical analyses of leadership issues, promote rational problem-solving and decision-making regarding issues facing educational systems from preschool to higher education (P-16).

Required Teacher Education Coursework:

EDT 500	Models of Teaching	3
EDT 501	Introduction to American Education	3
EDT 505	School, Self and Society	3
EDT 659	Special Topics in Teaching (Scholarly Study in Education)	3
EDT 667	Educational Research Seminar ¹	3

Required Educational Leadership Coursework:

EDA 505	Educational Leadership	3
EDA 510	Instructional Leadership	3
EDA 511	Curriculum	3
EDA 551	Research ¹	3

Required Counselor Education Coursework:

EDC 540	Perspectives in Higher Education	3
EDC 560	Leadership in College & University Environment	3
EDC 568	Research & Evaluation in Human Services ¹	3

¹ Students must select one of the these courses.

Principal Licensure (ELP)

Students may earn a Principal license by completing the University of Dayton Master of Science degree in Educational Leadership, or its approved equivalent; successfully completing the 12 semester hours of designated Principal license coursework; providing evidence of two years of successful teaching experience under a standard teaching credential on the level for which the administrative license is sought; and obtaining a passing score on the Ohio Assessments for Educator's exam. Beginning September 1, 2013, the Ohio Assessments for Educators will replace the Praxis II series as the required Ohio educator licensure assessment. The Praxis II exam successfully completed with a passing score before September 1, 2013 will be honored by the University of Dayton and the State of Ohio. More information about the Ohio Assessments for Educators exam can be found online at <http://www.oh.nesinc.com/>.

Students have the opportunity to pursue coursework via the Internet or by combining distance learning and traditional courses in pursuit of the Principal license.

EDA 607	Internship II ^{Prereq. EDA 507}	3
EDA 611	Assessment & Instruction for School Improvement	3
EDA 626	Staff Personnel	3

EDA 655	Principalship	3
Total Hours		12

Superintendent Licensure (ELS)

Students may earn a Superintendent license by completing both the University of Dayton Master of Science degree in Educational Leadership and the Principal licensure, or their approved equivalent, plus the 12 additional semester hours of designated coursework as listed below. In addition, students must have successfully completed three years of administrative experience under a standard administration credential.

Required

EDA 718	Superintendency	3
EDA 733	Internship III	3
EDA 760	Seminar: District Level Management	3
EDA 761	Seminar: District Level Leadership	3
Total Hours		12

Concentration in Instructional Leadership in Catholic Schools (CAT)

The program will provide valuable training, preparation, and educational experiences for Catholic school teachers who wish to help others improve their instructional abilities. In today's world, certificate programs are becoming more important as they provide valuable information, and yet are cost friendly due to the need for fewer courses. From an employer and employee standpoint, additional training can provide recognition of enhanced skills that can lead to greater opportunity for students and improved performance for employers.

The focus of the program will be to provide coursework that will enhance the ability of students to assist others in curricular and instructional improvement. Specifically, the certificate program will consist of three courses, each worth three semester hours for a total of nine semester hours. The courses will focus on leadership and human interaction (EDA 505), curriculum (EDA 511) and instructional leadership (EDA 510).

EDA 505	Educational Leadership	3
EDA 510	Instructional Leadership	3
EDA 511	Curriculum	3

Health and Sport Science

- Master of Science in Education, Exercise Science

Corinne Daprano, Department Chairperson

Until further notice, applications are not being accepted for the Master of Science in Education, Physical Education Specialization.

The Department of Health and Sport Science offers a Doctor of Physical Therapy (DPT) and a Master of Science in Education (M.S.E.) in exercise science. The DPT is a fully accredited professional program that aims to graduate knowledgeable, service-oriented, self-assured, adaptable, reflective practitioners who, by virtue of critical and integrative thinking, lifelong learning, and ethical values, render independent judgments concerning patient/client needs that are supported by evidence; promote the health of the client; and enhance the professional, contextual, and collaborative foundations for practice. The M.S.E. in exercise science is designed to prepare individuals for careers in exercise science, corporate fitness, wellness, or personal training as well as for doctoral study in the exercise sciences. It has a scientific base which includes a substantive

research emphasis. Graduates will also be prepared for the American College of Sports Medicine or National Strength and Conditioning Association certification exams. The degree requires a research/capstone project that must be submitted to a professional journal for publication prior to graduation.

Advising

The coordinator of the graduate program within the department will act as the student's academic advisor. A personalized program will be planned with the student during the first term of enrollment in an effort to meet the student's professional and personal goals and needs. The coordinator will also counsel the student on the purpose and requirements of graduate work, selection of courses, and the options available within the department.

Assistantships

There are several graduate assistantships (GA) available within the Department of Health and Sport Science. In return for tuition remission and a stipend, GAs teach courses, labs, assist faculty with research and participate in other departmental activities as appropriate. Those interested in GA positions should contact the department chair.

Master of Science in Education in Exercise Science (EES)

A minimum of 30 semester hours is required. Students must achieve an average of at least B (3.0) in all work undertaken to qualify for graduation. Students who receive grades of C or less in two courses will be dismissed from the program.

Research Component

Select one of the following:	3
EDU 990	Research Methods & Design
EDT 660	Introduction to Educational Research
HSS 555	Sport Science Research & Design Processes

Select one of the following:	3
EDU 992	Quantitative Research & Analysis
HSS 560	Evaluation & Application of Statistics in Sport Science

Select one of the following:	3
EDU 993	Advanced Research, Statistics & Data Analysis
HSS 563	Advanced Statistics in Sport Science

Educational Component

EDT 500	Models of Teaching	3
HSS 540	Instructional Strategies	3

Professional Component

Select five of the following: *	15
HSS 531	Nutrition Exercise & Sports
HSS 537	Biomechanics
HSS 548	Safety & Law: Sport Science
HSS 550	Physiological Response in Exercise
HSS 551	Laboratory Techniques in Sport Science
HSS 556	Issues in Sport Science
HSS 591	Research Project

Total Hours	30
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* HSS 591 Research Project and HSS 550 Physiological Response in Exercise are required.

Courses

HSS 531. Nutrition Exercise & Sports. 3 Hours

Investigates the latest research trends in the nutritional assessment of the athlete. Topics will pertain to dietary needs, fluid replenishment, pre-game meals, and 'fad' diets for the athlete.

HSS 537. Biomechanics. 3 Hours

Investigations of physical principles operative in the performance of physical education activities with attempts to analyze for methods of greater effectiveness and improved performance.

HSS 540. Instructional Strategies. 3 Hours

Contemporary research on teaching in physical education, sport instruction, and an in-depth study of Mosston's Spectrum of Teaching Styles serve as the primary foci of this course.

HSS 548. Safety & Law: Sport Science. 3 Hours

Study of basic safety measures to prevent injuries and avoid legal suits. Investigation of the fundamental principles involved in the legal aspects of sports in contemporary society. Analysis of specific court cases dealing with negligence in physical education and sport.

HSS 550. Physiological Response in Exercise. 3 Hours

Study of the physiological changes that occur during exercise and training.

HSS 551. Laboratory Techniques in Sport Science. 3 Hours

The practical application of selected sport science tests and measurements. Emphasis will be placed on human performance (strength, cardiovascular, flexibility, and body composition) testing.

HSS 555. Sport Science Research & Design Processes. 3 Hours

This course is designed to develop an understanding of the nature of the general field of sport science research. It emphasizes the application of various research processes and design, learning by doing, and learning through example. Intended for use by individuals who have minimal knowledge of statistics.

HSS 556. Issues in Sport Science. 2 Hours

Seminar to investigate and report on a specific issue in sport science.

HSS 560. Evaluation & Application of Statistics in Sport Science. 3 Hours

Application of descriptive and inferential statistics to sport science tests and measurements. Quantitative analysis of selected physical fitness, motor performance, and body composition data.

HSS 563. Advanced Statistics in Sport Science. 3 Hours

The theory and hands-on applications of various social science statistical analyses to include: independent and dependent groups t-test, analysis of variance and covariance, multiple regression and non-parametric analyses. Students will use selected statistical software packages to execute real-world analyses problems.

HSS 575. Independent Study in Physical Education & Sport Science. 1-6 Hours

Individual investigations of a problem in sport science. Students may not register for HSS 575 without having completed HSS 555 and HSS 560.

HSS 582. Internship in Sport Science. 1-4 Hours

Job-related experience under the immediate supervision of personnel from a local sport science agency.

HSS 591. Research Project. 1-6 Hours

The development, planning, execution, analysis and manuscript completion of a research thesis in the sport sciences. The specific research question will be the student's choice with concurrence from his/her project advisor. Submission of the written product to a peer-reviewed research journal of at least national distribution is required before graduation. Students will also complete a successful oral defense of the thesis before the predesignated thesis team of at least three graduate faculty members from the School of Education & Allied Professions, two of which are from the Department of Health & Sport Science.

Physical Therapy

- Doctor of Physical Therapy

Philip A. Anloague, Department Chairperson

The physical therapist professional education program at the University of Dayton aims to graduate knowledgeable, service-oriented, self-assured, adaptable, reflective practitioners who, by virtue of critical and integrative thinking, lifelong learning, and ethical values, render independent judgments concerning patient/client needs that are supported by evidence; promote the health of the client; and enhance the professional, contextual, and collaborative foundations for practice. The three-year (8 semesters) Physical Therapy Program integrates didactic, hands-on, and clinical experiences that culminate in a practitioner ready for today's state of practice and beyond. The didactic portion of the curriculum is enhanced by 38 weeks of full-time clinical training that is divided into four different clinical rotations providing immediate "real-world" reinforcement for classroom and lab instruction. A primary method of curriculum delivery is problem-based learning (PBL). This case focused, small group learning format facilitates the student's ability to identify, utilize, and manage learning resources and contributes to a smooth transition from the classroom to the clinic. Problem-based learning integrates knowledge and skills from various disciplines to facilitate the development of a reflective practitioner in a manner that emphasizes professional decision-making and the use of critical analysis in problem solving. In order to qualify for admission to the DPT Program, students must have an undergraduate degree and meet admission requirements. Students attend classes on a year round basis.

Clinical Experiences

Students complete 38 weeks of full-time clinical training throughout the curriculum. The first 3 rotations of 6, 8 and 12 weeks respectively follow specific core clinical modules focusing on general medicine, neurology and orthopedics. The final 12 week rotation focuses on a specialty area and is completed just prior to graduation. Clinical training may require travel and students are responsible for all expenses.

Faculty

Eight of the nine core faculty hold terminal Doctoral Degrees and five are certified clinical specialists. Our faculty has many years of experience teaching in higher physical therapy education and a rich history of clinical experience, research and scholarship. Six faculty are currently involved in clinical practice. Adjunct faculty, 69% with Master's or Doctoral degrees and 43% being a board certified clinical specialist, assist with tutorials, labs and specialty lectures.

Doctor of Physical Therapy (DPT)

Requirements:

Core Module 1: Basic Science (16 weeks)	17
Core Module 2: Clinical Science (11 weeks)	14

General Medicine I (6 weeks)	6.5
General Medicine II (6 weeks, summer term 1)	5.5
Clinical Module I General Medicine (6 weeks, summer term 2)	5
Neurology I (10 weeks)	11
Neurology II (6 weeks)	7.5
Clinical Module II: Neurology (8 weeks)	7
Orthopedics I (9 weeks)	8.5
Clinical Module III: Orthopedics (12 weeks, summer term 1)	10
Orthopedics II (6 weeks)	5.5
Advanced Therapy I (10 weeks)	10.5
Advanced Therapy II (5 weeks)	5
Clinical Module IV: Contract Clinical (12 weeks)	10
Summation Module (1 week)	2
Total Hours	125

Courses

DPT 805. Functional Physiology I: Introduction to Pathology. 4 Hours

A small group, problem based learning course which focuses on the study of human physiological function of the major organ systems including clinical manifestations associated with pathophysiological conditions. Introduction of applied physiology and exercise physiology concepts in musculoskeletal, cardiovascular, and pulmonary function. Foundations of pharmacokinetics and pharmacodynamics are also studied in this course.

DPT 806. Functional Physiology II: Exercise Physiology. 2.5 Hours

Advanced concepts of applied physiology and exercise physiology concepts in musculoskeletal, cardiovascular, and pulmonary function are studied.

DPT 810. Professional Seminar I: Health Care. 2 Hours

Provides a comparative overview of health care systems and the role of physical therapy. Students learn about the APTA and the development of professional behaviors as they work on personal strategies for integration into the profession. Learning styles are presented and discussed within the context of clinical practice and professional development.

DPT 811. Professional Seminar II: Clinical Practice. 2 Hours

Designed to introduce the student to clinical practice. Students learn professional communication and documentation skills. Topics include the medical record, personnel supervision, scheduling, legal and ethical issues including sexual harassment, and the cost of service delivery.

DPT 815. Human Gross Anatomy. 5 Hours

Comprehensive course with lecture and human cadaver dissection, emphasizing the skeletal, muscle, and nervous systems. The aim is to provide a solid morphological basis for a synthesis of anatomy, physiology, and the physical therapy clinical sciences. The lab section involves dissection and identification of structures in the cadaver and the study of charts, models, radiographic anatomy, and projected materials.

DPT 818. Neuroscience. 4.5 Hours

Comprehensive course utilizing lecture and active learning methodologies, including labs covering neuroanatomy and physiology of the central, peripheral, and autonomic nervous systems as they pertain to normal somatic function. Basic disease families are introduced.

DPT 820. Movement Science. 4 Hours

Comprehensive course with lecture, small group, clinical lab, and dissection, which integrates anatomy, biomechanics, and clinical examination of the spine, trunk, and appendicular muscular system into the evaluation of human movement dysfunction. Students learn basic gait and posture examination skills and develop clinical reasoning to facilitate the development of appropriate therapeutic exercise interventions.

DPT 825. Clinical Science V: Current Technology. 2 Hours

Designed to present the general principles of pharmacology in relation to physical therapy practice. Basic concepts of drug therapy, nomenclature, and drug safety are introduced. Pharmacokinetic principles including drug administration, absorption, distribution, action, and interaction are reviewed as they relate to physical therapy and rehabilitation.

DPT 840. Clinical Science I: Tissue Injury & Repair. 2 Hours

This course presents basic principles of tissue injury, inflammation, healing, repair, and regeneration as related to physical therapy rehabilitation. Medical and specific surgical interventions are identified to provide the clinical presentation and intervention strategies for given dysfunctions.

DPT 841. Clinical Science II: Introduction to Medical Diagnostics. 2.5 Hours

Designed to provide knowledge and the appropriate screening tools necessary for examining and intervening with clients in the physical therapy setting. The medical examination/evaluation is presented including the patient interview, identification of red flags or risk factors, symptom investigation, and review of systems. Medical diagnostic modalities are discussed with focus on radiology, MRI, CT, diagnostic US, and EMG.

DPT 842. Clinical Science III: Modalities I. 1 Hour

Comprehensive course including lab principles and practice of thermotherapy and cryotherapy procedures. Problem-solving approach to clinical decision making is integrated into the application of hydrotherapy, aquatic therapy, superficial and deep heat modalities, and cold modalities.

DPT 843. Clinical Science IV: Modalities II. 1 Hour

Comprehensive course including lab principles and practice of physical therapy modalities with focus on electrotherapy procedures. Problem-solving approach to clinical decision making is integrated into the application of modalities, including electrotherapy procedures in patient populations across the life span.

DPT 846. Maturation Science I. 1.5 Hour

Comprehensive course including clinical lab, which is designed to examine human development and maturation from conception to aging. Emphasis is placed on the recognition of appropriate neurological, cognitive, motor, and psychosocial characteristics related to various states of growth, development, and maturation.

DPT 847. Maturation Science II. 1 Hour

Continuation of DPT 846 with further study of the maturational influences on therapeutic intervention. Students learn clinical examination and reasoning skills required for physical therapy intervention throughout the life span. Students are introduced to congenital developmental and age-related pathologies.

DPT 910. Professional Seminar II: Leadership & Management. 1 Hour

A seminar course with increased emphasis on business and management principles. Students will be asked to correlate didactic information learned to this point with information obtained from clinical fieldwork. Documentation review will be performed with emphasis on the management perspective. Updates on healthcare reform and impact on physical therapy as a business will be a focus area. Students will learn self-marketing techniques to optimize the employment search. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 911. Professional Seminar IV: Business & Marketing. 1.5 Hour

Seminar course designed to help the student formulate strategies for professional assessment and development post-graduation. Topics include professional values and responsibilities, expanding your professional options, continuing education, specialty certification, and advanced degrees. Each student participates in a comprehensive program evaluation and does a formal presentation of the graduate project. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 912. Professional Seminar V: Professional Development. 1 Hour

Seminar course designed to help the student formulate strategies for professional assessment and development post-graduation. Topics include professional values and responsibilities, expanding your professional options, continuing education, specialty certification, and advanced degrees. Each student participates in a comprehensive program evaluation and does a formal presentation of the graduate project. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 940. Clinical Science V: Current Technology. 1 Hour

This course is designed to provide the principles and knowledge related to current medical technology and the advancements related to physical therapy. New technologies regarding therapeutic or diagnostic modalities and rehabilitation are studied with focus on the efficacy of these interventions. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 951. Clinical Rotation I: General Medicine. 5 Hours

Six-week clinical rotation in general medicine to provide full-time clinical exposure, allowing students to integrate current knowledge and training with supervised patient care. Emphasis on continued development of clinical reasoning along with identification and utilization of appropriate clinical resources.

DPT 952. Clinical Rotation II: Neurology. 7 Hours

This eight-week clinical rotation in rehabilitation will provide full-time clinical exposure, allowing the student to integrate current knowledge and training with supervised patient care. Emphasis is on the continued development of clinical skills and reasoning, along with the development of interpersonal skills as a member of the health care team. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 953. Clinical Rotation III: Orthopedics. 4-10 Hours

This 12-week clinical rotation in orthopedics/sports medicine will provide full-time clinical exposure, allowing the student to integrate current knowledge and training with supervised patient care. Emphasis is on the continued development of clinical skills and reasoning, with increasing responsibility for independent decision making and clinical interaction. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 954. Clinical Rotation IV: Contract Clinical. 10 Hours

This final clinical rotation is designed to allow the student to continue developing clinical skills and reasoning in an area of special interest. Increasing independence in clinical practice is expected, with increased clinical responsibilities in the areas of program development and implementation, as well as administration and clinical management to include staff supervision. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 961. Clinical Pathology: General Medicine I. 1.5 Hour

This small group problem-based learning course utilizing patient case scenarios of various general medical, acute care, and postoperative patient case scenarios or pathologies to facilitate the integration of previous knowledge with new learning. Students review and apply basic and clinical science concepts to each case, formulating appropriate physical therapy assessment and treatment strategies. Prerequisite(s): DPT 971, DPT 981.

DPT 962. Clinical Pathology: General Medicine II. 1.5 Hour

This small group problem-based learning course utilizing patient case scenarios of various advanced general medical, acute care, and postoperative patient case scenarios or pathologies to facilitate the integration of previous knowledge with new learning. Students review and apply basic and clinical science concepts to each case, formulating appropriate physical therapy assessment and treatment strategies. Integration of medical diagnostics, pharmacology, imaging, and factors that lead to medical referral in relation to physical therapy intervention is emphasized. Prerequisite(s): DPT 972, DPT 982.

DPT 963. Clinical Pathology: Neurology. 3 Hours

This small group problem-based learning course utilizes patient case scenarios, describing various neurological pathologies, to facilitate the integration of previous knowledge with new learning. The student will use basic and clinical science principles to formulate appropriate assessment and treatment strategies for the patient with neurological deficits. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 964. Clinical Pathology: Neurology II. 1.5 Hour

This small group problem-based learning course utilizes patient case scenarios of various pediatric pathologies, to facilitate the integration of previous knowledge with new learning. The student will use basic and clinical science principles to formulate appropriate assessment and treatment strategies for pediatric patients. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 965. Clinical Pathology: Orthopedics I. 3 Hours

This course is taught using the small-group tutorial process. Case scenarios are used to create learning issues. Resolution of learning issues occurs through integration of present knowledge with new learning. New learning occurs through small-group interaction and the students' independent utilization of resources. The emphasis in this course is on continued development of clinical reasoning and clinical decision making as it relates to orthopedic pathologies, with primary focus given to the extremities and secondary focus to the spine. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum. Corequisite(s): DPT 684; Clinical Skills Lab.

DPT 966. Clinical Pathology: Orthopedics II. 1.5 Hour

This small group problem-based learning course utilizing patient case scenarios dealing with differential diagnosis and management of complex orthopedic pathologies to facilitate the integration of previous knowledge with new learning. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 967. Clinical Pathology: Advanced Therapy. 3 Hours

This small group problem-based learning course utilizing patient case scenarios of various advanced topics including cardiopulmonary, women's health issues, electrotherapeutics and orthopedic, neurological, and pediatric therapeutic interventions. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 971. Skills Laboratory: General Medicine I. 1 Hour

Designed to facilitate skill acquisition, along with clinical reasoning and decision making as it relates to the physical therapy care and management of the patient with acute medical and postoperative pathology. Students learn physical examination tests and measures, along with therapeutic interventions including electrotherapy modalities appropriate for this population. Prerequisite(s): DPT 961, DPT 981.

DPT 971L. Skills Laboratory: General Medicine I. 1 Hour

Designed to facilitate skill acquisition, along with clinical reasoning and decision making as it relates to the physical therapy care and management of the patient with acute medical and postoperative pathology. Students learn physical examination tests and measure, along with therapeutic interventions including electrotherapy modalities appropriate for this population. Prerequisite(s): DPT 961, DPT 981.

DPT 972. Skills Laboratory: General Medicine II. 1 Hour

Designed to facilitate skill acquisition, along with clinical reasoning and decision making as it relates to the physical therapy care and management of the patient with acute medical and postoperative pathology. Students expand skills related to physical examination tests and measures as related to medical diagnostics and medical or health care referral. Advanced therapeutic interventions including electrotherapy modalities appropriate for this population is addressed. Prerequisite(s): DPT 962, DPT 982.

DPT 972L. Skills Laboratory: General Medicine II. 1 Hour

Designed to facilitate skill acquisition, along with clinical reasoning and decision making as it relates to the physical therapy care and management of the patient with acute medical and postoperative pathology. Students expand skills related to physical examination tests and measure as related to medical diagnostics and medical or health care referral. Advanced therapeutic interventions including electrotherapy modalities appropriate for this population is addressed. Prerequisite(s): DPT 962, DPT 982.

DPT 973L. Skills Laboratory: Neurology I. 2 Hours

This course is designed to assist the student with the development of clinical skills and reasoning essential for the assessment and treatment of patients with neurological pathologies. Therapeutic procedures and protocols appropriate for this patient population will be taught with special considerations regarding patient safety. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 974L. Skills Laboratory: Neurology II. 1 Hour

Designed to facilitate skill acquisition along with clinical reasoning and decision making as it relates to the physical therapy care and management of the pediatric patient. Students learn physical examination tests and measures along with therapeutic interventions appropriate for this population. Therapeutic procedures and protocols appropriate for these patients and taught with special consideration for patient/family needs and education. Prerequisite(s): DPT 964, DPT 984.

DPT 975. Skills Laboratory: Orthopedics I. 1.5 Hour

Course description is currently unavailable. This laboratory course is designed to help the student develop clinical skills and reasoning essential to the examination, evaluation, and physical therapy intervention of orthopedic patients. Emphasis is focused on clinical reasoning and clinical skill development as they apply to common extremity and spine pathologies. Skills include: examination techniques, use of modalities, therapeutic exercise, soft tissue techniques, mechanical traction, and articular mobilization. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum. Corequisite(s): DPT 965, DPT 985.

DPT 975L. Skills Laboratory: Orthopedics I. 1.5 Hour

Course description is currently unavailable. This laboratory course is designed to help the student develop clinical skills and reasoning essential to the examination, evaluation, and physical therapy intervention of orthopedic patients. Emphasis is focused on clinical reasoning and clinical skill development as they apply to common extremity and spine pathologies. Skills include: examination techniques, use of modalities, therapeutic exercise, soft tissue techniques, mechanical traction, and articular mobilization. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum. Corequisite(s): DPT 965, DPT 985.

DPT 976L. Skills Laboratory: Orthopedics II. 1 Hour

This course is designed to facilitate skill acquisition along with clinical reasoning and decision making as it relates to the physical therapy care and management of orthopedic patients with complex musculoskeletal pathology and dysfunction. Students learn physical examination tests and measures along with therapeutic interventions including electrotherapy modalities appropriate for this population. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 977L. Skills Laboratory: Advanced Physical Therapy I. 2 Hours

This course is designed to facilitate skill acquisition along with clinical reasoning and decision making as it relates to the physical therapy care and management of various advanced topics including cardiopulmonary rehabilitation, women's health issues, manual therapy strategies, electrotherapeutics as well as orthopedic, neurological, and pediatric therapeutic interventions. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 981. Seminar: General Medicine I. 1 Hour

Presentation/discussion of comprehensive issues related to physical therapy management of the general medical and postoperative patients. Topics include diabetes, wound care, universal precautions, medical diagnostics, amputees, arthroplasty, treatment of the terminally ill patient, pharmacology, and durable medical equipment. Prerequisite(s): DPT 961, DPT 971.

DPT 982. Clinical Issues Seminar: General Medicine II. 1 Hour

Presentation/discussion of comprehensive issues related to physical therapy management of advanced topics related to the general medical and postoperative patients. Topics include the diagnoses related to the integumentary system, cardiopulmonary, oncology, vestibular dysfunction as well as the primary care for the adolescent, obstetric, work-injured, and geriatric populations. Prerequisite(s): DPT 962, DPT 972.

DPT 983. Clinical Issues Seminar: Neurology. 2 Hours

Presentation/discussion of comprehensive issues related to physical therapy management of the patient with neurological dysfunction. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 984. Clinical Issues Seminar: Neurology II. 1 Hour

Presentation/discussion of comprehensive issues related to physical therapy management of the pediatric patient. Topics include treatment within a variety of settings including school-based, hospital-based, private practice, and home care; psychosocial issues relating to the patient and family; funding; documentation; and pharmacological management. Prerequisite(s): DPT 964, DPT 974.

DPT 985. Clinical Issues Seminar: Orthopedics I. 2 Hours

This seminar course focuses on comprehensive and complex issues related to physical therapy management of the orthopedic patient, including: application of biomechanical principles to movement and therapeutic exercise; principles of conditioning; training and therapeutic exercise prescription and rehabilitation; physical therapy management of the post-operative patient; medical diagnostics; documentation; and clinical administration. Students will study the history of manual therapies and current philosophies of patient care. The student will also be given an opportunity to develop interpersonal communication and work ethic skills associated with project development and production and role playing patient simulations. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum. Corequisite(s): DPT 965, DPT 975.

DPT 986. Clinical Issues Seminar: Orthopedics II. 1 Hour

Seminar presenting/discussing comprehensive issues related to physical therapy management of the complex orthopedic patient with select axial musculoskeletal pathologies. Includes chronic pain management, medical diagnostics, surgical intervention for the spine, differential diagnosis, and age-related pathologies. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 987. Clinical Issues Seminar: Advanced Therapy. 3 Hours

Seminar/discussion on issues related to physical therapy care and the profession. Includes preventive health care programs, physical therapy consultation, burn and wound care management, industrial rehabilitation, and sports medicine. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 988. Clinical Practice Electives. 5 Hours

Clinical Education Workshops: Concentrated lecture/lab instruction in selected advanced physical therapy patient-care topics including: advanced orthopedics, Back to Golf, MET, manual therapy for lymphedema, advanced NDT, rehabilitation technology, advanced prosthetics, advanced handling for pediatric patients, and orthotic fabrication. Clinical Enrichment Seminars: This seminar/discussion course will address select issues related to physical therapy care and the profession. Topic areas include: cardiopulmonary rehabilitation, women's health issues, medical management of the complex acute care patient, treatment of patients with terminal illness, and the rehabilitation of patients with burns. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 991. Research I. 2 Hours

An introductory course on research methods and design. Emphasis is placed on introducing statistical models, use of statistical software, experimental design, and the development of critical reasoning skills for reading and evaluating current research literature. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 992. Research II. 4 Hours

A continuation of DPT 991, the focus of this course is on student identification and selection of a research proposal topic. Advanced statistical analysis will be discussed, along with informed consent, writing techniques, funding acquisition, and presentation of findings. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 993. Research III. 2 Hours

A continuation of DPT 991, the focus of this course is student completion of the preliminary text of the graduate project proposal. Remediation of prior materials from DPT 992 will be included for topics not passed at a score of 75% on the Final Exam from Research I. Advanced statistical topics include the use of Intraclass Correlation to determine reliability. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 994. Research IV. 1 Hour

Integrating research, scholarship, and evidence-based practice. Prerequisite(s): Successful completion of all prior course work as outlined in the University of Dayton DPT curriculum.

DPT 995. Research V. 1 Hour

Thesis presentation and board exam preparation (research only). Pass/Fail. Prerequisite(s): DPT 991, DPT 994. Corequisite(s): DPT Summation Module.

DPT 999. Independent Study. 1-10 Hours

Independent study.

Physician Assistant Education

- Master of Physician Assistant Practice

Susan Wulff, Department Chairperson

The Physician Assistant Education Department's mission is to produce physician assistants who are committed to the service of the human person through the skillful, compassionate, and ethical provision of health care within the context of the Catholic Marianist tradition. We emphasize excellent generalist care for the whole person, particularly upholding dignity for society's most vulnerable, in a learning environment which emphasizes leadership, life-long learning and service.

Master of Physician Assistant Practice (PAP)

Fall Semester I

PAS 500	Foundations of Patient Care	6
PAS 503	Ethical and Social Issues in Health Care	1
PAS 505	Foundations of PA Practice I	1
PAS 510	Essentials of Hematology/Oncology	1.5
PAS 515	Essentials of Infectious Disease	1.5
PAS 520	Essentials of Otolaryngology	3
PAS 525	Essentials of Gastroenterology	6
PAS 535	Essentials of Endocrinology	3
PAS 533	Applied Patient Assessment I	1.5

Spring Semester II

PAS 530	Essentials of Nephrology & Urology	1.5
PAS 540	Essentials of Cardiology	9
PAS 545	Essentials of Pulmonology	4.5
PAS 549	Seminar in Special Topics	1
PAS 548	Applied Patient Assessment II	1.5

Summer Semester III

PAS 550	Essentials of Orthopedics/Rheumatology	6
PAS 555	Essentials of Neurology	3
PAS 560	Essentials of Dermatology	1.5
PAS 565	Principles of Geriatrics	1
PAS 568	Applied Patient Assessment III	1.5

Fall Semester IV

PAS 570	Principles of Pediatrics	3
PAS 575	Principles of Women's Health Issues	3
PAS 580	Principles of Mental Health	3
PAS 585	Principles of Emergency Medicine	6
PAS 590	Principles of Care for the Surgical Patient	1.5
PAS 593	Applied Patient Assessment IV	1.5
PAS 600	Research Design	3

Clinical Year

PAS 603	Foundations of PA Practice II	1
PAS 605	Clinical Experience Family Medicine	2.5
PAS 615	Clinical Experience Adult Medicine	2.5
PAS 635	Clinical Experience General Surgery	2.5
PAS 604	Clinical Experience Office Orthopedic Practice	2
PAS 614	Clinical Experience Pediatrics	2
PAS 625	Clinical Experience Emergency Medicine	2.5
PAS 624	Clinical Experience Women's Health	2
PAS 634	Clinical Experience in Mental Health	2
PAS 646	Clinical Elective Experience	3
PAS 650	Capstone Project	2

Total Hours 100

Courses

PAS 500. Foundations of Patient Care. 6 Hours

Prepares students to begin patient care through developing skills in effective patient interviewing, basic pharmacotherapeutics, ordering and interpreting radiographs and diagnostic tests, performing injections, IV insertions, and vital signs.

PAS 503. Ethical and Social Issues in Health Care. 1 Hour

Examines the ethical, social, and legal issues that accompany medical provider's interactions with patients and contribute to their effectiveness as compassionate healers and healthcare professionals. Various issues are explored, including ethical principles and decision making, caring for a diverse population, religious ethical and social considerations, end of life challenges and the legal issues that may affect these situations.

PAS 505. Foundations of PA Practice I. 1 Hour

Taught in a seminar fashion, explores the history of the PA profession, current trends in practice, significance of professional organizations pertinent to students, the impact of US health care delivery system and public health policy and concepts of evidence based medicine. Students will develop communication skills, maximize their learning styles, and define professionalism as it applies to the health care field.

PAS 510. Essentials of Hematology/Oncology. 1.5 Hour

Systems-based module addressing physiology, pathophysiology, diagnostic studies, medical procedures, pharmacology, clinical medicine, and surgical conditions involving the hematology system and common oncological conditions that is presented in lecture and patient simulation format.

PAS 515. Essentials of Infectious Disease. 1.5 Hour

Systems-based module addressing physiology, pathophysiology, diagnostic studies, pharmacology, clinical medicine and surgical conditions involving infectious diseases presented in lecture and patient simulation format.

PAS 520. Essentials of Otolaryngology. 3 Hours

Systems-based module addressing anatomy, physiology, pathophysiology, history/physical examination skills, diagnostic studies, medical procedures, pharmacology, clinical medicine and surgical conditions involving the HEENT system that is presented in lecture and patient simulation format.

PAS 525. Essentials of Gastroenterology. 6 Hours

Systems-based module addressing nutrition, anatomy, physiology, pathophysiology, history/physical examination skills, diagnostic studies, medical procedures, pharmacology, clinical medicine and surgical conditions involving the gastrointestinal system that is presented in lecture and patient simulation format.

PAS 530. Essentials of Nephrology & Urology. 1.5 Hour

Systems-based module addressing anatomy, physiology, pathophysiology, history/physical examination skills, diagnostic studies, medical procedures, pharmacology, clinical medicine and surgical conditions involving the renal and urological system that is presented in lecture and patient simulation format.

PAS 533. Applied Patient Assessment I. 1.5 Hour

Integrates information from previous modules. Using critical thinking, student groups will review, discuss patient cases then assimilate information to develop diagnosis and treatment plans. Module culminates with individual assessment using simulation.

PAS 535. Essentials of Endocrinology. 3 Hours

Systems-based module addressing anatomy, physiology, pathophysiology, history/physical examination skills, diagnostic studies, medical procedures, pharmacology, clinical medicine and surgical conditions involving the endocrine system that is presented in lecture and patient simulation format.

PAS 540. Essentials of Cardiology. 9 Hours

Systems-based module addressing anatomy, physiology, pathophysiology, history/physical examination skills, diagnostic studies, medical procedures, pharmacology, clinical medicine and surgical conditions involving the cardiovascular system presented in lecture and patient simulation format.

PAS 545. Essentials of Pulmonology. 4.5 Hours

Systems-based module addressing anatomy, physiology, pathophysiology, history/physical examination skills, diagnostic studies, medical procedures, pharmacology, clinical medicine and surgical conditions involving the respiratory system presented in lecture and patient simulation format.

PAS 548. Applied Patient Assessment II. 1.5 Hour

Integrates information from previous modules. Using critical thinking, student groups will review, discuss patient cases then assimilate information to develop diagnosis and treatment plans. Module culminates with individual assessment using simulation.

PAS 549. Seminar in Special Topics. 1 Hour

Two-week seminar which addresses, preventive medicine, alternative medicine, and physical medicine/rehabilitation. Each topic will address most commonly encountered issues; lecture and group case studies refine the application of newly learned material.

PAS 550. Essentials of Orthopedics/Rheumatology. 6 Hours

Systems-based module addressing anatomy, physiology, pathophysiology, history/physical examination skills, diagnostic studies, medical procedures, pharmacology, clinical medicine and surgical conditions involving the musculoskeletal system, including rheumatological diseases. Material is presented in lecture and patient simulation format.

PAS 555. Essentials of Neurology. 3 Hours

Systems-based module addressing anatomy, physiology, pathophysiology, history/physical examination skills, diagnostic studies, medical procedures, pharmacology, clinical medicine and surgical conditions involving the neurological system presented in lecture and patient simulation format.

PAS 560. Essentials of Dermatology. 1.5 Hour

Systems-based module addressing anatomy, physiology, pathophysiology, history/physical examination skills, diagnostic studies, medical procedures, pharmacology, clinical medicine and surgical conditions involving the dermatological system presented in lecture and patient simulation format.

PAS 565. Principles of Geriatrics. 1 Hour

Population-based course dealing with social and medical problems specific to the geriatric age group. Topics will focus on techniques of communication in this age group, medical treatments specific to the elderly, and navigation through health care systems.

PAS 568. Applied Patient Assessment III. 1.5 Hour

Integrates information from previous modules. Using critical thinking, student groups will review, discuss patient cases, and then assimilate information to develop diagnosis and treatment plans. Module culminates with individual assessment using simulation.

PAS 570. Principles of Pediatrics. 3 Hours

Population-based module focusing on pediatric issues. The course addresses etiology, epidemiology, clinical signs and symptoms, physical exam findings, diagnosis, treatment, and prognosis for significant issues in the pediatric population.

PAS 575. Principles of Women's Health Issues. 3 Hours

Population-based module focusing on women's issues. The course addresses etiology, epidemiology, clinical signs and symptoms, physical exam findings, diagnosis, treatment, and prognosis for significant issues in the female population.

PAS 580. Principles of Mental Health. 3 Hours

Population-based module focusing on mental health issues. The course addresses etiology, epidemiology, clinical signs and symptoms, physical exam findings, diagnosis, treatment, and prognosis for significant psychiatric, behavioral medicine issues.

PAS 585. Principles of Emergency Medicine. 6 Hours

Taught in a case-based format, this population-based module emphasizes stabilizing patients with life-threatening trauma or illness and selecting appropriate diagnostic and therapeutic measures. Students learn treatment of trauma and medical disorders commonly presenting to the emergency department and become Advanced Cardiac Life Support (ACLS), Pediatric Advances Life Support (PALS), and Basic Disaster Life Support (BDLS) certified.

PAS 590. Principles of Care for the Surgical Patient. 1.5 Hour

Population-based course dealing with basics needed for surgical patient. This course includes pre-operative evaluation, peri-and post-operative tenets of care for the surgical patient. Students will demonstrate suturing, gowning/gloving skills.

PAS 593. Applied Patient Assessment IV. 1.5 Hour

Integrates information from previous modules. Using critical thinking, student groups will review, discuss patient cases, and then assimilate information to develop diagnosis and treatment plans. Module culminates with individual assessment using simulation.

PAS 600. Research Design. 3 Hours

Instruction in research methods and application to the clinical setting. Basic concepts of epidemiology and statistics integrate into concepts related to medical practice. Students critically read published reports of clinical research then identify strengths and weaknesses in structure, data presentation and conclusions. This course provides skills necessary to practice evidence based medicine.

PAS 603. Foundations of PA Practice II. 1 Hour

Taught in seminar fashion, prepares the PA student for clinical practice post-graduation. Emphasizes topics of PA residency programs, PA professional organizations, coding/reimbursement/billing information, and malpractice liability. Prepares student for employment with resume construction, interview skills, contracts, and assistance in finding employment as a PA.

PAS 604. Clinical Experience Office Orthopedic Practice. 2 Hours

Four week required rotation in an orthopedic office clinical setting. Students engage in all aspects of patient care, including history taking, physical examination, and treatment plan design and evaluation. Students' application of patient and family education to treatment and preventive measures is emphasized.

PAS 605. Clinical Experience Family Medicine. 2.5 Hours

Five week required rotation in clinical setting of general primary care. Students engage in all aspects of patient care, including history taking, physical examination, and treatment plan design and evaluation. Students' application of patient and family education to treatment and preventive measures is emphasized.

PAS 614. Clinical Experience Pediatrics. 2 Hours

Four week required rotation in a pediatric clinical setting. Students engage in all aspects of patient care, including history taking, physical examination, and treatment plan design and evaluation. Students' application of patient and family education to treatment and preventive measures is emphasized.

PAS 615. Clinical Experience Adult Medicine. 2.5 Hours

Four week required rotation in clinical setting of in adult/internal medicine in a hospital setting. Students engage in all aspects of patient care, including history taking, physical examination, and treatment plan design and evaluation. Students' application of patient and family education to treatment and preventive measures is emphasized.

PAS 624. Clinical Experience Women's Health. 2 Hours

Four week required rotation in a clinical setting of women's health/obstetrics and gynecology. Students engage in all aspects of patient care, including pre-natal care, history taking, physical examination, and treatment plan design and evaluation. Students' application of patient and family education to treatment and preventive measures is emphasized.

PAS 625. Clinical Experience Emergency Medicine. 2.5 Hours

Five week required rotation in the emergency department clinical setting. Students engage in all aspects of patient care, including history taking, physical examination, and treatment plan design and evaluation. Students' application of patient and family education to treatment and preventive measures is emphasized.

PAS 634. Clinical Experience in Mental Health. 2 Hours

Four week required rotation in a mental health clinical setting. Students engage in all aspects of patient care, including history taking, physical examination, and treatment plan design and evaluation. Students' application of patient and family education to treatment and preventive measures is emphasized.

PAS 635. Clinical Experience General Surgery. 2.5 Hours

Four week required rotation in clinical setting of general surgery. Students engage in all aspects of patient care, including history taking, physical examination, and treatment plan design and evaluation. Students' application of patient and family education to treatment and preventive measures is emphasized.

PAS 646. Clinical Elective Experience. 3 Hours

Elective rotation of student's choice (with PA faculty guidance and approval). A six week rotation that will provide the student with either a repeat rotation or new clinical experience. Students can choose either one 6 week rotation or a combination of experiences totaling 6 weeks.

PAS 650. Capstone Project. 2 Hours

Designed to provide students with the opportunity to complete a scholarly project with faculty as mentors for this experience. The process includes choice of topic, literature review, data collection, and paper preparation; culminates in either a professional article or formal presentation.

Teacher Education

- Master of Science in Education, Early Childhood Leadership and Advocacy
- Master of Science in Education, Interdisciplinary Educational Studies
- Master of Science in Education, Leadership in Educational Systems
- Master of Science in Education, Literacy
- Master of Science in Education, Music Education
- Master of Science in Education, Teacher as Leader
- Master of Science in Education, Technology-Enhanced Learning
- Master of Science in Education, Transdisciplinary Early Childhood Education
- Master of Science in Education, Mathematics Education (p. 72) (Joint SEHS and CAS degree program)
- Licensure, Adolescence to Young Adult Education
- Licensure, Early Childhood Education

- Licensure, Early Childhood Intervention Specialist
- Licensure, Intervention Specialist Mild/Moderate
- Licensure, Middle Childhood Education
- Licensure, Multi-Age Education
- Endorsement, Computer Technology
- Endorsement, Early Childhood Generalist
- Endorsement, Middle Childhood Generalist
- Endorsement, Prekindergarten Special Needs
- Endorsement, Reading
- Endorsement, Teacher Leader
- Endorsement, Teaching English to Speakers of Other Languages
- Certificate, Early Childhood Leadership and Advocacy
- Certificate, Early Childhood Intervention Specialist
- Certificate, Teaching English to Speakers of Other Languages
- Certificate, Technology-Enhanced Learning

Connie L. Bowman, Department Chairperson

Professors Emeriti: Frye, Fuchs, Geiger, Hart, Joseph, Rowley, Sudzina, Talbert-Johnson, Weaver

Professors: Kinnucan-Welsch, Lasley, Watras

Associate Professors: Adams, Baldwin, Bowman, Collopy, Herrelko, Kelly, Richards, White

Assistant Professors: Arnold, Bogard, Gallagher, Sableski

Clinical Faculty: Engelhardt, Mathes, Nenonene, Scheuermann

Lecturer: Comingore

Teacher-in-Residence: Evans

Visiting Professors: Falk, Lawless Frank

The mission of the Department of Teacher Education is the development of reflective, competent and humane teachers. Recognizing the value of balancing theory and practice in professional education, the department provides candidates and faculty with the opportunity to be of service and to do research in P-12 settings. It dedicates itself to the discovery, construction and development of the knowledge, skills and dispositions that enable teachers to become educational leaders. The goal is to be a center of excellence in teacher education, thereby supporting continuing professional development and advocacy within the profession of teaching.

Four types of programs are offered in the Department of Teacher Education leading to different credentials for different purposes. The Master of Science in Education and Health Sciences is an advanced degree for professional educators, which requires a minimum of 30 semester credit hours. Persons can select from several options representing a specialized field, or concentration. In addition to the concentration courses, students earning the master's also complete 12–13 hours in foundations of education and research, known as the core courses to complete the required minimum of 30 hours.

Second, the department offers programs that lead to a state of Ohio teaching license. These programs are for persons who hold a bachelor's degree and wish to pursue a teaching license at the post-baccalaureate level. Students who are successful in a licensure program have the option to earn the Master of Science in Education and Health Sciences by completing the 12–13 hours of core courses and the minimum requirement of 30 semester hours.

The department also offers programs that lead to a state of Ohio endorsement. This credential is added to a valid state of Ohio teaching license and signifies specialized expertise in school settings.

Fourth, the department offers programs that lead to a University of Dayton graduate certificate. These programs also signify specialized expertise and often are the same as or similar to endorsement programs. Persons do not need to hold a valid state of Ohio teaching license to be eligible for a graduate certificate, but some certificate programs may require prior teaching experience for admission.

Master of Science in Education Concentrations

Early Childhood Leadership and Advocacy (ECL)

The early childhood leadership and advocacy (ECLA) concentration is designed for experienced early childhood (ECE) professionals, such as program administrators, supervisors, teacher leaders and other professionals who work with and advocate for young children and their families. This program prepares candidates with the knowledge and skills required to be effective leaders and advocates in the field of early care and education. All candidates in this concentration must complete the graduate leadership core requirements and either the administration strand or the advocacy strand.

MSE Core Requirements

EDT 500	Models of Teaching	3
EDT 502	Philosophical Studies in Education	3
or EDT 503	History of Education in the United States	
EDT 660	Introduction to Educational Research	3

Select one of the following options:

Option A

EDT 662	Thesis	2
EDT 663	Thesis	2

Option B

EDT 667	Educational Research Seminar	3
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Graduate Leadership Core Requirements

EDA 505	Educational Leadership	3
EDA 509	Supervision & Professional Development	3
EDA 556	Leadership in Diverse Communities	3
EDT 565E	Internship and Practicum in Early Childhood Leadership	3

Choose from one of the following focus areas: 11-18

Early Childhood Administration Strand

EDT 560E	Early Childhood Program and Personnel Management	3
EDT 560EL	Early Childhood Program and Personnel Management Laboratory	0-1
EDT 561E	Supporting Quality Curriculum and Instruction in Early Care and Education	3
EDT 561EL	Supporting Quality Curriculum and Instruction in Early Care and Education Laboratory	0-1
EDT 562E	Regulations, Licensing and the Law in Early Care and Education	3
EDT 562EL	Regulations, Licensing and the Law in Early Care and Education Laboratory	0-1
EDT 563E	Managing Finances and Marketing in Early Care and Education	3

EDT 563EL	Managing Finances and Marketing in Early Care and Education Laboratory	0-1
Early Childhood Advocacy Strand		
EDT 510	Introduction to Transdisciplinary Early Childhood Education	2
EDT 561E	Supporting Quality Curriculum and Instruction in Early Care and Education	3
EDT 561EL	Supporting Quality Curriculum and Instruction in Early Care and Education Laboratory	0-1
EDT 564E	Advocacy in Early Care and Education	3
EDT 573	Collaborating with Families, Professionals and Agencies	3

Interdisciplinary Educational Studies (EIP)

A concentration in interdisciplinary educational studies offers the graduate candidate flexibility to design a program to meet diverse professional goals. Candidates must select concentration coursework (18 semester hours) from both the School of Education and Health Sciences and from at least one department outside of the SEHS.

MSE Core Requirements

EDT 500	Models of Teaching	3
EDT 502	Philosophical Studies in Education	3
or EDT 503	History of Education in the United States	
EDT 660	Introduction to Educational Research	3

Select one of the following options:

Option A

EDT 662	Thesis	2
EDT 663	Thesis	2

Option B

EDT 667	Educational Research Seminar	3
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Concentration Requirements

Approved Concentration Courses in Education	6-12
Approved Concentration Courses outside of the SEHS	6-12

Leadership in Educational Systems (ESY)

The leadership for educational systems concentration is designed to provide students with a thorough understanding of the United States system of education and to develop leadership skills to administer educational systems. The program addresses the growing need that international students have to study the United States educational systems and yet are not interested in, nor qualify for, licensure. This program will feature an interdisciplinary approach; however, the degree is awarded through the Department of Educational Administration. Courses in the program will be provided by the Department of Educational Administration (EDA), the Department of Counselor Education (EDC) and the Department of Teacher Education (EDT), and will guide students through critical analyses of leadership issues, promote rational problem-solving and decision-making regarding issues facing educational systems from preschool to higher education (P-16).

Required Teacher Education Coursework:

EDT 500	Models of Teaching	3
EDT 501	Introduction to American Education	3
EDT 505	School, Self and Society	3

EDT 659	Special Topics in Teaching (Scholarly Study in Education)	3
EDT 667	Educational Research Seminar ¹	3
Required Educational Leadership Coursework:		
EDA 505	Educational Leadership	3
EDA 510	Instructional Leadership	3
EDA 511	Curriculum	3
EDA 551	Research ¹	3
Required Counselor Education Coursework:		
EDC 540	Perspectives in Higher Education	3
EDC 560	Leadership in College & University Environment	3
EDC 568	Research & Evaluation in Human Services ¹	3

¹ Students must select one of the these courses.

Literacy (ERE)

The master's degree concentration in literacy prepares a candidate to assume professional and leadership roles related to literacy in a school setting. The coursework in this concentration aligns with performance outcomes as outlined by the Standards for Reading Professionals, International Reading Association. Candidates must have already completed prerequisite reading requirements or the approved equivalents: EDT 600, EDT 601, EDT 602, and EDT 603.

MSE Core Requirements

EDT 500	Models of Teaching	3
EDT 502	Philosophical Studies in Education	3
or EDT 503	History of Education in the United States	
EDT 660	Introduction to Educational Research	3

Select one of the following options:

Option A

EDT 662	Thesis	2
EDT 663	Thesis	2

Option B

EDT 667	Educational Research Seminar	3
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Concentration Requirements

EDT 605	Advanced Study in Reading/Language Arts	3
EDT 606	Assessment and Evaluation of Reading Difficulties	3
EDT 607	Practicum in Reading Intervention Techniques	3
EDT 608	The Writing Classroom	3
EDT 609	Issues, Trends and Research in Reading	3
EDT 650	Professional Development of Teacher Leaders	3

Total Hours 18

Music Education (MUE)

The concentration in music education is offered collaboratively through the School of Education and Health Sciences and the College of Arts and Sciences. This program is designed for music educators and focuses on practical applications to the music classroom and rehearsal room. Candidates must have a bachelor's degree or licensure in music education as a requirement for admission to the program.

Note: Requirements for the MSE in Music Education (MSE.MUE) are currently undergoing revisions to reduce the number of courses required and increase individual course credit from two to three semester

hours. Please contact Dr. Linda Hartley for the most current curriculum information. http://www.udayton.edu/directory/artssciences/music/hartley_linda_a.php.

MSE Core Requirements

EDT 500	Models of Teaching	3
EDT 502	Philosophical Studies in Education	3
or EDT 503	History of Education in the United States	
EDT 660	Introduction to Educational Research	3

Select one of the following options:

Option A

EDT 662	Thesis	2
EDT 663	Thesis	2

Option B

EDT 667	Educational Research Seminar	3
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Concentration Requirements

MUS 501	Graduate Seminar in Musicology	2
MUS 503	Teaching World Music	2
MUS 511	Music Theory, Analysis, and Technology	2
MUS 531	Foundations & Current Issues in Music Education	2

Select one of the following:

MUS 535	Literature & Resources for Classroom Music	1
MUS 536	Literature & Resources for the Choral Ensemble	1
MUS 537	Literature & Resources for the Instrumental Ensembles	1

Select one of the following:

MUS 544	Advanced Techniques for Classroom Music	2
MUS 545	Advanced Choral Conducting & Rehearsal Techniques	2
MUS 546	Advanced Instrumental Conducting & Rehearsal Techniques	2

MUS 599	Graduate Performance Studies	1-2
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Electives (courses in MUS, EDT, EDW or EDA)		6
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Total Hours		27-28
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Teacher as Leader (ETL)

The teacher as leader concentration offers teachers an opportunity to pursue professional development and leadership opportunities outside of building and district administration. Teachers pursuing this degree would likely fulfill roles such as instructional leader, lead teacher, mentor teacher and curriculum committee member. All candidates in this concentration must complete the teacher leader core sequence; several options are available for specialty areas. The teacher as leader concentration does not meet the requirements for the state of Ohio teacher leader endorsement, which is a post-master's program. Please see the teacher leader endorsement program for more information.

MSE Core Requirements

EDT 500	Models of Teaching	3
EDT 502	Philosophical Studies in Education	3
or EDT 503	History of Education in the United States	
EDT 660	Introduction to Educational Research	3

Select one of the following options:

Option A

EDT 662	Thesis	2
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EDT 663	Thesis	2
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Option B

EDT 667	Educational Research Seminar	3
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Concentration Requirements

EDA 505	Educational Leadership	3
EDA 556	Leadership in Diverse Communities	3
EDT 650	Professional Development of Teacher Leaders	3
Choose from one of the following specialty areas:		9

Leadership

EDA 509	Supervision & Professional Development	3
EDA 511	Curriculum	3
EDA 515	School Law	3

Literacy

EDT 605	Advanced Study in Reading/Language Arts	3
EDT 609	Issues, Trends and Research in Reading	3

Elective

Special Education

EDT 572	Introduction to Education of Learners with Mild/Moderate Needs	3
EDT 573	Collaborating with Families, Professionals and Agencies	3
EDT 574	Behavior Management	3

Technology

EDT 629	Cognition, Learning and Technology	3
EDT 631	Planning and Assessing Technology	3

Elective

Technology-Enhanced Learning (TEL)

This graduate program prepares in-service teachers to integrate technology-enhanced learning into their own teaching and to assist other professionals in their buildings in accomplishing the same. The courses focus on helping master's candidates increase teacher and student learning in the context of a technology-enhanced, problem-based learning environment. The concentration courses also meet the requirements for the computer technology endorsement from the state of Ohio and the graduate certificate in technology-enhanced learning.

MSE Core Requirements

EDT 500	Models of Teaching	3
EDT 502	Philosophical Studies in Education	3
or EDT 503	History of Education in the United States	
EDT 660	Introduction to Educational Research	3

Select one of the following options:

Option A

EDT 662	Thesis	2
EDT 663	Thesis	2

Option B

EDT 667	Educational Research Seminar	3
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Concentration Requirements

EDT 629	Cognition, Learning and Technology	3
EDT 630	Multimedia Production	3
EDT 631	Planning and Assessing Technology	3
EDT 632	Distance Education in a Digital Age	3
EDT 633	Web Design and Development	3

EDT 634	Becoming an Effective Building Technology Leader	1-4
Total Hours		16-19

Transdisciplinary Early Childhood Education (ECE)

The transdisciplinary early childhood education (ECE) graduate program is a cohort program designed for individuals who seek to work with young children and their families. The program has multiple options, including a master's degree and two state of Ohio licenses, early childhood and early childhood intervention specialist (see licensure programs). The program is a blended program, meaning that the coursework specific to special education and general education is blended and cannot be separated. Other options include the prekindergarten special needs endorsement and the coursework for the early (childhood) intervention specialist certificate (certificate issued by Ohio Department of Developmental Disabilities).

MSE Core Requirements

EDT 500	Models of Teaching	3
EDT 502	Philosophical Studies in Education	3
or EDT 503	History of Education in the United States	
EDT 660	Introduction to Educational Research	3

Select one of the following options:

Option A

EDT 662	Thesis	2
EDT 663	Thesis	2

Option B

EDT 667	Educational Research Seminar	3
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Concentration Requirements

EDT 510	Introduction to Transdisciplinary Early Childhood Education	2
EDT 511	Integrated Curriculum for Young Children	2
EDT 512	Summer Play Institute	2
EDT 513	Developmentally and Individually Appropriate Practice	3
EDT 516	Collaborative Assessment Birth to Age Eight	3
EDT 517	Early Childhood Seminar on Medical and Health Issues	3
EDT 573	Collaborating with Families, Professionals and Agencies	3

Licensure Programs

For those persons who have an undergraduate degree in a field other than education, the Department of Teacher Education offers programs leading to teacher licensure at the graduate level. All licensure programs include coursework, corresponding laboratory courses requiring field hours between 20-90 hours and a clinical experience (student teaching) of a minimum of 12 weeks full-time in a classroom. Candidates who complete the requirements for licensure may choose to complete the Master of Science of Education and Health Sciences core requirements and the minimum 30 semester hours for the master's degree, but it is not mandatory. Credit earned for student teaching does not apply to a master's degree.

Prior to any field experience, all candidates must complete at the University of Dayton a BCII and FBI criminal background check. Prior to the final clinical experience, candidates must complete an application

to student teach and have satisfied all prerequisites and program requirements. In order for the University of Dayton to approve the state of Ohio teaching license application, applicants must have on file in the SEHS dean's office passing scores on the state of Ohio licensure tests.

Adolescence to Young Adult Education (EYA)

Completion of the program requirements for adolescence to young adult (AYA) education leads to licensure in the state of Ohio for grades seven to 12. Candidates must complete approved licensure program coursework in one of the following teaching concentration areas: earth sciences, integrated language arts, integrated mathematics, integrated science, integrated social studies, life sciences or physical sciences. Concentration requirements also include professional education coursework. For general information see licensure programs.

Professional Education Requirements

EDT 502	Philosophical Studies in Education	3
or EDT 503	History of Education in the United States	
EDT 507	The Profession of Teaching	2
EDT 507L	The Profession of Teaching Laboratory	1
EDT 508	Theories of Learning and Human Development	3
EDT 509	Instruction, Management and Assessment	3
EDT 509L	Instruction, Management and Assessment Laboratory	0-1
EDT 570	Educating Diverse Student Populations in Inclusive Settings	3
EDT 570L	Educating Diverse Student Populations in Inclusive Settings Laboratory	0-1
EDT 602	Critical Reading in the Content Areas	3
EDT 569	Student Teaching- Adolescence to Young Adult	3-7

Methods Courses (select one course with the corresponding laboratory course):

EDT 550	Integrated Language Arts Methods for Adolescence to Young Adult	3
EDT 550L	Integrated Language Arts Methods for Adolescence to Young Adult Laboratory	0-1
EDT 551	Integrated Social Studies Methods for Adolescence to Young Adult	3
EDT 551L	Integrated Social Studies Methods for Adolescence to Young Adult Laboratory	0-1
EDT 553	Integrated Mathematics Methods for Adolescence to Young Adult	3
EDT 553L	Integrated Mathematics Methods for Adolescence to Young Adult Laboratory	0-1
EDT 554	Science Methods for Adolescence to Young Adult	3
EDT 554L	Science Methods for Adolescence to Young Adult Laboratory	0-1

Early Childhood Education (ECE)

Early Childhood Intervention Specialist (EIS)

Students who enter the transdisciplinary ECE program are eligible to earn two state of Ohio licenses, ECE and early childhood intervention specialist (ECIS). The ECE license is valid for teaching children who are typically-developing, at-risk, gifted and who have mild to moderate

educational needs. The license is issued for ages three through eight, or prekindergarten through grade three. The ECIS license is valid for teaching children who have mild, moderate to intensive educational needs, including service coordination. For general information see licensure programs.

To be eligible for either the ECE or the ECIS licenses, 16 hours of the following coursework must be satisfied (undergraduate or graduate), before beginning coursework in the transdisciplinary ECE cohort group. The remaining courses can be taken as corequisites during the cohort group coursework. The cohort coursework is listed in the course list following the prerequisite list.

EDT 507	The Profession of Teaching	2
EDT 507L	The Profession of Teaching Laboratory	1
EDT 508	Theories of Learning and Human Development	3
EDT 518	Integrated Curriculum and Instruction for Kindergarten-Primary Grades	3
EDT 518L	Integrated Curriculum and Instruction for Kindergarten-Primary Grades Laboratory	0-1
EDT 570	Educating Diverse Student Populations in Inclusive Settings	3
EDT 570L	Educating Diverse Student Populations in Inclusive Settings Laboratory	0-1
EDT 571	Language Development and Emergent Literacy	3
EDT 600	Reading Methods	3
EDT 600L	Reading Methods Laboratory	0-1
EDT 601	Phonics, Spelling and Vocabulary	3
EDT 602	Critical Reading in the Content Areas	3
EDT 603	Foundations of Literacy through Literature	3
EDT 527	Student Teaching- K-3	3-7
Total Hours		30-37

Transdisciplinary ECE Cohort Coursework

EDT 510	Introduction to Transdisciplinary Early Childhood Education	2
EDT 511	Integrated Curriculum for Young Children	2
EDT 512	Summer Play Institute	2
EDT 513	Developmentally and Individually Appropriate Practice	3
EDT 516	Collaborative Assessment Birth to Age Eight	3
EDT 517	Early Childhood Seminar on Medical and Health Issues	3
EDT 528	Internship in Transdisciplinary Early Childhood Education (Ages 3-5)	3
EDT 573	Collaborating with Families, Professionals and Agencies	3

Intervention Specialist Mild/Moderate (EIS.EMM)

This program is for individuals wishing to teach students with mild/moderate disabilities (learning disabilities, mild cognitive disabilities and emotional disturbance). All classes required for this license are offered online/blended through Summer, 2016. Beginning Fall, 2016 all courses will be face-to-face/blended. Completion of this program leads to licensure in intervention specialist mild/moderate grades K-12. For general information see licensure programs. Course of study may vary based on sponsorship for licensure.

Professional Education Requirements

EDT 508	Theories of Learning and Human Development ¹	3
EDT 509	Instruction, Management and Assessment ¹	3
EDT 509L	Instruction, Management and Assessment Laboratory ¹	0-1
EDT 571	Language Development and Emergent Literacy ¹	3
EDT 572	Introduction to Education of Learners with Mild/Moderate Needs	3
EDT 572L	Introduction to Education of Learners with Mild/Moderate Needs Laboratory	0-1
EDT 573	Collaborating with Families, Professionals and Agencies	3
EDT 574	Behavior Management	3
EDT 575	Assessment: Mild/Moderate	3
EDT 575L	Assessment: Mild/Moderate Laboratory	0-1
EDT 576	Curriculum: Mild/Moderate	3
EDT 576L	Curriculum: Mild/Moderate Laboratory	0-1
EDT 579	Instructional Strategies: Mild/Moderate	3
EDT 579L	Instructional Strategies: Mild/Moderate Laboratory	0-1
EDT 600	Reading Methods	3
EDT 600L	Reading Methods Laboratory	0-1
EDT 601	Phonics, Spelling and Vocabulary	3
EDT 602	Critical Reading in the Content Areas	3
EDT 603	Foundations of Literacy through Literature	3
EDT 659	Special Topics in Teaching (Student Teaching Seminar)	1
EDT 589	Student Teaching: Mild/Moderate ²	3-7

¹ Additional course requirement for students who have not previously completed equivalent coursework.

² Some students may qualify to register for EDT 587, please see adviser.

Middle Childhood Education (EMS)

Completion of the program requirements for middle childhood education (MCE) leads to licensure in the state of Ohio for grades four to nine. Candidates must complete approved coursework in two teaching concentration areas. The teaching concentration areas include: mathematics, science, social studies and reading/language arts. For general information see licensure programs.

Professional Education Requirements

EDT 502	Philosophical Studies in Education	3
or EDT 503	History of Education in the United States	
EDT 507	The Profession of Teaching	2
EDT 507L	The Profession of Teaching Laboratory	1
EDT 508	Theories of Learning and Human Development	3
EDT 530	Middle School Principles and Practices	3
EDT 530L	Middle School Principles and Practices Laboratory	0-1
EDT 570	Educating Diverse Student Populations in Inclusive Settings	3
EDT 570L	Educating Diverse Student Populations in Inclusive Settings Laboratory	0-1
EDT 600	Reading Methods	3
EDT 600L	Reading Methods Laboratory	0-1

EDT 601	Phonics, Spelling and Vocabulary	3
EDT 602	Critical Reading in the Content Areas	3
EDT 603	Foundations of Literacy through Literature	3

Select two of the following methods courses with the corequisite laboratory courses:

EDT 532	Reading/Language Arts Methods for Middle Childhood Education	
EDT 532L	Reading/Language Arts Methods for Middle Childhood Education Laboratory	
EDT 533	Mathematics Methods for Middle Childhood Education	
EDT 533L	Mathematics Methods for Middle Childhood Education Laboratory	
EDT 534	Science Methods for Middle Childhood Education	
EDT 534L	Science Methods for Middle Childhood Education Laboratory	
EDT 535	Social Studies Methods for Middle Childhood Education	
EDT 535L	Social Studies Methods for Middle Childhood Education Laboratory	
EDT 549	Student Teaching- Middle Childhood	3-7

Multi-Age Education (EAG)

Completion of the program requirements for multi-age education leads to licensure in the state of Ohio for grades prekindergarten through 12. Candidates must complete approved coursework in one of the following teaching concentration areas: foreign language, visual arts or music. For general information see licensure programs.

Professional Education

EDT 502	Philosophical Studies in Education	3
or EDT 503	History of Education in the United States	
EDT 507	The Profession of Teaching	2
EDT 507L	The Profession of Teaching Laboratory	1
EDT 508	Theories of Learning and Human Development	3
EDT 509	Instruction, Management and Assessment	3
EDT 509L	Instruction, Management and Assessment Laboratory	0-1
EDT 570	Educating Diverse Student Populations in Inclusive Settings	3
EDT 570L	Educating Diverse Student Populations in Inclusive Settings Laboratory	0-1
EDT 602	Critical Reading in the Content Areas	3
Methods courses specific to licensure: See adviser for specific courses		3
Student teaching specific to licensure: See adviser for specific courses		3-7

Endorsement Programs

Computer Technology Endorsement (TEC)

The state of Ohio computer technology endorsement can be added to a valid Ohio teaching certificate/license and is valid for grades K-12. The program prepares in-service teachers to integrate technology-enhanced learning into their teaching and to assist other professionals in their

buildings in accomplishing the same. Applications for the endorsement must be submitted to the SEHS dean's office for approval.

Program Requirements

EDT 629	Cognition, Learning and Technology	3
EDT 630	Multimedia Production	3
EDT 631	Planning and Assessing Technology	3
EDT 632	Distance Education in a Digital Age	3
EDT 633	Web Design and Development	3
EDT 634	Becoming an Effective Building Technology Leader	1-4

Total Hours

16-19

Early Childhood Generalist Endorsement (ECE.GEN)

The state of Ohio early childhood generalist endorsement can be added to a valid ECE license. The endorsement allows teachers in self-contained fourth and fifth grade classrooms to teach the subject areas of mathematics, science and social studies. In order for the University of Dayton to approve the state of Ohio endorsement application, candidates must have on file in the SEHS dean's office passing scores on the state of Ohio licensure tests.

Program Requirements

EDT 519	Social Studies for Fourth and Fifth Grades	3
EDT 523	Early Childhood Mathematics Grades Four and Five Methods	3
EDT 524	Early Childhood Science Grades Four and Five Methods	3

Total Hours

9

Middle Childhood Generalist Endorsement (EMS.GEN)

The state of Ohio middle childhood generalist endorsement can be added to a valid MCE license for any combination of the four areas of teaching concentration. The generalist endorsement will allow teachers to teach grades four to six only. In order for the University of Dayton to approve the state of Ohio endorsement application, candidates must have on file in the SEHS dean's office passing scores on the state of Ohio licensure tests.

Middle Childhood Endorsement

Reading/Language Arts		3
EDT 541	Middle Childhood Reading/Language Arts 4-6 General Methods	3

Select one from following:

EDT 608	The Writing Classroom	3
ENG 592	History of English	
ENG 594	Structure of English	
LNG 568	Introduction to Linguistics	

Mathematics

EDT 542	Middle Childhood Mathematics 4-6 General Methods	3
MTH 214	Mathematical Concepts for Middle School Teachers	3

Science (Prerequisites: SCI 190, 190L, 210 & 210L)

EDT 543	Middle Childhood Science 4-6 General Methods	3
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SCI 230	Organisms, Evolution & Environment	3
SCI 230L	Organisms, Evolution & Environment Laboratory	1

Social Studies

EDT 544	Middle Childhood Social Studies 4-6 General Methods	3
HST 251	American History to 1865	3

Prekindergarten Special Needs Endorsement (ECE.PSN)

The prekindergarten special needs (PKSN) endorsement is valid for teaching children ages three to five who have mild, moderate to intensive needs. The endorsement can be added to an IS or ECE license. In order for the University of Dayton to approve the state of Ohio endorsement application, candidates must have on file in the SEHS dean's office passing scores on the state of Ohio licensure tests.

EDT 513	Developmentally and Individually Appropriate Practice	3
EDT 516	Collaborative Assessment Birth to Age Eight	3
EDT 517	Early Childhood Seminar on Medical and Health Issues	3
EDT 528	Internship in Transdisciplinary Early Childhood Education (Ages 3-5)	3
EDT 573	Collaborating with Families, Professionals and Agencies	3
Total Hours		15

Reading Endorsement (ERE)

The reading endorsement program is a 15 semester hour graduate program that signifies advanced work in the field of reading. The state of Ohio reading endorsement can be added to a valid teaching certificate/license, and is for grades P-12. To begin the coursework for the reading endorsement, candidates must have already completed prerequisite reading requirements or the approved equivalents. Three semester hours of prerequisites, which may be at the graduate or undergraduate level, may be applied to the reading endorsement program requirements. In order for the University of Dayton to approve the state of Ohio endorsement application, candidates must have on file in the SEHS dean's office passing scores on the state of Ohio licensure tests.

EDT 605	Advanced Study in Reading/Language Arts	3
EDT 606	Assessment and Evaluation of Reading Difficulties	3
EDT 607	Practicum in Reading Intervention Techniques	3
EDT 650	Professional Development of Teacher Leaders	3

Three approved credit hours in reading to total 15 semester hours

Teacher Leader Endorsement (ETL)

The teacher leader endorsement program is a post-master's program that acknowledges the important role of teacher leaders in school settings, such as mentoring and coaching, providing professional development and decision-making. The program's nine semester hours consist of coursework and associated clinical activities. To be eligible for admission, prospective students need to have a master's degree and at least four years of successful teaching experience. Due to the unique nature of the content and clinical practice, transferring credits for these courses will not be considered. Candidates completing the endorsement program may apply to the Ohio Department of Education for the teacher leader endorsement, a criterion of the Tier 4 Lead Professional Educator

License. Applications for the endorsement must be approved by the SEHS dean's office.

EDT 648	Teacher Leaders Using Data for Decision Making	3
EDT 649	Coaching and Teacher Leaders	3
EDT 650	Professional Development of Teacher Leaders	3

Teaching English To Speakers Of Other Languages Endorsement (TSL)

The graduate teaching English to speakers of other languages (TESOL) endorsement program is for P-12 teachers who hold a valid state of Ohio teaching license in any subject. This program prepares teachers to serve English-language learners effectively as content area and grade level classroom teachers or as ESOL specialists. Completion of the endorsement program leads to eligibility for a TESOL endorsement from the state of Ohio. In order for the University of Dayton to approve the state of Ohio endorsement application, candidates must have on file in the SEHS dean's office passing scores on the state of Ohio licensure tests.

EDT 537	Second Language Learning and Teaching	3
EDT 538	TESOL Practicum	1
EDT 539	Sociolinguistics in Language Education	3
EDT 540	Practicum in ESOL Instruction and Assessment	3
ENG 541	TESOL Methods	3
ENG 594	Structure of English	3
LNG 568	Introduction to Linguistics	3

Certificate Programs

Early Childhood Leadership and Advocacy (ECL)

The early childhood leadership and advocacy (ECLA) certificate is designed for experienced ECE professionals, such as program administrators, supervisors, teacher leaders and other professionals who work with and advocate for young children and their families. This program prepares candidates with the knowledge and skills required to be effective leaders and advocates in the field of early care and education.

Professional Courses

EDT 560E	Early Childhood Program and Personnel Management	3
EDT 560EL	Early Childhood Program and Personnel Management Laboratory	1
EDT 561E	Supporting Quality Curriculum and Instruction in Early Care and Education	3
EDT 561EL	Supporting Quality Curriculum and Instruction in Early Care and Education Laboratory	1
EDT 562E	Regulations, Licensing and the Law in Early Care and Education	3
EDT 562EL	Regulations, Licensing and the Law in Early Care and Education Laboratory	1
EDT 563E	Managing Finances and Marketing in Early Care and Education	3
EDT 563EL	Managing Finances and Marketing in Early Care and Education Laboratory	1
EDT 564E	Advocacy in Early Care and Education	3

EDT 565E	Internship and Practicum in Early Childhood Leadership	3
Total Hours		22

Early (Childhood) Intervention Specialist Certificate (ECE.EIC)

The early childhood intervention specialist (ECIS) certificate program is granted through the Ohio Department of Developmental Disabilities. It is valid for servicing infants and toddlers, ages birth through two, who have an identified developmental delay or who are at risk for developing such a delay. The young child is served within the context of family.

Prerequisites/Corequisites

EDT 508	Theories of Learning and Human Development	3
EDT 570	Educating Diverse Student Populations in Inclusive Settings	3
EDT 570L	Educating Diverse Student Populations in Inclusive Settings Laboratory	0-1
Total Hours		6-7

To be eligible for the ECIS certificate from DODD the following coursework must be satisfied as a part of the transdisciplinary ECE cohort group.

EDT 510	Introduction to Transdisciplinary Early Childhood Education	2
EDT 511	Integrated Curriculum for Young Children	2
EDT 512	Summer Play Institute	2
EDT 514	Curriculum and Instruction for Infants and Toddlers with Special Needs	3
EDT 515	Infant and Toddler Development Practicum	2
EDT 516	Collaborative Assessment Birth to Age Eight	3
EDT 517	Early Childhood Seminar on Medical and Health Issues	3
EDT 573	Collaborating with Families, Professionals and Agencies	3
Total Hours		20

Teaching English to Speakers of Other Languages Certificate (TSL)

The graduate teaching English to speakers of other languages (TESOL) certificate program is for individuals who already hold a bachelor's degree in any field. This program prepares students to teach English as an additional language in postsecondary schools, adult education settings and private language institutes in the U.S. and abroad. It can also help pre- and in-service P-12 teachers gain competence in working with English-language learners in their grade level and content area classrooms. It should be noted the certificate alone does not qualify a teacher for a TESOL endorsement from the state of Ohio.

EDT 537	Second Language Learning and Teaching	3
EDT 538	TESOL Practicum	1
ENG 541	TESOL Methods	3
ENG 594	Structure of English	3
LNG 568	Introduction to Linguistics	3

Technology-Enhanced Learning Certificate (TEL)

The technology-enhanced learning certificate program has the same curriculum as the computer technology endorsement, which is a credential for those persons holding a state of Ohio teaching license. For those persons who do not hold an Ohio license, the technology-enhanced learning certificate program is an option. This program prepares in-service teachers to integrate technology-enhanced learning into their own teaching and to assist other professionals in their buildings in accomplishing the same. The courses focus on helping master's candidates increase teacher and student learning in the context of a technology-enhanced, problem-based learning environment.

EDT 629	Cognition, Learning and Technology	3
EDT 630	Multimedia Production	3
EDT 631	Planning and Assessing Technology	3
EDT 632	Distance Education in a Digital Age	3
EDT 633	Web Design and Development	3
EDT 634	Becoming an Effective Building Technology Leader	1-4
Total Hours		16-19

Courses

EDT 500. Models of Teaching. 3 Hours

This course is a study of eight instructional models specifically designed to meet the needs of diverse learners. Candidates will be expected to design instructional units that integrate the models.

EDT 501. Introduction to American Education. 3 Hours

This course is designed for individuals who are new to the American educational system and will include site visits to a variety of educational settings including public and private schools serving students in grades P-12. Students will visit schools, and discuss American education policies, practices and the impact of reform efforts with educators and administrators. Prerequisite(s): Intensive English Program level 5 or equivalent TOEFL score.

EDT 502. Philosophical Studies in Education. 3 Hours

This course is a study of the writings of major philosophers as they relate to education (including those in the Marianist tradition). Interpretations are made for the development of a critical, personal theory of teaching, counseling, educational administration and psychological services.

EDT 503. History of Education in the United States. 3 Hours

This course is a study of the relationship of schools and social change in the United States from Colonial times to the present. Interpretations of changes in educational policies for the development of a critical theory of education are discussed.

EDT 505. School, Self and Society. 3 Hours

A study of the relationships among institutional reform, personality development and social change in various levels and types of education such as ECE, MCE and AYA. The students will make a comparison of schools around the world. One aim of such a study is to locate the differences that derive from differences in the cultures of the communities they serve. Another aim is to record how schools have changed from forces of globalization. A third aim is to determine the causes and the effects of the changes.

EDT 506. History of Catholic K-12 Schools in the United States. 3 Hours

This course examines the Catholic K-12 educational experience in the United States with a particular emphasis on the impact that Catholic schools have had on the creation of Catholic culture in America and on American culture in general. Particular emphasis is placed upon those historical antecedents that directly or indirectly affect Catholic schools today.

EDT 507. The Profession of Teaching. 2 Hours

This course is designed to study the principal components of effective teaching that facilitate the learning of all students. Students will explore and demonstrate knowledge of current educational issues, the Ohio Standards for the Teaching Profession and other professional standards. Students will provide evidence of the development of professional dispositions and their understanding of the importance of developing a community of learners that respects and appreciates diversity. Students will provide evidence of critical reflection on the teaching process as it relates to incorporating social justice and the Marianist characteristics of education. Corequisite(s): EDT 507L.

EDT 507L. The Profession of Teaching Laboratory. 0-1 Hours

This 20 hour field experience is designed to accompany the EDT 507 course. Both the course and field experience are designed to study the principal components of effective teaching that facilitate the learning of all students. Students will explore and demonstrate knowledge of current educational issues, the Ohio Standards for the Teaching Profession and other professional standards. Students will provide evidence of the development of professional dispositions and their understanding of the importance of developing a community of learners that respects and appreciates diversity. Students will use their lab experience as the basis for providing evidence of critical reflection on the teaching process as it relates to incorporating social justice and the Marianist characteristics of education into their understanding about the profession. Corequisite(s): EDT 507.

EDT 508. Theories of Learning and Human Development. 3 Hours

This course is a study of theories of learning and human development (physical, social, emotional, intellectual and moral) as they relate to P-12 practices, including ECE, MCE and AYA licensure areas.

EDT 509. Instruction, Management and Assessment. 3 Hours

This course is a study of curriculum, instruction, management styles and assessment techniques that promote student learning and achievement. Emphasis is on classroom-based theory-to-practice connections.

This course is primarily intended for initial licensure candidates.

Prerequisite(s): EDT 507, EDT 507L, EDT 508; a passing score on the Ohio Assessment for Educators (or the Oral Proficiency Interview and Writing Proficiency Test for foreign language) specialty area exam(s). Corequisite(s): EDT 509L.

EDT 509L. Instruction, Management and Assessment Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regard to instruction, management and assessment in school settings. Corequisite(s): EDT 509.

EDT 510. Introduction to Transdisciplinary Early Childhood Education. 2 Hours

This course is an introduction to the ECE cohort group and to transdisciplinary methods of teaming and collaboration. Candidates will work in teams to explore educational models and current issues associated with the field of ECE. This course is technology enhanced. ECE cohort application must have been submitted and approved before registering for this course. Prerequisite(s): EDT 508, EDT 570, EDT 570L.

EDT 510L. Introduction to Transdisciplinary Early Childhood Education Laboratory. 0-1 Hours

This course is designed for international students who are new to American culture and educational practice. Students will develop field related vocabulary while exploring schools and centers in the Miami Valley and processing what they see. Corequisite(s): EDT 510.

EDT 511. Integrated Curriculum for Young Children. 2 Hours

This course introduces and develops the theoretical and practical bases for the creation of integrated curriculum for infants, toddlers and preschoolers using a play-based approach. The content areas of mathematics and science provide opportunities for Reggio style documentation, and the Ohio Early Learning Academic Content Standards are emphasized.

EDT 512. Summer Play Institute. 2 Hours

The Summer Play Institute is a field-based forum in which candidates implement the integrated curriculum activities developed in EDT 511. Candidates will engage in child-initiated play sessions that will be videotaped and reviewed by members of the cohort and the instructor. Supported play which facilitates development will be emphasized. Prerequisite(s): EDT 510 (may be taken as a corequisite). Corequisite(s): EDT 511.

EDT 513. Developmentally and Individually Appropriate Practice. 3 Hours

The course shifts focus from the age-appropriate practice to the needs of the individual child and family. Candidates will learn to develop practice that supports and facilitates the development of young children ages birth to eight specifically those with disabilities. Significant review of related research drives this course. Field experience required. Prerequisite(s): EDT 510.

EDT 514. Curriculum and Instruction for Infants and Toddlers with Special Needs. 3 Hours

This course focuses on the planning and instructional methods, materials and evaluation techniques for working with young children who are at risk for or who have been identified with developmental delays, ages birth to three, and their families. Field experience required. Prerequisite(s): EDT 510.

EDT 515. Infant and Toddler Development Practicum. 2 Hours

This guided practicum will provide an opportunity for candidates to develop and apply their knowledge of typical and atypical development from conception to age three as they observe young children in both structured and naturalistic settings. Developmental milestones as well as related risk factors will be emphasized. Field experience required. Prerequisite(s): EDT 510.

EDT 516. Collaborative Assessment Birth to Age Eight. 3 Hours

This course is the study of the transdisciplinary and collaborative nature of assessment in diagnosis, screening and instruction of young children, ages birth to eight, that are typically developing as well as those with disabilities. The course will focus on the role of the family in the assessment process. Systemic observation using a play-based approach will be emphasized. Prerequisite(s): EDT 510.

EDT 517. Early Childhood Seminar on Medical and Health Issues. 3 Hours

This course is the study of the health care and medical needs associated with young children with disabilities. Students engage in the study of how medical/physical conditions affect the cognitive, social/emotional, language, motor and adaptive development of a child and family. Collaboration between educational and medical professionals is stressed, in an effort to integrate services for young children.

EDT 518. Integrated Curriculum and Instruction for Kindergarten-Primary Grades. 3 Hours

This course will focus on integrating curriculum and instruction for kindergarten and the primary grades. Special attention will be paid to the Ohio academic content standards with emphases on science, social studies and mathematics instruction. Planning, instructional methods, materials and evaluation techniques for teaching children on the kindergarten to primary levels will be covered. Corequisite(s): EDT 518L.

EDT 518L. Integrated Curriculum and Instruction for Kindergarten-Primary Grades Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regard to integrated planning, instruction and assessment in elementary school settings. Corequisite(s): EDT 518.

EDT 519. Social Studies for Fourth and Fifth Grades. 3 Hours

A course designed to address social studies content including social aspects of learning, and pedagogy specific to fourth and fifth grades.

EDT 523. Early Childhood Mathematics Grades Four and Five Methods. 3 Hours

Planning, diagnosis, instructional methods, materials, assessment and evaluation techniques for teaching mathematics to students in grades four and five with varied needs and abilities using a tier method. Topics include: Ohio Academic Content Standards, applications and instructional techniques that address proficiency testing, resources, technologies, manipulatives, interdisciplinary connections, grouping techniques, current research, and 21st century skills.

EDT 524. Early Childhood Science Grades Four and Five Methods. 3 Hours

Planning, diagnosis, instructional methods, materials, assessment and evaluation techniques for teaching science to students in grades four and five with varied needs and abilities using a tier method. Topics include: Ohio Academic Content Standards, applications and instructional techniques that address proficiency testing, resources, technologies, manipulatives, interdisciplinary connections, grouping techniques, current research and 21st century skills.

EDT 526. Student Teaching- K-3. 1 Hour

Full-time supervised and evaluated teaching in a K-3 setting. The candidate will demonstrate the knowledge, skills, attitudes and dispositions required of a beginning K-3 teacher. Prerequisite(s): Registration for the course and approved student teaching/internship application packet submitted to the Department of Teacher Education at the beginning of the term prior to the student teaching experience; completion of all coursework; previous experience in a K-3 classroom; instructor permission.

EDT 527. Student Teaching- K-3. 3-7 Hours

Full-time supervised and evaluated teaching in a K-3 setting. The candidate will demonstrate the knowledge, skills, attitudes and dispositions required of a beginning K-3 teacher. Prerequisite(s): Registration for the course and approved student teaching/internship application packet submitted to the Department of Teacher Education at the beginning of the term prior to the student teaching experience; completion of all coursework.

EDT 528. Internship in Transdisciplinary Early Childhood Education (Ages 3-5). 3 Hours

Supervised and evaluated teaching in a preschool special needs setting. The candidate will demonstrate the knowledge, skills, attitudes and dispositions needed to comply with the National Association for the Education of Young Children (NAEYC) and the Division for Early Childhood of the Council of Exceptional Children (DEC) guidelines for appropriate practice. Field experience required. Prerequisite(s): Registration for the course and approved student teaching/internship application packet submitted to the Department of Teacher Education at the beginning of the term prior to the student teaching experience.

EDT 529. Internship in Early Intervention. 3-10 Hours

Supervised and evaluated teaching in an infant/toddler educational setting. Candidates are to demonstrate the knowledge, skills, attitudes and dispositions needed to comply with the National Association for the Education of Young Children (NAEYC) and the Division for Early Childhood and the Council of Exceptional Children (DEC) guidelines for appropriate practice. Field experience required. Prerequisite(s): Registration for the course and approved student teaching/internship application packet submitted to the Department of Teacher Education at the beginning of the term prior to the student teaching experience.

EDT 530. Middle School Principles and Practices. 3 Hours

This course is primarily a study of organization (school structure), philosophy and curriculum of middle level education (ages nine to 14) grades four to nine. It is designed to present the theoretical knowledge base about middle level (school) education. Issues and concerns, current trends and the essential elements relating to middle level education will be discussed throughout the semester of study. A variety of inquiry methods will be modeled that encourage critical thinking skills. Prerequisite(s): EDT 507, EDT 507L, EDT 508; passing score(s) on the Ohio Assessment for Educators specialty area exam. Corequisite(s): EDT 530L.

EDT 530L. Middle School Principles and Practices Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regards to the study of organization (school structure), philosophy and curriculum of middle level education (ages nine to 14), grades four to nine. It is designed to support the course study of the theoretical knowledge base about middle level (school) education. Issues and concerns, current trends and the essential elements relating to middle level education will be observed and studied throughout the semester. Corequisite(s): EDT 530.

EDT 532. Reading/Language Arts Methods for Middle Childhood Education. 3 Hours

This course focuses on the planning, diagnosis, instructional methods, materials, assessment and evaluation techniques for teaching reading/language arts to students in the middle schools with varied needs and abilities. The topics emphasized in this course include: an understanding of Ohio's academic content standards for grades four to nine, applications and instructional techniques that address the Ohio achievement tests, various resources, technologies, interdisciplinary connections, various grouping techniques and current research. Prerequisite(s): EDT 530, EDT 530L. Corequisite(s): EDT 532L.

EDT 532L. Reading/Language Arts Methods for Middle Childhood Education Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regard to teaching reading/language arts to students in middle schools. Corequisite(s): EDT 532.

EDT 533. Mathematics Methods for Middle Childhood Education. 3 Hours

This course focuses on the planning, diagnosis, instructional methods, materials, assessment and evaluation techniques for teaching mathematics to students in the middle schools with varied needs and abilities. The topics emphasized in this course include: an understanding of Ohio's academic content standards for grades four to nine, applications and instructional techniques that address the Ohio achievement tests, various resources, technologies, manipulatives and other visuals, interdisciplinary connections, various grouping techniques and current research. Prerequisite(s): EDT 530, EDT 530L. Corequisite(s): EDT 533L.

EDT 533L. Mathematics Methods for Middle Childhood Education Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regard to teaching mathematics to students in middle schools. Corequisite(s): EDT 533.

EDT 534. Science Methods for Middle Childhood Education. 3 Hours

This course focuses on the planning, diagnosis, instructional methods, materials, assessment and evaluation techniques for teaching science to students in the middle schools with varied needs and abilities. The topics emphasized in this course include: an understanding of Ohio's academic content standards for grades four to nine, applications and instructional techniques that address the Ohio achievement tests, various resources, technologies, experiments and other hands-on experiences, interdisciplinary connections, various grouping techniques and current research. Prerequisite(s): EDT 530, EDT 530L. Corequisite(s): EDT 534L.

EDT 534L. Science Methods for Middle Childhood Education Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates with the opportunity for field reflections in regard to teaching science to students in middle schools. Corequisite(s): EDT 534.

EDT 535. Social Studies Methods for Middle Childhood Education. 3 Hours

This course focuses on the planning, diagnosis, instructional methods, materials, assessment and evaluation techniques for teaching social studies to students in the middle schools with varied needs and abilities. The topics emphasized in this course include: an understanding of Ohio's academic content standards for grades four to nine, applications and instructional techniques that address the Ohio achievement tests, various resources, technologies and active hands-on experiences, other visuals, interdisciplinary connections, various grouping techniques and current research. Prerequisite(s): EDT 530, EDT 530L. Corequisite(s): EDT 535L.

EDT 535L. Social Studies Methods for Middle Childhood Education Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regard to teaching social studies to students in middle schools. Corequisite(s): EDT 535.

EDT 536. The Culture of the Catholic School. 3 Hours

This course explores the theological, moral, academic, human and social components that give the Catholic school its distinctive culture. The role of spiritual, sacramental and communal relationships in the creation of Catholic school identity will be examined.

EDT 537. Second Language Learning and Teaching. 3 Hours

This course is an exploration of the nature of language proficiency, second language acquisition and literacy, bilingualism and biliteracy, the role of culture in language learning and implications for second language teaching.

EDT 538. TESOL Practicum. 1 Hour

This course provides opportunities to practice planning, instruction and assessment in an ESOL classroom under the mentorship of an experienced ESOL teacher. Prerequisite(s): EDT 537, ENG 472, LNG 568, ENG 541.

EDT 539. Sociolinguistics in Language Education. 3 Hours

This course examines social, cultural, linguistic and policy issues relevant to working with English language learners in U.S. schools.

EDT 540. Practicum in ESOL Instruction and Assessment. 3 Hours

This course focuses on planning and implementing ESOL instruction and assessment and on interpreting and using assessment data. It includes both course meeting and field experience components. Prerequisite(s): EDT 537, EDT 539, ENG 541, ENG 546, LNG 568.

EDT 541. Middle Childhood Reading/Language Arts 4-6 General Methods. 3 Hours

This course focuses on the planning, diagnosis, instructional methods, materials, assessment and evaluation techniques for teaching reading/language arts to students with varied needs and abilities in the middle schools. The topics emphasized in this course include: Ohio's academic content standards for grades 4-6, applications and instructional techniques that address the Ohio proficiency tests, resources, technologies, interdisciplinary connections, grouping techniques and current research.

EDT 542. Middle Childhood Mathematics 4-6 General Methods. 3 Hours

The topics emphasized in this course include: Ohio academic content standards for grades 4-6, applications and instructional techniques that address state testing for students with varied needs and abilities using a tier method, resources, technologies, manipulatives, interdisciplinary connections, grouping techniques, current research and 21st century skills.

EDT 543. Middle Childhood Science 4-6 General Methods. 3 Hours

This course focuses on the instructional methods, materials, assessments and evaluation techniques for teaching science to students with varied needs and abilities in grades 4-6. The topics emphasized in this course include: national and state content standards for science in grades 4-6; applications and instructional techniques addressing relevant Ohio assessments; resources, technologies, experiments and other hands-on experiences; interdisciplinary connections; grouping techniques; and current research in science teaching and learning.

EDT 544. Middle Childhood Social Studies 4-6 General Methods. 3 Hours

Planning, diagnosis, instructional methods, materials, assessment and evaluation techniques for teaching social studies to students in the middle schools with varied needs and abilities using a tier method. The topics emphasized in this course include: an understanding of national and state content standards for social studies for grades four through six, applications and instructional techniques that address relevant Ohio assessments, various resources, technologies, hands-on experiences, interdisciplinary connections, various grouping techniques, current research in social studies teaching and learning.

EDT 549. Student Teaching- Middle Childhood. 3-7 Hours

Full-time supervised and evaluated teaching in grades four to nine in at least one of the two candidate's concentration subjects. The candidate will demonstrate the knowledge, skills and dispositions required of a beginning middle level teacher. Attendance at weekly seminars is required. Prerequisite(s): Two of the following courses (with the corresponding laboratory course): EDT 532, EDT 532L or EDT 533, EDT 533L or EDT 534, EDT 534L or EDT 535, EDT 535L; formal admission to student teaching a full term in advance.

EDT 550. Integrated Language Arts Methods for Adolescence to Young Adult. 3 Hours

This course focuses on planning, diagnosis, instructional methods, materials, assessment and evaluation techniques for teaching all levels of integrated language arts to students in grades seven to 12 with varied needs and abilities. Topics include: understanding Ohio's academic content standards for grades seven to 12, applications and instructional techniques that address the Ohio achievement and competency tests, various resources, technologies, interdisciplinary connections, various grouping techniques, best practices and current research. This course is for initial licensure candidates. Prerequisite(s): EDT 509, EDT 509L. Corequisite(s): EDT 550L.

EDT 550L. Integrated Language Arts Methods for Adolescence to Young Adult Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regard to teaching integrated language arts to students in grades seven to 12. Corequisite(s): EDT 550.

EDT 551. Integrated Social Studies Methods for Adolescence to Young Adult. 3 Hours

This course focuses on planning, diagnosis, instructional methods, materials, assessment and evaluation techniques for teaching all levels of integrated social studies to students in grades seven to 12 with varied needs and abilities. Topics include: understanding Ohio's academic content standards for grades seven to 12, applications and instructional techniques that address the Ohio achievement and competency tests, various resources, technologies, hands-on activities, interdisciplinary connections, various grouping techniques, best practices and current research. This course is for initial licensure candidates. Prerequisite(s): EDT 509, EDT 509L. Corequisite(s): EDT 551L.

EDT 551L. Integrated Social Studies Methods for Adolescence to Young Adult Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regard to teaching integrated social studies to students in grades seven to 12. Corequisite(s): EDT 551.

EDT 552. Foreign Language Methods for Adolescence to Young Adult. 3 Hours

This course focuses on planning, diagnosis, instructional methods, materials, assessment and evaluation techniques for teaching all levels of foreign language to students in grades seven to 12 with varied needs and abilities. Topics include: understanding Ohio's academic content standards for grades seven to 12, applications and instructional techniques that address the Ohio achievement and competency tests, various resources, technologies, hands-on activities and other visuals, interdisciplinary connections, various grouping techniques, best practices and current research. This course is for initial licensure candidates. Prerequisite(s): EDT 509, EDT 509L. Corequisite(s): EDT 552L.

EDT 552L. Foreign Language Methods for Adolescence to Young Adult Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regard to teaching foreign language to students in grades seven to 12. Corequisite(s): EDT 552.

EDT 553. Integrated Mathematics Methods for Adolescence to Young Adult. 3 Hours

This course focuses on planning, diagnosis, instructional methods, materials, assessment, and evaluation techniques for teaching all levels of mathematics to students in grades seven to 12 with varied needs and abilities. Topics include: understanding Ohio's academic content standards for grades seven to 12, applications and instructional techniques that address the Ohio achievement and competency tests, various resources, technologies, manipulatives, hands-on activities, other visuals, interdisciplinary connections, various grouping techniques, best practices and current research. This course is for initial licensure candidates. Prerequisite(s): EDT 509, EDT 509L. Corequisite(s): EDT 553L.

EDT 553L. Integrated Mathematics Methods for Adolescence to Young Adult Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regard to teaching mathematics to students in grades seven to 12. Corequisite(s): EDT 553.

EDT 554. Science Methods for Adolescence to Young Adult. 3 Hours

This course focuses on planning, diagnosis, instructional methods, materials, assessment and evaluation techniques for teaching all levels of science to students in grades seven to 12 with varied needs and abilities. Topics include: understanding Ohio's academic content standards for grades seven to 12, applications and instructional techniques that address the Ohio achievement and competency tests, various resources, technologies, hands-on activities, interdisciplinary connections, various grouping techniques, safety issues, best practices and current research. This course is for initial licensure candidates. Prerequisite(s): EDT 509, EDT 509L. Corequisite(s): EDT 554L.

EDT 554L. Science Methods for Adolescence to Young Adult Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regard to teaching science to students in grades seven to 12. Corequisite(s): EDT 554.

EDT 559. Music Student Teaching. 3-7 Hours

Full-time supervised and evaluated teaching in music classes in schools (P-12). The candidate will demonstrate the knowledge, skills and dispositions required of a beginning music teacher. Attendance at a weekly seminar is required. The student teaching seminar is designed so that student teachers may reflect and share experiences with one another and with experienced teachers. Each seminar will include informal sharing/discussion sessions as well as formal presentations on topics of importance related to the practice of music education as well as securing a teaching position.

EDT 560E. Early Childhood Program and Personnel Management. 3 Hours

This course is the first in the early childhood leadership program. Students will explore program and personnel management and human relations in early care and education. Prerequisite(s): Admittance to the graduate ECE leadership program. Corequisite(s): EDT 560EL.

EDT 560EL. Early Childhood Program and Personnel Management Laboratory. 0-1 Hours

This course is the first in the early childhood leadership program. Students will explore program and personnel management and human relations in early care and education. Corequisite(s): EDT 560E.

EDT 561E. Supporting Quality Curriculum and Instruction in Early Care and Education. 3 Hours

This course provides opportunities for students to use research to identify and support quality early childhood curriculum, instruction and assessment. Prerequisite(s): EDT 560E, EDT 560EL. Corequisite(s): EDT 561EL.

EDT 561EL. Supporting Quality Curriculum and Instruction in Early Care and Education Laboratory. 0-1 Hours

This course provides opportunities for students to use research to identify and support quality early childhood curriculum, instruction and assessment. Corequisite(s): EDT 561E.

EDT 562E. Regulations, Licensing and the Law in Early Care and Education. 3 Hours

This course addresses ethics in early care and education as well as issues related to health, safety and nutrition regulations including first aid, communicable disease, safety policies and practices. Reporting and recognizing child abuse is addressed. Students will learn to respond to regulations, licensing and laws that impact programs for young children. Prerequisite(s): EDT 560E, EDT 560EL. Corequisite(s): EDT 562EL.

EDT 562EL. Regulations, Licensing and the Law in Early Care and Education Laboratory. 0-1 Hours

This course addresses ethics in early care and education as well as issues related to health, safety and nutrition regulations including first aid, communicable disease, safety policies and practices. Reporting and recognizing child abuse is addressed. Students will learn to respond to regulations, licensing and laws that impact programs for young children. Corequisite(s): EDT 562E.

EDT 563E. Managing Finances and Marketing in Early Care and Education. 3 Hours

Students will explore strategies for managing finances and developing marketing plans in the field of early care and education. Prerequisite(s): EDT 560E, EDT 560EL. Corequisite(s): EDT 563EL.

EDT 563EL. Managing Finances and Marketing in Early Care and Education Laboratory. 0-1 Hours

This course supports students in EDT 563E as they explore managing finances and developing marketing plans in the field of early care and education. Corequisite(s): EDT 563E.

EDT 564E. Advocacy in Early Care and Education. 3 Hours

This course explores current political, educational and societal issues related to early care and education and examines how teachers develop leadership skills to become better advocates for children, families and the profession. Prerequisite(s): EDT 560E, EDT 560EL.

EDT 565E. Internship and Practicum in Early Childhood Leadership. 3 Hours

This internship serves as the culminating experience where students demonstrate the knowledge, skills and dispositions addressed in the four preceding early childhood leadership courses. Students complete a six week full-time internship working with/as an early childhood director or administrator. Prerequisite(s): EDT 560E, EDT 560EL, EDT 561E, EDT 561EL, EDT 562E, EDT 562EL, EDT 563E, EDT 563EL.

EDT 567. Advanced Phonics and Multisensory Instruction. 3 Hours

This is the first course of a two-course practicum sequence for the dyslexia certificate. This course will cover the specific nature of dyslexia as a language-based learning disability, multisensory instruction, advanced phonics, spelling, vocabulary and lesson planning for tutoring. Prerequisite(s): EDT 601, EDT 603, EDT 605.

EDT 568. Student Teaching Languages P-12. 3-7 Hours

Full-time supervised and evaluated teaching of foreign languages in P-12 classes. The candidate will demonstrate the knowledge, skills and dispositions required of a beginning foreign language teacher. Attendance at weekly seminars is required.

EDT 569. Student Teaching- Adolescence to Young Adult. 3-7 Hours

Full-time supervised and evaluated teaching in the content area in a junior or senior high school classroom. The candidate will demonstrate the knowledge, skills and dispositions required of a beginning secondary teacher. Attendance at weekly seminars is required. Prerequisite(s): Passing score on the Ohio Assessment for Educators specialty area exam; completion of 80% of content area courses; formal admission to student teaching a semester in advance.

EDT 570. Educating Diverse Student Populations in Inclusive Settings. 3 Hours

This course is the study of the characteristics, legal aspects and educational needs of students with challenges in learning. The role of the general educator in making curricular modifications and accommodations, adapting instruction and collaborating with other educators to facilitate learning in the general classroom for these students is examined. Prerequisite(s): EDT 507, EDT 507L (may also be taken as corequisites). Corequisite(s): EDT 570L.

EDT 570L. Educating Diverse Student Populations in Inclusive Settings Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regard to educating students with special needs in school settings. Corequisite(s): EDT 570.

EDT 571. Language Development and Emergent Literacy. 3 Hours

This course is the study of oral language and literacy development in children, with implications for all learners, including children with special needs.

EDT 572. Introduction to Education of Learners with Mild/Moderate Needs. 3 Hours

This course is the study of the role and function of the intervention specialist. This course presents issues of definition, identification and placement procedures. The candidate will acquire knowledge of major researchers and history, variations in belief, traditions and values across cultures and current practices in the field. Corequisite(s): EDT 572L (varies by program).

EDT 572L. Introduction to Education of Learners with Mild/Moderate Needs Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regard to the role and function of the intervention specialist. Corequisite(s): EDT 572.

EDT 573. Collaborating with Families, Professionals and Agencies. 3 Hours

This course examines theories and techniques to assist teachers in working with professionals, families and agency personnel to provide an appropriate educational program, improve home-school relationships and develop family-professional partnerships. Historical and legal perspectives of parental influence on special education services are examined.

EDT 574. Behavior Management. 3 Hours

This course examines the principles and methods of observing, recording, assessing and managing human behavior with emphasis on students with disabilities. Prerequisite(s): EDT 572, EDT 572L (varies by program).

EDT 575. Assessment: Mild/Moderate. 3 Hours

This course is the study of the multidisciplinary use of assessment instruments and techniques in the diagnosis, planning and evaluation of the special needs learner and the development of individual education programs. Prerequisite(s): EDT 572, EDT 572L, EDT 573, EDT 574 (varies by program). Corequisite(s): EDT 575L (varies by program).

EDT 575L. Assessment: Mild/Moderate Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regard to use of assessment instruments and techniques in the school setting.

EDT 576. Curriculum: Mild/Moderate. 2-3 Hours

This course is the study of curriculum development considering the motor, cognitive, academic, social, language, affective, functional, life skills and individual programming of students with mild/moderate disabilities. Prerequisite(s): EDT 572, EDT 572L, EDT 573, EDT 574, EDT 575, EDT 575L (varies by program). Corequisite(s): EDT 576L, EDT 579, EDT 579L (varies by program).

EDT 576L. Curriculum: Mild/Moderate Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regard to curriculum development for students with mild/moderate disabilities. Corequisite(s): EDT 576, EDT 579, EDT 579L (varies by program).

EDT 578. Application of Computers/Technology in Special Education. 2 Hours

This course is the study of basic computer applications in special education, including instructional programs, software evaluation, telecommunications, multimedia and hypermedia, assistive technology, augmentative devices, resources and legal/ethical issues. Prerequisite(s): Basic computing/technology skills.

EDT 579. Instructional Strategies: Mild/Moderate. 2-3 Hours

This course examines the strategies, materials and evaluation techniques for teaching students with mild/moderate learning needs. Prerequisite(s): EDT 572, EDT 572L, EDT 573, EDT 574, EDT 575, EDT 575L (varies by program). Corequisite(s): EDT 576, EDT 576L, EDT 579L (varies by program).

EDT 579L. Instructional Strategies: Mild/Moderate Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regard to planning, instruction, and assessment for students with mild/moderate learning needs. Corequisite(s): EDT 576, EDT 576L, EDT 579 (varies by program).

EDT 580. Introduction- Moderate to Intern. 5-10 Hours

No description available.

EDT 582. Dyslexia Methods Practicum. 3 Hours

This is the second course of a two-course practicum sequence for the dyslexia methods certificate. This course will take place in a local school and will involve one-to-one, supervised tutoring of a student with reading difficulties using a multisensory instructional approach. Prerequisite(s): EDT 567.

EDT 583L. Teaching Visual Arts Laboratory. 0-1 Hours

This course is the field experience portion of VAE 583, and consists of activities related to curriculum, planning, theory and practice for teaching visual arts to students, grades P-12. Corequisite(s): VAE 583.

EDT 587. Student Teaching: Mild/Moderate. 1 Hour

Supervised and evaluated teaching with students demonstrating mild/moderate learning needs. The candidate will demonstrate the knowledge, skills and dispositions of an intervention specialist. Attendance at seminars may be required. Prerequisite(s): EDT 575, EDT 575L, EDT 576, EDT 576L, EDT 579, EDT 579L; approval of faculty.

EDT 589. Student Teaching: Mild/Moderate. 3-7 Hours

Supervised and evaluated teaching with students demonstrating mild/moderate learning needs. The candidate will demonstrate the knowledge, skills and dispositions of an intervention specialist. Attendance at seminars may be required. Prerequisite(s): EDT 575, EDT 575L, EDT 576, EDT 576L, EDT 579, EDT 579L.

EDT 599. Student Teaching- Art (P-12). 3-10 Hours

Full-time supervised and evaluated teaching in art classes in school (P-12). The candidate will demonstrate the knowledge, skills and dispositions required of a beginning art teacher. Attendance at weekly seminars is required. Prerequisite(s): Passing score on the Ohio Assessment for Educators specialty area exam; completion of 80% of content area courses; formal admission to student teaching a semester in advance.

EDT 600. Reading Methods. 3 Hours

An integrated language arts course focusing on the knowledge base underpinning the teaching of reading and related language arts processes within the language arts and across curriculum to students of various ages, needs and abilities. Topics include: planning, instructional methods, materials, assessment and evaluation techniques. ECE, MCE and IS licensure candidates must meet program requirement in reading. AYA candidates are also required to meet this requirement if working toward Ohio's Reading Endorsement. Corequisite(s): EDT 600L.

EDT 600L. Reading Methods Laboratory. 0-1 Hours

This course consists of planned field experiences providing candidates the opportunity for field reflections in regard to planning, instruction and assessment of language arts across the curriculum in school settings. Corequisite(s): EDT 600.

EDT 601. Phonics, Spelling and Vocabulary. 3 Hours

This course provides the background knowledge necessary for effectively teaching and assessing the role of phonics in the reading process. Emphases are on developing phonemic awareness, phonics, spelling and word recognition/word meaning embedded in the context of a total reading/language arts program focused on meaning construction. ECE, MCE and IS initial licensure candidates must meet program requirements in reading. AYA candidates are also required to meet this requirement if working toward Ohio's Reading Endorsement.

EDT 602. Critical Reading in the Content Areas. 3 Hours

In this course, MCE and IS candidates examine the strategies and techniques in the development of prior knowledge skills, study skills, vocabulary, technology and assessment as they relate to critical reading abilities in a variety of curriculum areas. This course is part of Ohio's 12-hour State Mandated Reading Core. ECE, MCE, IS and multi-age licensure candidates must meet this requirement.

EDT 603. Foundations of Literacy through Literature. 3 Hours

This course serves as an introductory course to the reading/language arts (listening, speaking, reading, writing, viewing, visual representation) and the role literature plays in these processes. It is a foundation course in reading and is intended to align with the requirements of Ohio Reading Core licensure standards for the ECE, MCE and IS programs. Topics examined include the foundations of literacy, research theories and related models of reading, various children's and young adult literature, the integration of technology in literacy, an overview of the importance of on-going assessment in teaching reading/language arts and an awareness of cultural, linguistic and ethnic diversity in individual learners.

EDT 605. Advanced Study in Reading/Language Arts. 3 Hours

This course is designed to provide teachers the opportunity to extend their knowledge of the reading/language arts processes and the principles underlying effective instruction. Key concepts are drawn from recent research and theory in language learning, developmental reading research and research describing the literacy processes of children.

EDT 606. Assessment and Evaluation of Reading Difficulties. 3 Hours

This course is the study of formal and informal diagnostic tests and procedures for identifying reading strengths and weaknesses with applications for reading programs. Candidates must register for EDT 607 the next semester. Prerequisite(s): EDT 605.

EDT 607. Practicum in Reading Intervention Techniques. 3 Hours

In this course the candidate will apply knowledge of informal and formal evaluation instruments for diagnosing reading ability and disability and their causes with students and to plan appropriate intervention experiences for those students. Laboratory portion of EDT 606. This course must be taken the semester immediately following EDT 606. Prerequisite(s): EDT 606.

EDT 608. The Writing Classroom. 3 Hours

This course will focus on the teacher as a writer. Elements of the writing process will be discussed and implemented. Candidates will develop a classroom writing program.

EDT 609. Issues, Trends and Research in Reading. 3 Hours

Basic course for teachers concerned with the psychology of learning to read and current issues, trends and research in teaching reading/language arts.

EDT 629. Cognition, Learning and Technology. 3 Hours

This course focuses on the connections between cognitive psychology and technology-enhanced teaching and learning. New insights emerging from the latest research on human cognition have important implications for instructional design. Such insights suggest ways of teaching and learning that foster deep understanding, better thinking and the use of knowledge to solve complex problems. Students will learn how to build technology-enhanced, problem-based learning environments grounded in the latest research on human cognition and constructivist learning theory. This course is the gateway course leading to the Master of Science in Education with a concentration in technology-enhanced learning. It is the prerequisite for all other courses in the program.

EDT 630. Multimedia Production. 3 Hours

This course will allow students to manipulate and manage multimedia resources, including presentation software, graphics and audio and video clips to create engaging learning experiences. Students will engage in multimedia activities that focus on classroom technology integration.

EDT 631. Planning and Assessing Technology. 3 Hours

In this course, candidates will learn how to systematically plan and assess growth in the use of technology by K-12 teachers, students and administrators.

EDT 632. Distance Education in a Digital Age. 3 Hours

This course teaches candidates to design powerful learning experiences that connect students to the real world by using a variety of distance education tools, including web-based and teleconferencing technologies.

EDT 633. Web Design and Development. 3 Hours

This course is designed to be an introductory level course for educators with no previous web design experience. The course focuses on using HTML authoring software to build a working website that can be implemented for a typical classroom setting. Upon completion of this course, students develop a class website and demonstrate the technical proficiency to update the website as needed.

EDT 634. Becoming an Effective Building Technology Leader. 1-4 Hours

This capstone course examines the practical concerns of becoming a building leader and resource in the integration of technology-enhanced learning. Study of research on leadership and innovation undergirds the candidate's understanding of the issues of building level management. Field experience required.

EDT 648. Teacher Leaders Using Data for Decision Making. 3 Hours

Study of the role of teacher leaders facilitating collaborative team efforts at building and district levels in using data to inform instruction. Types of assessments and their respective roles in instructional planning and differentiation of teaching will be explored. Prerequisite(s): EDT 650.

EDT 649. Coaching and Teacher Leaders. 3 Hours

Designed to prepare classroom teachers for work as instructional mentors and coaches. Course learning activities are structured around a coaching framework designed to support mentor teachers in the process of reflection and self-assessment. Prerequisite(s): EDT 650.

EDT 650. Professional Development of Teacher Leaders. 3 Hours

This course is a study of existing and emerging models of professional development designed to provide classroom teachers with opportunities to assume new leadership roles and responsibilities in the school community.

EDT 658. Independent Study. 1-3 Hours

This course is an in-depth study of a selected educational topic. The candidate develops an individual learning plan that includes objectives, schedule of readings and assignments, products and methods of evaluation. Prerequisite(s): Permission of department chair.

EDT 659. Special Topics in Teaching. 1-3 Hours

This course is the study of specialized areas of education not typically included in the professional education sequence. Topics are announced.

EDT 660. Introduction to Educational Research. 3 Hours

This course is a study of key components necessary to understand, analyze and evaluate research. Emphases are on understanding the foundational principles of inquiry and related issues. EDT 660 is taken early in the master's program.

EDT 662. Thesis. 2 Hours

The thesis serves as the culmination of courses in a candidate's graduate program where thesis was chosen as a research option. There is a mandatory two-term requirement for thesis. Prerequisite(s): EDT 660.

EDT 663. Thesis. 2 Hours

The thesis serves as the culmination of courses in a candidate's graduate program where the thesis option was chosen as a research choice. There is a mandatory two-term requirement for the thesis option.

EDT 667. Educational Research Seminar. 3 Hours

In this course, students apply the principles of design by implementing a research study in an educational setting. The findings are presented in a public forum. This course is the capstone learning activity of the master's degree. Prerequisite(s): EDT 660.

EDT 672. History of Higher Education in the United States. 3 Hours

This course is a study of the development of postsecondary American education from Colonial times to the present with special emphases on mission, purposes, governance and curriculum as they change over time and differ by institutional type.

EDT 680. Coaching in Diverse Classrooms. 2 Hours

The focus of this course is on the preparation of literacy specialists to coach teachers in the implementation of culturally responsive instruction for diverse learners. This population includes special needs, culturally and linguistically diverse students. Emphasis will be placed on connections between current theory, research, and instructional practice. Prerequisite(s): Acceptance to END. LTS program.

EDT 681. Coaching for Effective Assessment Practice. 2 Hours

Designed for reading specialists, this course teaches knowledge, skills and dispositions in school-based professional development and coaching on classroom-based reading assessment concepts and skills. Prerequisite(s): Acceptance to END.LTS program.

EDT 682. Pedagogy of Effective Literacy Instruction. 2 Hours

This course enables candidates to demonstrate knowledge of a wide range of instructional practices, methods, and curriculum materials, including technology, that support effective reading and writing instruction. Candidates integrate their knowledge and dispositions regarding curriculum, instructional practices, curricular materials, assessment and evaluation to create literate environments that foster both reading and writing in all students. Prerequisite(s): Acceptance to END.LTS program.

EDT 683. Professional Development in Literacy. 2 Hours

An introduction to research and knowledge bases related to teacher professional development from a variety of perspectives. Examines coaching as one venue of supporting teacher professional development. Prerequisite(s): Acceptance to END.LTS program.

EDT 684. Advanced Literacy Research. 2 Hours

This course is an introduction to literacy research as an integral part of professional development. It builds on candidate understanding of a variety of research paradigms in reading and writing research, supports engagement in inquiry that significantly advances candidates' current understanding of the teaching of reading and writing, and provides opportunities for candidates to collaborate with other literacy professionals in order to advance understanding of evidence-based practice. Prerequisite(s): Acceptance to END.LTS program.

EDT 685. LTS Internship. 4 Hours

The internship is the culminating activity supporting and integrating the accomplishment of the Literacy Specialist Endorsement Standards I - VI. This school-based practicum over an academic year includes providing group and individual professional development to colleagues for continuous improvement of literacy curriculum, instruction, and assessment. Diagnostic reading and writing clinical experiences focus on databased decision making to inform coaching. Prerequisite(s): Acceptance to END. LTS program.

School of Engineering

Eddy M. Rojas, Dean

The School of Engineering offers programs leading to master's and doctoral degrees in various areas of engineering. These graduate programs permit both departmental and interdisciplinary study to meet the specialized and continuing educational needs of the engineer. Sufficient flexibility allows the student to specialize or pursue a broad field of study. Current graduate programs in the School of Engineering lead to the following degrees:

Master of Science

- in Aerospace Engineering
- in Bioengineering
- in Chemical Engineering
- in Civil Engineering
- in Computer Engineering
- in Electrical Engineering
- in Electro-Optics
- in Engineering
- in Engineering Management
- in Engineering Mechanics
- in Materials Engineering
- in Mechanical Engineering
- in Management Science
- in Renewable and Clean Energy

Doctor of Engineering

- Major in Aerospace Engineering
- Major in Electrical Engineering
- Major in Materials Engineering
- Major in Mechanical Engineering

Doctor of Philosophy in Electro-Optics

- Major in Electro-Optics

Doctor of Philosophy in Engineering

- Major in Aerospace Engineering
- Major in Electrical Engineering
- Major in Materials Engineering
- Major in Mechanical Engineering

Programs and the courses appropriate to each of these degrees are described in the Program of Study (p. 144).

Assistantships and Fellowships

Assistantships and fellowships are available for the encouragement of graduate work and the promotion of research. They are administered by the academic departments.

Doctoral Degree Requirements

The School of Engineering offers programs leading to the Doctor of Philosophy (Ph.D.) in engineering and in electro-optics, and Doctor of Engineering (D.E.). The programs leading to the Ph.D. in engineering

and D.E. degrees encompass major fields of study in aerospace engineering, electrical engineering, materials engineering, and mechanical engineering.

To learn more about available doctoral programs please click on the "Programs of Study" link on the navigation menu to the right.

Doctor of Philosophy (Ph.D.)

The Ph.D. is granted in recognition of superior achievement in independent research and coursework. The research must demonstrate that the student possesses the capacity for original thought, talent for research, and ability to organize and present findings.

The minimum credit hours required for the Ph.D. degree are 60 semester hours beyond the master's degree. This includes a minimum of 30 semester hours for the dissertation and a minimum of 30 semester hours of course-work. A student seeking the Ph.D. is required to complete a minimum of six semester hours in advanced mathematics.

The dissertation must either add to the fundamental knowledge of the field or provide a new and better interpretation of facts already known. It is expected to result in one or more manuscripts submitted for publication in a refereed journal.

Doctor of Engineering (D.E.)

The D.E. is granted in recognition of superior achievement in coursework and an independent project. The project will usually be broad in scope, involve more than one discipline or subdiscipline, and be closely tied to an industrial application.

A minimum of 60 semester hours beyond the master's degree is required for the D.E. degree. This includes a minimum of 21 semester hours for the dissertation and a minimum of 39 semester hours of coursework. A student seeking the D.E. is required to complete a minimum of 21 semester hours in the major area (covering the domains of at least two subdisciplines), a minimum of six semester hours in advanced mathematics, and nine semester hours in a synergistic area of engineering or science.

The dissertation must address an integrated industrial project. It is expected to result in a manuscript submitted for publication in an applied engineering journal and/or to documentation leading to a patent.

Temporary Advisor

Immediately upon admission into the doctoral program, a student will be assigned a temporary advisor. This temporary advisor will assist the student in the initial selection of courses for the first semester of enrollment.

Doctoral Advisory Committee

Before the student completes the second enrolled semester or 12 credit hours, the student, in consultation with the department chair or program director, selects a major professor to serve as the chair of the doctoral advisory committee. The chair of the doctoral advisory committee will be a member of the graduate faculty. An advisory committee consisting of the chair and at least two other graduate faculty members from the programs of the School of Engineering will then be recommended for approval to the department chair or program director and to the associate dean of engineering. Appointment of one additional member of the committee from outside the student's program (i.e., other university faculty, adjunct professors, prominent researchers in industry or government) is required. One additional graduate faculty member may be appointed by the associate dean of engineering. The composition of the committee will generally reflect the student's area of study and research interest. The duties of the doctoral advisory committee include advising the student, assisting the student in preparing the program

of study, administering and reporting the candidacy examination, assisting in planning and conducting research, approving the dissertation, and conducting and reporting the results of the dissertation defense. A dissertation advisor other than the chair of the doctoral advisory committee may be appointed by the doctoral advisory committee.

Plan of Study

The plan of study shall include all the specific courses beyond the master's degree that the student is required to complete. The plan shall indicate the time and manner in which these requirements will be met. The preliminary Plan of Study is to be completed and approved by the doctoral advisor, the department chair or program director, and the associate dean of engineering, before the beginning of the third semester of the student's enrollment. The final Plan of Study should be completed once the committee is formed and prior to the presentation of the dissertation proposal.

Candidacy Examination

The candidacy examination for the doctoral degree is generally taken when most of the coursework, as outlined on the approved plan of study, has been completed. Its purpose is to determine the student's eligibility to become a candidate for the doctoral degree. It will include two parts: (1) a written and an oral examination covering the domain of coursework; and (2) an oral examination on the dissertation proposal. Part 2 must be completed within six months of the completion of Part 1. At the discretion of the doctoral advisory committee, the Part 2 examination can be taken simultaneously with the oral portion of the Part 1 examination.

The proposal outlining in detail the proposed area of dissertation research should clearly show the review of the literature in the area, the need for and the uniqueness of the research, the general approach, expected results, the laboratories and/or other facilities needed, and a schedule of work. No more than 12 semester hours of dissertation can be taken prior to successful presentation of the dissertation proposal. The student must make a copy of this proposal available to each doctoral advisory committee member at least one week prior to the Part 2 examination.

The student must pass all parts of the examination to be admitted to candidacy. The student is considered to have passed only when the decision of the doctoral advisory committee is unanimous. All members must sign the examination report form with an indication of their decision noted prior to it being submitted to the associate dean of engineering. If any part of the examination is unsatisfactory, the student will be notified in writing of the conditions for another examination. No student will be permitted to take any part of the examination more than twice. A second examination may not be given earlier than four months after the submission of the examination report.

A student must pass the candidacy examination at least six months prior to the dissertation defense.

Dissertation

A single author dissertation is required of each doctoral candidate who has passed the candidacy examination. The dissertation topic will be selected by the student in consultation with the advisor and the doctoral advisory committee. The dissertation topic must be approved by the doctoral advisory committee.

The student must obtain approval from the doctoral advisory committee to undertake all or part of the dissertation in absentia. A letter requesting such permission, signed by the chair of the doctoral advisory committee, must be submitted to the associate dean of engineering. This letter should outline in detail the relationship between the advisor and the candidate and the name and background of the person who will directly

advise the candidate during the accomplishment of this independent research. This person will be added to the advisory committee.

The University of Dayton's guide to creating and submitting a thesis or dissertation can be found at <http://libguides.udayton.edu/etd>.

Dissertation Defense

No earlier than six months after the successful candidacy examination, the candidate shall defend the doctoral dissertation in a public forum to demonstrate to the committee that all the preparation for which the doctoral degree is awarded has been met. The defense is open to all members of the University of Dayton faculty, student body and interested outside parties. The members of the doctoral advisory committee, with the advisor acting as chair, will conduct this dissertation defense.

Before the announcement of this defense, the doctoral advisory committee must agree that the dissertation is ready for public defense. At least two weeks prior to the date of the defense, the candidate must provide the committee with copies of the nearly final dissertation and also submit "Request to Schedule Dissertation Defense" form to their advisor. For the defense to be satisfactory, the advisory committee members must agree that the dissertation defense has been successfully completed. If the candidate's defense is deemed unsatisfactory by only one member, the case will be referred to the associate dean of the engineering for appropriate action.

In addition to defending the dissertation, the candidate must verify that a paper based on the dissertation has been submitted to a refereed journal for publication.

Additional Requirements

The student must satisfactorily complete the courses listed in the doctoral plan of study with a 3.0/4.0 or better cumulative GPA. One grade of "F" or more than six semester hours of "C" grade may be grounds for dismissal from the program by the Dean, pending recommendation of the doctoral advisory committee. Grades received from a dissertation are Pass/Fail, and do not count toward the GPA.

Two thirds of the semester hours required beyond the master's degree should be earned at the University of Dayton. Generally, this is 40 semester hours beyond the master's degree.

Candidates must complete a minimum of 30 semester hours of dissertation. Candidates are required to register for two semester hours of dissertation during the semester in which the dissertation is defended. Students are expected to complete the dissertation requirements for the doctoral degree within nine years from matriculation.

Any other specific requirements and sequences leading to these degrees are described in the following sections or in departmental and program documents.

Master's Degree Requirements

To learn more about available master's programs please click on the Programs of Study here (p. 144).

Unclassified Status

Students anticipating acceptance into a degree-granting program may register for only six semester hours of graduate coursework without approval of the associate dean of engineering. There is no guarantee that any hours taken before acceptance will count toward a degree. An application for graduate study should be submitted as soon as possible to ensure that courses taken are compatible with degree requirements.

Performance in graduate courses taken before acceptance to a graduate program does not change admission requirements.

Conditional Admission

Students may be admitted to a program based on successfully completing the conditions specified in their acceptance letter. The acceptance letter will normally detail required prerequisite courses and grades required to be fully admitted to the program. If the conditions are not met, the student will not be allowed to continue in the program.

Advising

Each student accepted into a master's program is assigned an academic advisor. A change of academic advisor is permissible upon request of the student. The academic advisor shall be a member of the program faculty and be approved by the department chair or program director, and the associate dean of engineering. The academic advisor will assist the student in preparing a plan of study.

Plan of Study

A student must complete a minimum of 30 semester hours of graduate work. The specific courses should be itemized and approved on a Plan of Study form to be submitted to the Office of the Dean of Engineering, prior to registration for the tenth graduate semester hour (excluding transfer credits), or before registration for the third semester. It is the student's responsibility to obtain approval from the academic advisor for any changes made to the plan of study and to submit to the academic advisor all deletions and additions in writing before the fourth week of the student's final semester. The plan of study and any amendments must be approved by the student's academic advisor, the department chair or program director, and the associate dean of engineering.

Transfer of Credit

Up to six semester hours, or the equivalent, of graduate studies outside the University of Dayton may be accepted toward the master's degree. The transfer credit must be of B or higher grade level, cannot have been used to satisfy the requirements of an undergraduate degree, and must be verified by an official transcript from the granting institution. It is the responsibility of the student to have the transcript(s) sent to the Office for Graduate Admission and Processing.

Thesis

Each student whose plan of study requires a thesis must prepare it in accordance with the format outlined in the University of Dayton's guide to creating and submitting a thesis or dissertation. This guide can be found at <http://libguides.udayton.edu/etd>. The thesis must be based on the student's own work. Joint authorship is not permitted. The thesis advisor is responsible for supervising and approving the work, and assisting in forming the thesis committee and scheduling a defense. The thesis advisor may or may not be the academic advisor. The thesis defense may be either oral or written or both. The thesis must be presented to and approved by a committee of at least three members, at least two of whom are on the graduate faculty. The committee must receive the thesis at least one week prior to an oral defense. No student shall be allowed to defend the thesis more than twice.

A pass/fail grade will be assigned to the quality of the work. A final approved copy of the thesis is due in the Office of the Dean of Engineering no later than one week before graduation.

Academic Standards

Master's degree students are required to maintain a minimum cumulative grade point average of a B (3.0) in coursework, with no more than six semester hours of C or one F grade. Grades received from a thesis are Pass/Fail, and do not count toward the minimum grade point average of

3.0. Students who fail to meet these standards are placed on academic probation or dismissed from the program.

Time Limit

All requirements for a master's degree must be satisfied within seven calendar years from the time of matriculation.

Programs of Study

The School of Engineering offers programs leading to master's and doctoral degrees in various areas of engineering.

To learn more about the available programs in the School of Engineering, explore the departments:

- Aerospace Engineering (p. 144)
- Bioengineering (p. 148)
- Chemical Engineering (p. 149)
- Civil and Environmental Engineering (p. 151)
- Computer Engineering (p. 154)
- Electrical Engineering (p. 159)
- Electro-Optics (p. 162)
- Engineering (p. 164)
- Engineering Management (p. 164)
- Engineering Mechanics (p. 167)
- Management Science (p. 169)
- Materials Engineering (p. 171)
- Mechanical Engineering (p. 174)
- Renewable and Clean Energy (p. 180)

Aerospace Engineering

- Doctor of Engineering, Aerospace Engineering
- Doctor of Philosophy in Engineering, Aerospace Engineering
- Master of Science in Aerospace Engineering

Kelly Kissock, Department Chairperson

Doctor of Engineering, Aerospace Engineering (AEE)

See the Doctoral Degree Requirements section on the School of Engineering page and consult with the department chair.

Doctor of Philosophy in Engineering, Aerospace Engineering (AEE)

See the Doctoral Degree Requirements section on the School of Engineering page and consult with the department chair.

Master of Science in Aerospace Engineering (AEE)

The program of study leading to the Master of Science in Aerospace Engineering degree, developed by the student in conjunction with his/her advisor, must include a minimum of 30 semester hours. The program of study must include 18 or more semester hours of AEE/MEE/RCL credits and a minimum of 3 semester hours of mathematics. Students may pursue a thesis or non-thesis option. A thesis option requires 6 semester hours of AEE 599 Aerospace Engineering Thesis credits, which includes both an oral defense and a written thesis.

See also Master's Degree Requirements on the School of Engineering page and consult with the advisor.

Courses

AEE 500. Introduction to Numerical Methods. 3 Hours

Numerical analysis topics include the solution of systems of linear and nonlinear algebraic equations; matrix eigenvalue problems; ordinary differential equations; optimization techniques; numerical integration and interpolation. Engineering applications presented. Computer programming required.

AEE 501. Fundamental Aerodynamics. 3 Hours

Fundamentals of aerodynamics including compressibility phenomena for subsonic, transonic, and supersonic flow. Emphasis on steady and inviscid force and moment determination for airfoils and finite wings. Prerequisite(s): Fluid mechanics or an equivalent course.

AEE 502. Advanced Aerodynamics. 3 Hours

Advanced analytical development of viscous and compressible aerodynamics as applied to lifting surfaces and slender bodies. Approximations to lifting surface theory and numerical solutions. Introduction to unsteady aerodynamics. Prerequisite(s): AEE 501.

AEE 503. Introduction to Continuum Mechanics. 3 Hours

Tensors, calculus of variations, Lagrangian and Eulerian descriptions of motion. General equations of continuum mechanics, constitutive equations of mechanics, thermodynamics of continua. Specialization to cases of solid and fluid mechanics. Prerequisite(s): EGM 303.

AEE 504. Fundamentals of Fluid Mechanics. 3 Hours

An advanced course in fluid mechanics with emphasis on the derivation of conservation equations and the application of constitutive theory. Navier-Stokes equations. Ideal fluid approximation. Exact and approximate solutions to classical viscous and inviscid problems. Compressible and incompressible flows. Corequisite(s): MEE 503 or AEE 503.

AEE 505. Advanced Aerospace Systems Design & Integration. 3 Hours

Considers iterative aircraft design process through to preliminary design. A project based course, specific topics will vary but will apply to cutting edge aerospace systems integration and design problems. Students will take a set of requirements from conceptual design through to preliminary design, analysis, component testing, and integration on a systems level. Prerequisite(s): (MEE 425 or equivalent) or permission of instructor.

AEE 506. Mechanical Behavior of Materials. 3 Hours

Fundamental relationships between the structure and mechanical behavior of materials. Includes fundamentals of stress and strain, the physical basis for elastic deformation, elementary dislocation theory and plastic deformation, strengthening mechanisms, yield criteria and their application to biaxial and multi-axial behavior and failure, fracture and toughening mechanisms, creep and creep rupture, behavior and failure of cellular solids, and fatigue. Prerequisite(s): (MAT 501, MAT 502) or consent of instructor.

AEE 507. Orbital Dynamics. 3 Hours

Solution of the two-body problem; coordinate systems; time measurement; orbital elements. Basic orbital maneuvers; transfers; rendezvous; ground-tracks. Methods of orbit determination. Restricted three-body problem and introduction to artificial satellite theory. Prerequisite(s): MTH 219, EGM 202, or equivalent.

AEE 508. Aircraft Performance & Control. 3 Hours

Elementary development of aircraft equations of motion; performance in level flight; climbing and descending performance; turning performance; takeoff and landing performance; static stability and control in all three axes. Prerequisite(s): AEE 501.

AEE 510. Introduction to the Finite Element Method. 3 Hours

Introductory development of the Finite Element Method (FEM), and solution of one- and two-dimensional field problems from fluid, solid, and thermal mechanics. Principles of virtual work and Hamilton; approximate methods; description of stiffness, nodal force, and mass matrices; matrix assembly procedures. Course emphasis on a broad understanding of FEM theory and applications. Not open to Aircraft Structures majors. Prerequisite(s): EGM 303.

AEE 511. Principles of Corrosion. 3 Hours

Theoretical and practical application of electrochemical principles to the field of corrosion covering thermodynamics, kinetics, forms of corrosion and methods for characterizing and controlling corrosion in areas of biomedical engineering, aerospace, automotive, and marine environments. Prerequisite(s): MAT 501.

AEE 513. Propulsion. 3 Hours

Principles of propulsive devices, aerothermodynamics diffuser and nozzle flow, energy transfer in turbo-machinery, turbojet, turbo-fan, prop-fan engines, turbo-prop and turboshaft engines. RAM and SCRAM jet analysis and a brief introduction to related materials and air frame-propulsion interaction. Prerequisite(s): MEE 418.

AEE 514. Physical Gas Dynamics with Aerospace Applications. 3 Hours

Physical Gas Dynamics: The basic elements of kinetic theory, chemical thermodynamics, and statistical mechanics. Emphasis is placed on the application of these molecular theories for analyzing thermodynamic and transport phenomena, as they pertain to the modeling of 'real gas effects' in high temperature flows. The course assumes material media in local equilibrium in the gaseous state but some non-equilibrium behavior will also be considered. The equilibrium topics include kinetic theory and concepts related to microscopic, molecular collisions, macroscopic chemical thermodynamics, the law of mass action, internal molecular structure and quantum energy states, general statistical mechanics applied to the prediction of thermodynamic properties of monatomic and diatomic gases, chemically reacting mixtures, and the dissociation and ionization of gases. Prerequisite(s): Background in fluid mechanics, thermodynamics, and compressible flow or permission of instructor.

AEE 515. Conduction Heat Transfer. 3 Hours

Steady state and transient state conduction. Evaluation of temperature fields by formal mathematics, numerical analysis. Emphasis on approximate solution techniques.

AEE 516. Convection Heat & Mass Transfer. 3 Hours

Development of governing differential equations for convection. Methods of solution including similarity methods, integral methods, superposition of solutions, eigenvalue problems. Turbulent flow convection; integral methods, eddy diffusivities for heat and momentum. Extensions to mass transfer. Prerequisite(s): MEE 410.

AEE 517. Radiation Heat Transfer. 3 Hours

Fundamental relationships of radiation heat transfer. Radiation characteristics of surfaces. Geometric considerations in radiation exchange between surfaces. Emissivity and absorptivity of gases. Introduction to radiative exchange in gases.

AEE 519. Analytical Dynamics. 3 Hours

Dynamical analysis of a system of particles and rigid bodies. Lagrangian and Hamiltonian formulation of equations of motion; classical integrals of motion. Stability analysis of linear and nonlinear systems. Prerequisite(s): EGM 202, MTH 219, or equivalent.

AEE 520. Theoretical Kinematics. 3 Hours

Introduction to the mathematical theory underlying the analysis of general spatial motion. Analysis of mechanical systems including robots, mechanisms, walking machines and mechanical hands using linear algebra, quaternion and screw formulations. Fundamental concepts include forward and inverse kinematics, workspace, Jacobians, and singularities.

AEE 521. Flight Vehicle Dynamics. 3 Hours

Dynamics of flight vehicles that emphasize the fundamental theory of flight and its application to aerospace systems. Static and dynamic stability including the characteristic longitudinal and lateral perturbation motions about the equilibrium state. Prerequisite(s): AEE 501.

AEE 522. Geometric Methods in Kinematics. 3 Hours

Trajectories and velocities of moving bodies are designed and analyzed via the principles of classical differential and algebraic geometry. Fundamentals include centrodes, instantaneous invariants, resultants and center point design curves. Curves, surfaces, metrics, manifolds and geodesics in spaces of more than three dimensions are analyzed to study multi-parameter systems.

AEE 523. Engineering Design Optimization. 3 Hours

An introduction to the theory and algorithms of nonlinear optimization with an emphasis on applied engineering problems. Fundamentals include Newton's method, line searches, trust regions, convergence rates, and linear programming. Advanced topics include penalty, barrier and interior-point methods.

AEE 524. Electrochemical Power. 3 Hours

The course will cover fundamental as well as engineering aspects of fuel cell technology. Specifically, the course will cover basic principles of electrochemistry, electrical conductivity (electronic and ionic) of solids, and development/design of major fuel cells (alkaline, polymer electrolyte, phosphoric acid, molten carbonate, and solid oxide). A major part of the course will focus on solid oxide fuel cells (SOFC), as it is emerging to be dominant among various fuel cell technologies. The SOFC can readily and safely use many common hydrocarbon fuels such as natural gas, diesel, gasoline, alcohol, and coal gas. Prerequisite(s): MEE 301, MEE 312 or permission of instructor.

AEE 526. Aerospace Fuels Science. 3 Hours

Basic elements of hydrocarbon fuel production including petroleum based fuels and alternative fuels. Fuel properties, specifications, handling, and logistics. Introduction to chemical kinetics and the chemistry associated with liquid phase thermal-oxidative degradation of fuels. Introduction to the computational modeling of fuel thermal stability and fuel systems. Prerequisite(s): Permission of instructor.

AEE 527. Automatic Control Theory. 3 Hours

Stability and performance of automatic control systems. Classical methods of analysis including transfer functions, time-domain solutions, root locus and frequency response methods. Modern control theory techniques including state variable analysis, transformation to companion forms, controllability, pole placement, observability and observer systems. Prerequisite(s): ELE 432, MEE 435, or equivalent.

AEE 535. Mechanical Vibrations. 3 Hours

Review of undamped, damped, natural and forced vibrations of one and two degrees of freedom systems. Lagrange's equation, eigenvalue/eigenvector problems, modal analysis for discrete and continuous systems. Computer application for multi-degree of freedom, nonlinear problems. Prerequisite(s): MEE 319; computer programming.

AEE 536. Random Vibrations. 3 Hours

Introduction to probability distribution; characterization of random vibrations; harmonic analysis; auto- and cross-correlation and spectral density; coherence; response to single and multiple loadings; Fast Fourier Transform (FFT); applications in vibrations, vehicle dynamics, fatigue, etc. Prerequisite(s): MEE 319; computer programming.

AEE 538. Introduction to Aeroelasticity. 3 Hours

The study of the effect of aerodynamic forces on a flexible aircraft. Flexibility coefficients and natural modes of vibration. Quasi-steady aerodynamics. Static aeroelastic problems; wing divergence and dynamic aeroelasticity; wing flutter. An introduction to structural stability augmentation with controls. Prerequisite(s): AEE 501.

AEE 540. Flight Dynamics. 3 Hours

Laplace Transforms are used to investigate one DOF harmonic oscillations. One to six DOF differential equations of motion, including inertia, geometric, thrust, and aerodynamic terms are developed in the time domain. Euler angle rotations determine the orientation of the body. Small Disturbance Theory is used to linearize the equations, and the complex eigenproblem is solved to determine stability and mode shapes of aircraft motion. Pitch plane and lateral dynamics are analysed in both the time and frequency domains. Prerequisite(s): MTH 219, EGM 202.

AEE 541. Experimental Mechanics of Composite Materials. 3 Hours

Introduction to the mechanical response of fiber-reinforced composite materials with emphasis on the development of experimental methodology. Analytical topics include stress-strain behavior of an isotropic materials, laminate mechanics, and strength analysis. Theoretical models are applied to the analysis of experimental techniques used to characterize composite materials. Lectures are supplemented by laboratory sessions in which characterization tests are performed on contemporary composites. Prerequisite(s): EGM 303 or EGM 330.

AEE 543. Analytical Mechanics of Composite Materials. 3 Hours

Analytical models are developed to predict the mechanical and thermal behavior of fiber-reinforced composite materials as a function of constituent material properties. Both continuous and discontinuous fiber-reinforced systems are considered. Specific topics include basic mechanics of an isotropic materials, micromechanics, lamination theory, free-edge effects, and failure criteria. Prerequisite(s): EGM 303 or EGM 330.

AEE 544. Mechanics of Composite Structures. 3 Hours

Comprehensive treatment of laminated beams, plates, and sandwich structures. Effect of heterogeneity and anisotropy on bending under lateral loads, buckling, and free vibration are emphasized. Shear deformation and other higher order theories and their range of parametric application are also considered. Prerequisite(s): MAT 543 or permission of instructor.

AEE 545. Computational Methods for Design. 3 Hours

Modeling of mechanical systems and structures, analysis by analytical and numerical methods, development of mechanical design criteria and principles of optimum design. Selected topics in mechanical design and analysis, use of the digital computer as an aid in the design of mechanical elements. Prerequisite(s): Computer programming.

AEE 546. Finite Element Analysis I. 3 Hours

Fundamental development of the Finite Element Methods (FEM) and solution to field and comprehensive structural problems. Variational principles and weak-forms; finite element discretization; shape functions; finite elements for field problems; bar, beam, plate, and shell elements; isoparametric finite elements, stiffness, nodal force, and mass matrices; matrix assembly procedures; computer coding techniques; modeling decisions; program output interpretation. Course emphasis on a thorough understanding of FEM theory and modeling techniques. Prerequisite(s): AEE 503 or MEE 533.

AEE 547. Finite Element Analysis II. 3 Hours

Advanced topics: heat transfer; transient dynamics; nonlinear analysis; substructuring and static condensation; effects of inexact numerical integration and element incompatibility; patch test; frontal solution techniques; selected topics from the recent literature. Prerequisite(s): AEE 546.

AEE 551. Noise & Vibration Control. 3 Hours

Concepts of noise and vibration control applied to mechanical systems. Methodologies covered will include passive treatments using resistive elements (sound absorbers, vibration damping) and reactive elements (tailoring of material stiffness and mass); active control of sound and vibration; and numerical analysis. Prerequisite(s): MEE 319 or MEE 439.

AEE 552. Boundary Layers Theory. 3 Hours

Development of the Prandtl boundary layer approximation in two and three dimensions for both compressible and incompressible flows. Exact and approximate solutions for laminar flows. Unsteady boundary layers. Linear stability theory and transition to turbulence. Empirical and semi-empirical methods for turbulent boundary layers. Higher order boundary layer theory. Prerequisite(s): AEE 504 or equivalent.

AEE 553. Compressible Flow. 3 Hours

Fundamental equations of compressible flow. Introduction to flow in two and three dimensions. Two-dimensional supersonic flow, small perturbation theory, method of characteristics, oblique shock theory. Introduction to unsteady one-dimensional motion and shock tube theory. Method of surface singularities. Prerequisite(s): AEE 504 or equivalent.

AEE 555. Turbulence. 3 Hours

Origin, evolution, and dynamics of fully turbulent flows. Description of statistical theory, spectral dynamics, and the energy cascade. Characteristics of wall-bounded and free turbulent shear flows. Reynolds stress models. Prerequisite(s): AEE 504 or equivalent.

AEE 556. Hypersonic Aerodynamics. 3 Hours

Hypersonic prediction techniques, similarity rules, Newtonian impact theory, high-temperature equilibrium properties of gases; wake characteristics; heat transfer, chemical kinetics and reacting gas flows, simulation and testing techniques. Prerequisite(s): AEE 504 or permission of instructor.

AEE 558. Computational Fluid Dynamics. 3 Hours

Numerical solution to Navier-Stokes equations and approximations such as the boundary layer equations for air-flow about a slender body. Numerical techniques for the solution of the transonic small disturbance equations. Numerical determination of fluid instabilities. Prerequisite(s): AEE 504 or permission of instructor.

AEE 560. Propulsion Systems. 3 Hours

Introduction and history, types of propulsion systems, thermodynamics review and simple cycle analysis, thermodynamics of high speed gas flow, aircraft gas turbine engine, parametric cycle analysis of various types of gas turbine engines, component and engine performance analysis (inter-turbine burners), advanced cycles with regeneration, reheating, and inter-cooling, variable and inverse cycle engines, hybrid propulsion systems (turbo-ramjets, rocket-ram-scamjets, etc.), advanced propulsion systems, pulse detonation engine theory and concepts, thermal management of high-speed flight, energy management and vehicle synthesis. Prerequisite(s): (MEE 413 or MEE 513) or permission of instructor.

AEE 565. Fundamentals of Fuels & Combustion. 3 Hours

Heat of combustion and flame temperature calculations; rate of chemical reaction and Arrhenius relationship; theory of thermal explosions and concept of ignition delay and critical mass; phenomena associated with hydrocarbon-air combustion; specific applications of combustion.

AEE 566. Combustion Theory. 3 Hours

Theory of detonation (Rankine-Hugoniot relationships) and flame propagation rates in pre-mixed gas systems; turbulent flames and the well-stirred reactor; theory of diffusion flames; fuel droplet combustion; steady burning of solid materials; ignition and flame spreading across solid materials.

AEE 567. Smart Structures & Materials Overview. 3 Hours

Components of materials, sensing, actuation, and modeling. Electro-mechanical and thermo-mechanical modeling of SMA and piezo-ceramic materials. Elements of control, sensing, and vibration theory. Examples of using piezo-ceramic and shape memory alloy (SMA) based structures for actuation, vibration, position, and shape control with applications in automotive, aircraft, and satellites. Prerequisite(s): MEE 312 or permission of instructor; background in materials, electronics, vibrations, and controls or permission of instructor.

AEE 570. Fracture Mechanics. 3 Hours

Application of the principles of fracture mechanics to problems associated with fatigue and fracture in engineering structures. The course will cover the development of models that apply to a range of materials, geometries and loading conditions. Prerequisite(s): AEE 506 or permission of instructor.

AEE 590. Problems in Aerospace Engineering. 1-3 Hours

Special topics in Aerospace.

AEE 595. Aerospace Engineering Project. 1-6 Hours

Student participation in an aerospace research, design, or development project under the direction of a project advisor. The student must show satisfactory progress as determined by the project advisor and must present a written report at the conclusion of the project.

AEE 599. Aerospace Engineering Thesis. 3-6 Hours

Thesis in Aerospace Engineering.

AEE 690. Selected Readings in Aerospace Engineering. 1-3 Hours

Directed readings in aerospace engineering to be arranged and approved by the student's advisory committee and the program director. May be repeated.

AEE 698. DE Dissertation. 1-15 Hours

An original investigation as applied to aerospace engineering practice. Results must be of sufficient importance to merit publication.

AEE 699. PHD Dissertation. 1-15 Hours

Research in aerospace engineering. Results must be of sufficient importance to merit publication.

Bioengineering

- Master of Science in Bioengineering

Charles E. Browning, Department Chairperson

Robert J. Wilkens, Bioengineering Program Director

Master of Science in Bioengineering (BIE)

The program of study leading to the Master of Science in Bioengineering must include a minimum of 30 semester hours consisting of the following:

Bioengineering Core:

BIE 501	Introduction to Bioengineering ¹	3
BIE 503	Principles of Biology for Bioengineers	3
BIE 505	Principles of Engineering for Bioengineers ²	3
BIE 507	Bioengineering Experimentation Techniques	3
MTH 527	Biostatistics	3

Select one emphasis from: 6

Biomaterials/Biomechanics:

MAT 595	Special Problems in Materials Engineering	
BIE 521	Biomechanical Engineering	
BIE 511	Biomaterials	

Bioprocess:

BIE 533	Biofuel	
CME 560	Biological Processing of Wastewater	

Biosystems:

BIE 551	Transport Phenomena in Biological Systems	
BIE 561	Biomedical Engineering I	

Electives (as approved by advisor and program director) 6

Choose thesis or non-thesis: 6

Thesis: approved thesis project, a final examination is required at completion of thesis

Non-thesis:

Electives (3 hours)	
Capstone project (3 hours)	

Total Hours 33

¹ Or Biology undergraduate.

² Or Engineering undergraduate.

See also Master's Degree Requirements under School of Engineering in the catalog and consult with the advisor. The program has faculty with joint appointments in various programs within the School of Engineering and the College of Arts and Sciences.

Courses

BIE 501. Introduction to Bioengineering. 3 Hours

This class provides an introduction to bioengineering - a branch of engineering focusing on biological systems, biomaterials, engineering applications in living systems, and many other areas. By the end of this course, students will be able to understand bioengineering applications and processes, and properly apply engineering fundamentals, including transport phenomena and reaction kinetics, to these systems. Prerequisites(s): BIO 501, CME 324 or MEE 308 or permission of instructor.

BIE 503. Principles of Biology for Bioengineers. 3 Hours

This course is designed for students with undergraduate majors in engineering or non-biological sciences. The focus of the course is to provide a common broad base of basic knowledge and terminology in the biological sciences required for coursework in the bioengineering emphasis tracts. Prerequisite(s): (BIO 151, BIO 152) or permission of instructor.

BIE 505. Principles of Engineering for Bioengineers. 3 Hours

This course is designed for students with an undergraduate degree in science. The focus of the course is to provide a common broad base of basic knowledge and terminology in engineering required for coursework in the bioengineering emphasis tracts. It will cover basic mass and energy conservation and provide an introduction to thermodynamics, fluid mechanics, and heat and mass transfer. Prerequisite(s): MTH 219 or permission of instructor.

BIE 507. Bioengineering Experimentation Techniques. 3 Hours

Lecture/laboratory based course in basic biology laboratory techniques, generating testable hypotheses, formulating experimental design, report writing, and scientific presentation. Students will be introduced to basic techniques in DNA cloning, protein purification, RNA isolation, and bioengineering applications. Corequisite(s): (BIE 503 or equivalent) or permission of instructor.

BIE 511. Biomaterials. 3 Hours

The course introduces students with engineering materials used in dentistry, manufacture of surgical devices, prosthetics, and repair of tissues. Topics include bonding and atomic arrangement in materials, material selection, testing, and characterization, biocompatibility, tissue response to materials, and failure analysis. A spectrum of materials including metals, polymers, ceramics, and composites used in biomedical applications will be considered.

BIE 521. Biomechanical Engineering. 3 Hours

Application of engineering principles to clinical, occupational, and sports biomechanics topics. The course focuses on biomechanical analysis, particularly kinematics and kinetics of human movement, with emphasis on both research and product design. Prerequisite(s): (EGM 202; EGR 201) or permission of instructor.

BIE 529. Computational Chemistry. 3 Hours

Introduction to computational chemistry including a discussion of ab initio, semiempirical, and DFT methods and an overview of molecular mechanics and molecular simulation methods. Lectures are supplemented by simulation exercises using commercial programs such as Gaussian and Molecul Studio. Prerequisite(s): CHM 124 or consent of instructor.

BIE 533. Biofuel. 3 Hours

The course will provide an overview of the range of fuels derived from biological materials and processes, with a focus on anaerobic digestion, bioethanol and biodiesel and production of synthetic fuel from biological materials. The course will include an overview of the biochemistry of energy production in biological systems, discussions of the economics and environmental sustainability of biofuels, and a review of reactor and separation systems concepts relevant to biofuel production. Prerequisite(s) EGR 202, CHM 123 or consent of instructor.

BIE 551. Transport Phenomena in Biological Systems. 3 Hours

An integrated interdisciplinary systems-based examination of biological transport phenomena (momentum, heat and mass) and hemodynamics through mathematical modeling and biological processes as applied to physiological systems, with a focus on the cardiovascular, respiratory, and renal systems. Prerequisite(s): (BIE 503 or BIE 505; BIO 151, BIO 152; MTH 218) or permission of instructor.

BIE 560. Biological Processing of Wastewater. 3 Hours

Measuring the characteristics of wastewater produced from domestic and industrial sources. Principles of designing and operating microbiological processes for the treatment of wastewater. Mechanism and kinetics of biological reactions emphasized. Prerequisite(s): CHM 124.

BIE 561. Biomedical Engineering I. 3 Hours

Introduction to the fundamental concepts in biomedical engineering with specific focus on chemical engineering applications. Biomedical topics include overviews of areas such as biomaterials, tissue engineering, biosensors and biomedical engineering technology. Prerequisite(s): BIO 151 and CME 324 or BIE 501 or permission of instructor.

BIE 590. Selected Readings in Bioengineering. 1-3 Hours

Directed readings in selected areas of bioengineering to be arranged and approved by the advisor and the program director.

BIE 595. Special Problems in Bioengineering. 1-6 Hours

Special assignments in bioengineering to be arranged and approved by the advisor and the program director.

BIE 597. Research Methods. 3 Hours

This course will provide students the ability to apply research methods and problem solving skills to identify and define a research problem, develop hypotheses and research plans to test those hypotheses. Students will write and present an original research proposal.

BIE 598. Capstone Project. 1-3 Hours

This is a capstone project to be used by non-thesis students. Students must submit a proposal and a final report.

BIE 599. Thesis. 3-6 Hours

This is a two course sequence to cover the research and thesis preparation of the graduate student.

Chemical Engineering

- Master of Science in Chemical Engineering

Charles E. Browning, Department Chairperson

Kevin J. Myers, Chemical Engineering Program Coordinator

Master of Science in Chemical Engineering (CME)

The program of study leading to the Master of Science in chemical engineering must include a minimum of 30 semester hours consisting of the following:

Fifteen semester hours of chemical engineering graduate courses, including:

CME 507	Advanced Thermodynamics
CME 521	Advanced Transport Phenomena
or CME 522	Advanced Topics in Transport Phenomena
CME 542	Chemical Engineering Kinetics
or CME 543	Chemical Reactor Analysis & Design
CME 581	Advanced Chemical Engineering Calculations I
or CME 582	Advanced Chemical Engineering Calculations II

Nine semester hours of electives as approved by the advisor and the department chair.

Thesis project *

Total Hours

- * A final examination is required at the completion of the thesis. Upon the request of the student and with the approval of the faculty advisor and chair of the department, six hours of additional coursework plus three hours of special problem work may be substituted for the thesis.

With the approval of the faculty advisor and the department chair, a student may include up to 3 semester hours of 400 level courses in their program of study. The work done shall be of the grade of B or higher for that credit to be accepted toward a graduate degree.

See also Master's Degree Requirements in School of Engineering section in the bulletin and consult with the advisor.

The program of study allows concentrations in the following areas:

- Fuels and Combustion
- Environmental Engineering
- Materials Engineering
- Process Modeling and Control
- Bio-Engineering

Courses

CME 507. Advanced Thermodynamics. 3 Hours

Entropy balance. Thermodynamics of energy conversion. Mixtures. Equilibria. Current applications.

CME 508. Advanced Topics in Chemical Engineering. 3 Hours

Advanced Topics in Chemical Engineering.

CME 509. Introduction to Polymer Science - Thermoplastics. 3 Hours

Broad technical overview of the nature of synthetic macromolecules, including the formation of polymers and their structure, structure-property relationships, polymer characterization and processing, and applications of polymers. Fundamental topics such as viscoelasticity, the glassy state, time-temperature superposition, polymer transitions, and free volume will also be reviewed. The course focuses on thermoplastic polymers. Prerequisite(s): College chemistry; college physics, differential equations.

CME 510. High Performance Thermoset Polymers. 3 Hours

Survey of high performance thermoset resins, focusing on chemistry, processing and properties of six general resin families; vinyl ester, epoxy phenolic, cyanate ester, bismaleimide and polyimides. The course will include fundamental discussions of polymerization mechanisms, network structure development, rheology and time-temperature transformation, resin toughening, and structure processing property relationships. Characterization techniques will also be reviewed. Prerequisite(s): CME 509 or MAT 509 or general and organic chemistry or differential equations or permission of instructor.

CME 511. Principles of Corrosion. 3 Hours

Theoretical and practical application of electrochemical principles to the field of corrosion covering thermodynamics, kinetics, forms of corrosion and methods for characterizing and controlling corrosion in areas of biomedical engineering, aerospace, automotive, and marine environments. Prerequisite(s): MAT 501.

CME 512. Advanced Composites. 3 Hours

Materials and processing. Comprehensive introduction to advanced fiber reinforced polymeric matrix composites. Constituent materials and composite processing will be emphasized with special emphasis placed on structure-property relationships, the role of matrix in composite processing, mechanical behavior and laminate processing. Specific topics will include starting materials, material forms, processing, quality assurance, test methods, and mechanical behavior. Prerequisite(s): Permission of instructor.

CME 515. Statistics in Thermodynamics. 3 Hours

Statistics in Thermodynamics.

CME 521. Advanced Transport Phenomena. 3 Hours

Applications of the principles of momentum, heat and mass transfer to steady state and transient problems. Molecular concepts. Transport in turbulent flow. Boundary layer theory. Numerical applications. Prerequisite(s): CME 324, CME 381 or equivalent.

CME 522. Advanced Topics in Transport Phenomena. 3 Hours

The equations of change for multicomponent systems. Turbulent mass transport. Interphase transport in multicomponent systems. Combustion analysis. Macroscopic balances. Prerequisite(s): CME 325, CME 581, or equivalent.

CME 523. Transport Phenomena in Biological Systems. 3 Hours

An integrated interdisciplinary systems-based examination of biological transport phenomena (momentum, heat and mass) and hemodynamics through mathematical modeling and biological processes as applied to physiological systems, with a focus on the cardiovascular, respiratory, and renal systems. Prerequisite(s): (BIE 503 or BIE 505; BIO 151, BIO 152; MTH 218) or permission of instructor.

CME 524. Electrochemical Power. 3 Hours

The course will cover fundamental as well as engineering aspects of fuel cell technology. Specifically, the course will cover basic principles of electrochemistry, electrical conductivity (electronic and ionic) of solids, and development/design of major fuel cells (alkaline, polymer electrolyte, phosphoric acid, molten carbonate, and solid oxide). A major part of the course will focus on solid oxide fuel cells (SOFC), as it is emerging to be dominant among various fuel cell technologies. The SOFC can readily and safely use many common hydrocarbon fuels such as natural gas, diesel, gasoline, alcohol, and coal gas. Prerequisite(s): CME 311, CME 324, or permission of instructor.

CME 527. Methods of Polymer Analysis. 3 Hours

Modern laboratory techniques used in preparation and characterization of polymers; experimental investigations of polymer structure-property relations; measurement of molecular weight averages and distributions, thermal and mechanical properties, viscoelastic and rheological properties; transitions and crystallinity. Prerequisite(s): CME 509, CME 510 or consent of instructor.

CME 528. Chemical Behavior of Materials. 3 Hours

This course will address chemical behavior as a subject complementary to mechanical behavior of materials. A special emphasis will be given to structure-property relationships of the major classes of materials. Physical/chemical periodicity, bonding, processing chemistry, and chemical behavior in the application environment will be addressed. Each major class of materials will be discussed with specific case studies for each. Prerequisite(s): College chemistry or permission of the instructor.

CME 529. Computational Chemistry. 3 Hours

Introduction to computational chemistry including a discussion of ab initio, semiempirical, and DFT methods and an overview of molecular mechanics and molecular simulation methods. Lectures are supplemented by simulation exercises using commercial programs such as Gaussiari and Molecular Studio. Prerequisite(s): CHM124, or consent of instructor.

CME 530. Biomaterials. 3 Hours

The course introduces students with engineering materials used in dentistry, manufacture of surgical devices, prosthetics, and repair of tissues. Topics include bonding and atomic arrangement in materials, material selection, testing, and characterization, biocompatibility, tissue response to materials, and failure analysis. A spectrum of materials including metals, polymers, ceramics, and composites used in biomedical applications will be considered.

CME 532. Chemical Product Design. 3 Hours

Application of the design process to products based on chemical technology. Coverage of the entire design process from initial identification of product ideas, and culminating in the manufacture of a new product. Prerequisite(s): CME 311 and CME 324 or consent of instructor.

CME 533. Biofuel. 3 Hours

The course will provide an overview of the range of fuels derived from biological materials and processes, with a focus on anaerobic digestion, bioethanol and biodiesel, and production of synthetic fuel from biological materials. The course will include an overview of the biochemistry of energy production in biological systems, discussions of the economics and environmental sustainability of biofuels, and a review of reactor and separation systems concepts relevant to biofuel production. Prerequisite(s) EGR 202, CHM 123, or consent of instructor.

CME 541. Process Dynamics. 3 Hours

Mathematical modeling and computer simulation of process dynamics and control for chemical engineering processes.

CME 542. Chemical Engineering Kinetics. 3 Hours

Reaction kinetics. Heterogeneous catalytic reactions. Transport processes with fluid-solid heterogeneous reactions. Noncatalytic gas-solid reactions. Catalyst deactivation. Gas-liquid reactions. Prerequisite(s): CME 381, CME 306, or equivalent.

CME 543. Chemical Reactor Analysis & Design. 3 Hours

Design for optimum selectivity. Stability and transient behavior of the mixed flow reactor. Nonideal flow and balance models. Fixed and fluidized bed reactors. Multiphase flow reactors. Prerequisite(s): CME 381, CME 306, or equivalent.

CME 550. Agitation. 3 Hours

Agitator design and scaleup for blending and motion, solids suspension, gas dispersion, and viscous operations; experimental, computational, and design tools of agitation; static mixing; and mixing with chemical reaction. Prerequisite(s): CME 465 or permission of instructor.

CME 560. Biological Processing of Wastewater. 3 Hours

Measuring the characteristics of wastewater produced from domestic and industrial sources. Principles of designing and operating microbiological processes for the treatment of wastewater. Mechanisms and kinetics of biological reactions emphasized. Prerequisite(s): CHM 124.

CME 562. Physical & Chemical Wastewater Treatment Processes. 3 Hours

Designing of physical and chemical unit processes to treat wastewater originating primarily from industrial sources. Industry pretreatment technologies and the basis for their development. Prerequisite(s): CHM 123; CME 465, or permission of instructor.

CME 563. Hazardous Waste Engineering. 3 Hours

The fundamental principles of the design and operation of hazardous waste remediation processes. Characterizing contaminated sites and conducting treatability studies to select remediation strategies. Prerequisite(s): CHM 123; CME 465, or permission of instructor.

CME 564. Solid Waste Engineering. 3 Hours

Solid Waste Engineering.

CME 565. Fundamentals of Combustion. 3 Hours

Flames and combustion waves, detonation waves in gases, the chemistry of combustion, combustion of hydrocarbons, special aspects of gaseous combustion, combustion in mixed and condensed phases, explosions in closed vessels, and combustion and the environment. Prerequisite(s): CME 311, CME 306, or permission of instructor.

CME 566. Advanced Separations. 3 Hours

Azeotropic separations, complex column design, batch distillation, introduction to surface science, adsorptive separations, membrane separations, introduction to biological separations.

CME 574. Fundamentals of Air Pollution I. 3 Hours

Air pollution; combustion fundamentals; pollutant formation and control in combustion; pollutant formation and control methods in internal combustion engines; particle formation in combustion. Prerequisite(s): (CME 311 or MEE 301, MEE 302); (CME 324 or MEE 410), or permission of instructor.

CME 575. Fundamentals of Air Pollution Engineering II. 3 Hours

Review of the concepts of air pollution engineering; aerosols; removal of particles from gas streams; removal of gaseous pollutants from effluent streams; optimal air pollution control strategies. Prerequisite(s): CME 574 or permission of instructor.

CME 576. Environmental Engineering Separation Processes. 3 Hours

No description available.

CME 579. Materials for Advanced Energy Applications. 3 Hours

Various advanced energy technologies (AMTEC, Fuel Cells, Thermoelectrics, Nuclear, etc.) will be discussed with an emphasis on the role that materials have/will play in their development. Critical 'bottlenecks' in materials development delaying the introduction of new advanced energy systems will be identified. In addition, how material selections are made based on operational system environments in 'real world' scenarios will be presented. Prerequisite(s): (MAT 501, MAT 502) or permission of instructor.

CME 580. Polymer Decomposition, Degradation & Durability. 3 Hours

An in-depth study of the mechanisms leading to polymer decomposition and degradation, as well as methods for analyzing and preventing or minimizing these processes and thereby improving polymer durability. Topics include thermal/pyrolytic, thermo-oxidative, hydrolysis, photo/UV/weathering, flammability, mechanical, biodegradation, high energy radiation, and physical aging. Prerequisite(s): CME 509 / MAT 509 or CME 510 / MAT 510.

CME 581. Advanced Chemical Engineering Calculations I. 3 Hours

Applications of ordinary and partial differential equations to engineering problems. Classical methods of solution. Prerequisite(s): MTH 219 or permission of instructor.

CME 582. Advanced Chemical Engineering Calculations II. 3 Hours

Analyses and solutions of engineering problems described by differential equations. Numerical methods of solution.

CME 583. Process Modeling. 3 Hours

No description available.

CME 586. Introduction to Petroleum Engineering. 3 Hours

Introduction to the fundamental concepts in petroleum engineering. Petroleum topics include overviews of areas such as petroleum geology, petroleum fluids and thermodynamics, drilling and completion, and production and multiphase flow. In addition this course will cover refinery operations. Second term, each year. Prerequisite(s): Permission of instructor.

CME 590. Introduction to Bioengineering. 3 Hours

This class provides an introduction to bioengineering - a branch of engineering focusing on biological systems, biomaterials, engineering applications in living systems, and many other areas. By the end of this course, students will be able to understand bioengineering applications and processes, and properly apply engineering fundamentals, including transport phenomena and reaction kinetics, to these systems. Prerequisite(s): BIO 151, CME 324 or MEE 308 or permission of instructor.

CME 591. Biomedical Engineering I. 3 Hours

Introduction to the fundamental concepts in biomedical engineering with a special focus on chemical engineering applications. Biomedical topics include overviews of areas such as biomaterials, tissue engineering, biosensors and biomedical engineering technology. Second term, each year. Prerequisite(s): BIO 151 and CME 324, or BIE 501 or permission of instructor.

CME 592. Chemical Sensors & Biosensors. 3 Hours

Analysis performed with chemical sensors complement laboratory analysis and offer the potential of more rapid and on-line analysis in complex sample matrices. The demand for new chemical sensors, biosensors and sensing concepts is rapidly increasing and associated with the growing need to understand and/or control complex chemical and biochemical processes or detect the presence of toxic chemical or biological agents. Prerequisite(s): Permission of instructor.

CME 595. Special Problems in Chemical Engineering. 1-6 Hours

Special assignments in Chemical Engineering to be arranged and approved by the advisor and the program director.

CME 597. Research Methods. 3 Hours

This course will provide students the ability to apply research methods and problem solving skills to identify and define a research problem, develop hypotheses and research plans to test those hypotheses. Students will write and present an original research proposal.

CME 599. Thesis. 3-6 Hours

Chemical Engineering Thesis.

Civil and Environmental Engineering

- Master of Science in Civil Engineering

Donald V. Chase, Department Chairperson

Master of Science in Civil Engineering (CEE)

The program of study for the degree of Master of Science in Civil Engineering, developed in cooperation with an advisor assigned by the department chair, must include a minimum of 30 semester hours. The program of study must include:

1. Fifteen to eighteen semester hours of civil engineering, engineering mechanics, and/or thesis-related courses.
2. Six to nine semester hours of engineering or basic science electives.
3. Six semester hours of research on a civil engineering topic, CEE 599 Thesis. Students may elect to pursue a non-thesis option by replacing the six semester hours of thesis credit with six semester hours of coursework. The thesis option requires both an oral defense and a written thesis.

Students are strongly encouraged to identify an area of concentration (Environmental, Geotechnical, Structural Transportation, or Water Resources) in their program of study by selecting courses from the below areas. Civil Engineering courses in addition to the offerings listed below are available.

Environmental

CEE 560	Bio Proc Wastewatr	3
CEE 562	Phy & Chm Wastewatr	3
CEE 563	Hazardous Waste Engineering	3
CEE 564	Solid Waste Engineering	3
CEE 574	Fundamentals of Air Pollution Engineering I	3
CEE 575	Fundamentals of Air Pollution Engineering II	3
CEE 576	Environmental Engineering Separation Processes	3

Geotechnical

CEE 520	Adv Geotech Engr	3
CEE 522	Subsurface Investiga	3
CEE 524	Foundation Engr	3
CEE 526	Retaining Strc&Slope	3
CEE 528	Soil Dyn&Earthqk Eng	3

Structural

CEE 500	Adv Struct Analysis	3
CEE 501	Struct. Analysis by Computer	3
CEE 502	Prestressed Concrete	3
CEE 503	Intr Continuum Mech	3
CEE 504	Structural Dynamics	3
CEE 505	Plastic Design in Steel	3
CEE 507	Masonry Design	3
CEE 508	Design Timber Struc	3

Engineering Mechanics

CEE 511	Exprmntl Stress Anly	3
CEE 533	Theory of Elasticity	3
CEE 534	Theory of Plates & Shells	3
CEE 535	Advanced Mechanical Vibrations	3
CEE 539	Theory of Plasticity	3
CEE 540	Composites Design	3
CEE 541	Exper Mch-Comos Mtls	3
CEE 546	Finite Element Analysis I	3

Transportation

CEE 550	Hghwy Geometric Desgn	3
CEE 551	Traffic Engineering	3
CEE 552	Intelligent Transportation Sys	3
CEE 553	Travel Demand Mdng	3

CEE 554	Urban Public Trnsprtn	3
CEE 555	Hghwy Traffic Safety	3
CEE 558	Traffic Engr Rsrch	3

Water Resources

CEE 580	Hydrology & Seepage	3
CEE 582	Adv Hydraulics	3
CEE 584	Open Channel Flow	3

See also Master's Degree Requirements in School of Engineering section in the bulletin and consult with the advisor.

Courses

CEE 500. Advanced Structural Analysis. 3 Hours

Frames of variable cross section; arches; flat and folded plates; elastic stability of columns, frames, and plates; cylindrical, spherical, and barrel shells; structural dynamics of beams and frames. Prerequisite(s): CEE 317.

CEE 501. Structural Analysis by Computer. 3 Hours

Review of force and displacement methods. Introduction to direct element and substructure methods. Students write and execute computer programs to analyze plane and space trusses, grids, and frames. Prerequisite(s): CEE 317 or equivalent.

CEE 502. Prestressed Concrete. 3 Hours

Discussion of the properties of concrete and prestressed steel. Theory and design of prestressed concrete beams, slabs, columns, frames, ties, and circular tanks. Prerequisite(s): CEE 412 or equivalent.

CEE 503. Introduction to Continuum Mechanics. 3 Hours

Tensors, calculus of variations, Lagrangian and Eulerian descriptions of motion. General equations of continuum mechanics, constitutive equations of mechanics, thermodynamics of continua. Specialization to cases of solid and fluid mechanics. Prerequisite(s): EGM 303 or equivalent.

CEE 504. Structural Dynamics. 3 Hours

Response of undamped and damped single and multi-degree-of-freedom structures subjected to harmonic, periodic, and general dynamic loadings. Special topics include nonlinear structural response, response spectra, shear buildings, and simple systems with distributed properties. Prerequisite(s): CEE 316 or permission of instructor.

CEE 505. Plastic Design in Steel. 3 Hours

Analysis and design procedures based on ultimate load capacity applied to steel beams, frames, and their connections. Concept of plastic hinge, necessary conditions for the existence of plastic moment, instability, deformations, repeated and reversed loading, and minimum weight design. Prerequisite(s): CEE 411 or equivalent.

CEE 507. Masonry Design. 3 Hours

Properties and performance criteria of bricks, concrete blocks, mortar and grout; codes and construction practices; design of masonry elements. Prerequisite(s): CEE 316.

CEE 508. Design Timber Structures. 3 Hours

Study of basic wood properties and design considerations. Design and behavior of wood connectors, fasteners, beams, columns, and beam columns. Introduction to plywood and glued laminated members. Analysis and design of structural diaphragms and shear walls. Prerequisite(s): CEE 316 or permission of instructor.

CEE 511. Experimental Stress Analysis. 3 Hours

A study of the experimental analysis of stress as an aid to design for strength and economy with emphasis on electrical strain gages. Also, photoelasticity, brittle coatings, analogies, structural similitude. Two hours lecture and one three-hour laboratory period per week. Prerequisite(s): EGM 303 or equivalent.

CEE 515. Pavement Engineering. 3 Hours

Fundamental principles of flexible and rigid highway and airport pavement design, construction, and management. Prerequisite(s): CEE 403 or consent or equivalent.

CEE 520. Advanced Geotechnical Engineering. 3 Hours

Advanced study of Geotechnical engineering principles and study. Stress-strain characteristics; constitutive relationships; failure theories; dynamic soil properties; difficult soils; soil improvement; stability of earth slopes. Prerequisite(s): CEE 312 or equivalent.

CEE 522. Subsurface Investigations. 3 Hours

Soil & rock classification; Geophysical methods; subsurface explorations; soil sampling; van shear, standard penetration, cone penetration, pressuremeter, dilatometer, and plate load testing; in-situ measurements; field instrumentation. Prerequisite(s): CEE 312 or equivalent.

CEE 524. Foundation Engineering. 3 Hours

Application of Geotechnical engineering principles of analysis and design of shallow and deep foundations and earth retaining structures. Topics include site exploration and characterization, foundation types, bearing capacity, settlement analysis, shallow foundation design, earth pressures theories, design of retaining walls, flexible retaining structures and braced excavations, design of pile foundations and drilled piers. Prerequisite(s): CEE 312 or equivalent.

CEE 526. Retaining Structures & Slopes. 3 Hours

Earth pressure theories; design of earth retaining structures, such as rigid walls, anchored sheet pile walls, and reinforced soil structures; stability of excavation, cut, and natural slopes; slope stabilization methods. Prerequisite(s): CEE 312 or equivalent.

CEE 528. Soil Dynamics & Earthquake Engineering. 3 Hours

Soil behavior under dynamic loading conditions; foundation design for vibratory loadings; introductory earthquake engineering; field and laboratory techniques for determining dynamic soil properties and liquefaction potential. Prerequisite(s): CEE 312 or equivalent.

CEE 533. Theory of Elasticity. 3 Hours

Three-dimensional stress and strain at a point; equations of elasticity in Cartesian and curvilinear coordinates; methods of formulation of equations for solution, plane stress and plane strain, energy formulations, numerical solution procedures. Prerequisite(s): EGM 303 or equivalent. Corequisite(s): EGM 503.

CEE 534. Theory of Plates & Shells. 3 Hours

Theory of plates; small and large displacement theories of thin plates; shear deformation; buckling; sandwich plate theory. Thin shell theory; theory of surfaces; thin shell equations in orthogonal curvilinear coordinates; bending, membrane, and shallow shell theories. Prerequisite(s): EGM 533.

CEE 535. Advanced Mechanical Vibrations. 3 Hours

Review of undamped, damped, natural, and forced vibrations of one and two degrees of freedom systems. Lagrange's equation, eigenvalue/eigenvector problem, modal analysis for discrete and continuous systems. Computer application for multi-degree of freedom, nonlinear problems. Prerequisite(s): MEE 319 or equivalent; computer programming.

CEE 539. Theory of Plasticity. 3 Hours

Fundamentals of plasticity theory including elastic, viscoelastic, and elastic-plastic constitutive models; plastic deformation on the macroscopic and microscopic levels; stress-strain relations in the plastic regime; strain hardening; limit analysis; numerical procedures. Prerequisite(s): EGM 503 or EGM 533.

CEE 540. Composites Design. 3 Hours

Design with fiber reinforced composite materials. Fiber and resin selection, laminate design, bending and torsion of stiffening elements, open and filled holes, joining methods, fatigue, damage tolerance, building block approach, design allowables. Prerequisite(s): EGM 303 or equivalent.

CEE 541. Mechanics of Composite Materials. 3 Hours

Introduction to the mechanical response of fiber-reinforced composite materials with emphasis on the development of experimental methodology. Analytical topics include stress-strain behavior of anisotropic materials, laminate mechanics, and strength analysis. Theoretical models are applied to the analysis of experimental techniques used for characterizing composite materials. Lectures are supplemented by laboratory sessions in which characterization tests are performed on contemporary composite materials. Prerequisite(s): EGM 303 or equivalent.

CEE 543. Analytical Mechanics Composite Materials. 3 Hours

Analytical models are developed for predicting the mechanical and thermal behavior of fiber-reinforced composite materials as a function of constituent material properties. Both continuous and discontinuous fiber-reinforced systems are considered. Specific topics include basic mechanics of anisotropic materials, micro-mechanics and lamination theory, free edge effects, and failure criteria. Prerequisite(s): EGM 303 or equivalent.

CEE 546. Finite Element Analysis I. 3 Hours

Fundamental development of the Finite Element Method (FEM), and solution of field problems and comprehensive structural problems. Variational principles and weak forms; finite element discretization; shape functions; finite elements for field problems; bar, beam, plate, and shell elements; isoparametric finite elements, stiffness, nodal force, and mass matrices; matrix assembly procedures; computer coding techniques; modeling decisions; program output interpretation. Emphasis on a thorough understanding of FEM theory and modeling techniques. Prerequisite(s): CEE 503 or CEE 533.

CEE 550. Highway Geometric Design. 3 Hours

Advanced topics in horizontal and vertical alignment design controls and criteria, sight distance, intersection and interchange design. Prerequisite(s): CEE 403 or equivalent.

CEE 551. Traffic Engineering. 3 Hours

Characteristics of traffic, including the road user, vehicle, traffic control devices, accident analysis, signal operations and design and the fundamentals of signal system progression. Prerequisite(s): CEE 403 or equivalent.

CEE 552. Intelligent Transportation Systems. 3 Hours

Fundamentals of planning, design, deployment and operations of ITS. Integrated application of ITS architecture, traffic flow principles, advanced equipment, communications technologies and management strategies to provide traveler information and increase the safety and efficiency of the surface transportation system. Prerequisite(s): CEE 403 or equivalent.

CEE 553. Travel Demand Modeling. 3 Hours

Introduction to the theory, concepts and methods underlying the practice of urban travel demand modeling. The course involves model data inputs, model development, forecasting applications, and model evaluation techniques. Prerequisite(s): CEE 403 or equivalent.

CEE 554. Urban Public Transportation. 3 Hours

Planning and analysis of urban public transportation service and operations with a focus on bus and rail modes. Provides fundamental knowledge and methods for route and network planning, service planning and analysis, performance monitoring, operations control, and frequency and headway determination. Prerequisite(s): CEE 403 or equivalent.

CEE 555. Highway Traffic Safety. 3 Hours

Issues involved in transportation safety, strategic highway safety planning at state and local levels. Extent of the highway safety problem, elements of traffic accidents, common accident countermeasures, collection and analysis of accident data, evaluation of safety-related projects and programs, and litigation issues. Prerequisite(s): CEE 403 or equivalent.

CEE 558. Traffic Engineering Research. 3 Hours

Practical problems in control or capacity restraints based on studies of actual local situations. Prerequisite(s): CEE 403 or equivalent.

CEE 560. Biological Processes in Wastewater Engineering. 3 Hours

Measuring the characteristics of wastewater produced from domestic and industrial sources. Principles of designing and operating microbiological processes for the treatment of wastewater. Mechanisms and kinetics of biological reactions emphasized. Prerequisite(s): CHM 124 and (CEE 434 or CME 406) or equivalent.

CEE 562. Physical & Chemical Water & Wastewater Treatment Processes. 3 Hours

Principles and design of physical and chemical unit processes to treat water and wastewater. Industry pretreatment technologies and the basis for their development. Prerequisite(s): CHM 124 and (CEE 434 or CME 406) or equivalent.

CEE 563. Hazardous Waste Engineering. 3 Hours

The fundamental principles of the design and operation of hazardous waste control and hazardous substances remediation processes. Hazardous waste regulations, risk assessment and management. Prerequisite(s): CHM 124 or equivalent.

CEE 564. Solid Waste Engineering. 3 Hours

Characterizing solid waste. Managing solid waste collection, transport, minimization, and recycling. The design of solid waste disposal and resource recovery facilities.

CEE 574. Fundamentals of Air Pollution Engineering I. 3 Hours

Air pollution, combustion fundamentals, pollutant formation and control in combustion, pollutant formation and control methods in internal combustion engines, particle formation in combustion. Prerequisite(s): ((CME 311 or MEE 301); (CME 324 or MEE 410)) or permission of instructor.

CEE 575. Fundamentals of Air Pollution Engineering II. 3 Hours

Review of the concepts of air pollution engineering; aerosols; removal of gaseous pollutants from effluent streams; optimal air pollution control strategies. Prerequisite(s): CME 574 or permission of instructor.

CEE 576. Environmental Engineering Separation Processes. 3 Hours

Discussion of the unit operations associated with environmental engineering separation processes of solid-liquid, liquid-liquid, and gas-liquid systems; general use, principles of operation, and design procedures for specific types of equipment. Prerequisite(s): Permission of instructor.

CEE 580. Hydrology & Seepage. 3 Hours

Detailed study of the hydrologic cycle with a focus on rainfall/runoff generation techniques. Practical application of hydrologic fundamentals is demonstrated through the design of urban storm water systems. Introduction to sub-surface hydrology and groundwater modeling. Prerequisite(s): CEE 312, CEE 333 or equivalent.

CEE 582. Advanced Hydraulics. 3 Hours

Detailed examination of unsteady flow in closed-conduits and open channels. Practical methods for solving waterhammer and flood routing problems are presented. Physical modeling integrated with dimensional analysis and similitude is presented. Prerequisite(s): CEE 313, CEE 333 or equivalent.

CEE 584. Open Channel Flow. 3 Hours

Open channel flow in its various forms will be studied. Major topics to be covered include energy and momentum principles, uniform and gradually varied flow, rapidly varied flow, spatially varied flow and an introduction to unsteady flow. Pragmatic applications such as channel design, water surface profile computations, and culvert analysis will also be covered. Well-established solution approaches and widely accepted computer methods will be used to solve real-world problems. Prerequisite(s): CEE 313, CEE 333 or equivalent.

CEE 590. Selected Readings in Civil Engineering. 3 Hours

Directed readings in a designated area arranged and approved by the student's faculty advisor and the department chair. May be repeated.

CEE 595. Special Problems in Civil Engineering. 3 Hours

Special assignments in civil engineering subject matter to be arranged and approved by the student's advisor and the department chair.

CEE 598. Project. 3 Hours

Project in Civil and Environmental Engineering.

CEE 599. Thesis. 3-6 Hours

Thesis in Civil and Environmental Engineering.

Computer Engineering

- Master of Science in Computer Engineering

Guru Subramanyam, Department Chairperson

Master of Science in Computer Engineering (CPE)

The program of study leading to the Master of Science in Computer Engineering (MSCPE) must include a minimum of 30 semester hours of credit consisting of the following:

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Engineering Core Courses ¹		9
ECE 501	Contemporary Digital Systems	
ECE 532	Embedded Systems	
ECE 533	Computer Design	
CPS 510	System Analysis	
CPS 536	Operating Systems I	
CPS 570	Data Communications	
Concentration Area ²		9
Technical Electives ³		6
Choose thesis or non-thesis		6

Thesis: ECE 599 or CPS 599 (6 hours) ⁴

Non-thesis: ⁵

Concentration Area (3 hours) ²

Technical Elective (3 hours) ³

Total Hours 30

- ¹ Six semester hours must be ECE coursework; 3 semester hours must be CPS coursework.
- ² Concentration areas include the below or as approved by the advisor/advisory committee.
 1. Communications and Networking: ECE 561, ECE 537, and CPS 572
 2. Operating Systems & Computer Architecture: ECE 536, ECE 636, and CPS 544
 3. Software Engineering: ECE 537, ECE 538, CPS 512, CPS 543, and CPS 542/CPS 562
 4. Embedded Systems: ECE 531 and ECE 536
- ³ Electives must be approved by the advisor.
- ⁴ Students receiving 50% assistantship/stipend over one academic year or more will be required to pursue the thesis option.
- ⁵ Successful completion of a non-thesis research/design project, including submission of a written report of suitable length and a seminar presentation to interested faculty and students. All such projects will be supervised by a faculty member with similar research interests. **OR** Successful completion of two approved 3 semester hour courses requiring extensive project-based learning. Either of which will serve as a culminating experience for the degree.

Computer Science Courses

CPS 501. Advanced Programming and Data Structures. 3 Hours

A bridge course for students who already have a programming background. Covers advanced data structures and programming techniques in a high level programming language.

CPS 509. Topics in Computer Science. 1-3 Hours

Lectures in special areas of interest determined by the department. May be taken more than once for additional credit when the topics or contents change. Prerequisite(s): Permission of department chairperson.

CPS 510. System Analysis. 3 Hours

Process-oriented, data-oriented, and object-oriented approaches for systems development; comparison of various systems development life cycles; DFD methodology for systems analysis using state-of-the-art CASE (Computer Aided Software Engineering) tools; logical and event analyses of DFD specifications; tools and techniques for modeling real-time systems; data modeling; introduction to object-oriented analysis methodologies. Prerequisite(s): CPS 350.

CPS 512. System Design. 3 Hours

Principles of design, introduction to software design methodologies; issues in transition from analysis to logical and physical designs; detailed discussion of structured design methodology (Yourdon, Constantine, Myers); design guidelines; transform analysis; Warnier/Orr design methodologies; designing methodologies for real-time systems; introduction to object-oriented design; CASE tools and code generators. Prerequisite(s): CPS 510.

CPS 518. Software Engineering. 3 Hours

No description available.

CPS 520. Object-Oriented Systems Development. 3 Hours

Unified Modeling Language (UML), use cases, class diagrams, sequence diagrams, collaboration diagrams, state charts, activity diagrams, component and deployment views, design patterns, and implementation of various UML models through team projects. Prerequisite(s): CPS 350, CPS 510.

CPS 522. Software Project Management. 3 Hours

Cost and effort estimation models for software projects, planning techniques, productivity metrics, risk management, maintenance, reuse, quality assurance, configuration management, Capability Maturity Models (CMM and P-CMM), and ISO 9001. Prerequisite(s): CPS 510 or CPS 518 or CPS 520.

CPS 530. Algorithm Design. 3 Hours

The design and analysis of computer algorithms, including order notation, sorting, dynamic programming, graph algorithms, string matching, matrix multiplication, NP-completeness. Prerequisite(s): CPS 350.

CPS 534. Distributed Computing with Big Data. 3 Hours

This course introduces students to distributed computation frameworks (such as MapReduce) associated with massive datasets. Topics focus on parallel/distributed algorithms, data mining and machine learning algorithms for processing and analyzing very large amounts of data, and data visualization. Prerequisite(s): CPS 350.

CPS 536. Operating Systems I. 3 Hours

Models and algorithms pertinent to the design of computer operating systems; concurrent processes including synchronization, communication and deadlock problems, process and device scheduling policies, design of file systems, reliability and protection. Prerequisite(s): CPS 350.

CPS 542. Database Management Systems. 3 Hours

Physical and logical organization of data files; hierarchical, network, and relational database models; data definition language and data manipulation language of a commercial database management system; query languages. Prerequisite(s): CPS 350.

CPS 543. Advanced Concepts of Programming Languages. 3 Hours

This course involves the study of advanced programming language concepts and paradigms. Possible topics, covered at the discretion of the instructor, include metalinguistic abstraction and macros, fixed-point combinators, reflection and meta-object protocols, and generative and aspect-oriented programming with emphasis on applying these concepts in practical application domains. Prerequisite(s): CPS 352.

CPS 544. Systems Programming. 3 Hours

Analysis of compilers and their construction; programming techniques discussed in the current literature; advanced computer applications in both mathematical and nonnumeric areas. Prerequisite(s): CPS 350.

CPS 552. Discrete Event Simulation Techniques. 3 Hours

Simulation models; random number generation testing, special purpose simulation languages, statistical analysis of output; regenerative models; trace-driven models. Emphasis on models related to computer operating system design and performance evaluation. Prerequisite(s): CPS 350; statistics.

CPS 560. Computer Graphics. 3 Hours

Types of graphic hardware and their characteristics. Overview of software and techniques used in computer graphics. Two- and three-dimensional graphics displays. Prerequisite(s): CPS 350; programming ability in a procedure-oriented language.

CPS 561. Virtual Reality. 3 Hours

This course offers a broad introduction of virtual reality from fundamental theories to software/hardware technologies involved with the current state of the art in VR. Topics include 3D interaction techniques on virtual immersive systems, human pose/face/hands tracking, graphics and 3D animation collaborative networked virtual environment, augmented reality systems, and security. Some unforeseen security issues in many emerging VR systems are also addressed. Prerequisite(s): CPS 350.

CPS 562. Database Management Systems II. 3 Hours

Study of query execution and optimization, transaction management, concurrency control, recovery and security techniques. Advanced data models and emerging trends in database systems, like object-oriented database systems, distributed database systems, client-server architecture, multidatabase and heterogeneous systems. Other current database topics and emerging technologies will be discussed. Prerequisite(s): CPS 542.

CPS 566. Image Processing. 3 Hours

This course introduces students to a wide range of topics on digital image processing techniques. Topics includes image enhancement, 2D linear and nonlinear filtering, image compression and restoration, pattern recognition, big visual data analysis, and stochastic modeling on images. Prerequisite(s): CPS 350.

CPS 570. Data Communications. 3 Hours

The study of networks of interacting computers. The analysis of distributed processing and distributed databases. Prerequisite(s): CPS 350.

CPS 572. Computer Networking. 3 Hours

A unified view of the broad field of local area and long haul networks. A survey of the state of the art. Topics covered include networking theory, design approaches, standards, topologies and protocols. Prerequisite(s): CPS 536, CPS 570.

CPS 577. Computer System Design I. 3 Hours

Introduction to design and analysis of combinational and sequential circuits of MSI devices to design arithmetic and other computer functions. Analysis of a specific microcomputer architecture including usage of its machine and assembler language. Interfacing of various components with computers. Prerequisite(s): CPS 250.

CPS 580. Artificial Intelligence. 3 Hours

Presentation of theoretical concepts for artificial intelligence in the areas of knowledge representation and search techniques. These are examined in the context of applications for expert systems, semantic networks, and planning problems. Issues concerning functional programming and logic programming are also presented. Prerequisite(s): CPS 350.

CPS 581. Advanced Artificial Intelligence. 3 Hours

This course continues the studies pursued in Artificial Intelligence CPS 580. It delves more deeply into certain areas such as multiple agent systems and induction, and introduces new areas, such as neural networks and planning, not covered in CPS 580. As in CPS 580, each student shall complete a final project investigating some area of research in Artificial Intelligence. The project will encompass a literature search, paper, presentation, and implementation.

CPS 582. Automata Theory. 3 Hours

Finite automata, sequential machines. Turing machines, computability, existence of self-reproducing machines. Prerequisite(s): CPS 528.

CPS 583. Graph Algorithms. 3 Hours

Design and analysis of algorithms for problems based on graphs. Classical algorithms and efficient algorithms for restricted domains of graphs are covered. Analysis of algorithms, complexity classes P, NP, and NP-complete, traversals, bi-connectedness, strongly-connectedness, 2-SAT, planarity testing, and algorithms for restricted classes of graphs. Prerequisite(s): CPS 501.

CPS 591. Special Research Problems. 1-3 Hours

Individual readings and research in a specialized area. May be taken for at most six semester hours. Prerequisite(s): Permission of department chairperson.

CPS 592. Special Topics. 1-3 Hours

Lectures and/or laboratory experience in some areas determined by the department. Prerequisite(s): Permission of department chairperson.

CPS 595. Software Engineering Project I. 3 Hours

First of a two-course project sequence. Students, either individually or in teams, must propose a project, conduct background research, justify the adequacy of the work for a graduate project, complete analysis and design using appropriate methodologies and CASE tools, and write preliminary coding. Students are expected to write code and minimize the usage of visual or other development environments. A minimum of three class presentations is expected for project proposal, progress, and final analysis/design. Prerequisite(s): (CPS 510, CPS 530); permission of department chairperson.

CPS 596. Software Project II. 3 Hours

Continuation of CPS 595. Students are required to implement the analysis and design of their projects and make periodic presentations. Special attention needs to be given to the overall architecture of the system, usability, testing, and documentation. A minimum of two class presentations is expected for design and implementation. Prerequisite(s): CPS 595.

CPS 599. Thesis. 3-6 Hours

Thesis.

Electrical Computer Engr Courses

ECE 500. Introduction to the Graduate Program in Electrical and Computer Engineering. 0 Hours

Introduction to ECE graduate program, research methods in ECE, technical writing, literature research, ethics, software.

ECE 501. Contemporary Digital Systems. 3 Hours

Introduction to sequential logic; state machines; high-performance digital systems: theory and application of modern design; alternative implementation forms and introduction to HDL; productivity, recurring and non-recurring costs, flexibility, and testability; software drivers; hardware/software integration; finite state machines. The required background for this course is ECE 215 or equivalent.

ECE 503. Random Processes. 3 Hours

Random variables as applied to system theory, communications, signal processing and controls. Topics include advanced engineering probability, random variables, random vectors and an introduction to random processes. The required background for this course is ECE 340 or equivalent.

ECE 505. Digital Signal Processing. 3 Hours

A study of one-dimensional digital signal processing, including a review of continuous system analysis and sampling. Topics include z-transform techniques, digital filter design and analysis, and fast Fourier transform processing techniques. Required background: ECE 334 or equivalent course.

ECE 506. Microelectronic Devices. 3 Hours

Crystalline structure of matter, quantum mechanics and energy band theory; bulk properties of semiconductors; p-n and metal-semiconductor junctions; bipolar junction transistors; field-effect transistors; heterostructures; optical properties of semiconductors; devices, modeling and applications. The required background for this course is ECE 304 or equivalent.

ECE 507. Electromagnetic Fields I. 3 Hours

Fundamental concepts, wave equation and its solutions; wave propagation, reflection and transmission; potential theory; construction of modal solutions; various electromagnetic theorems: concept of source, uniqueness, equivalence, induction and reciprocity theorems. The required background for this course is ECE 333 or equivalent.

ECE 509. Analysis of Linear Systems. 3 Hours

State variable representation of linear systems and its relationship to the frequency domain representation using transfer functions and the Laplace transform. State transition matrix and solution of the state equation, stability, controllability, observability, state feedback and state observers are studied.

ECE 510. Microwave Circuits for Communications. 3 Hours

Microwave transmission, planar transmission lines, microwave components and filters. Microwave tubes, microwave communication, radar systems, and electronic support measures. Prerequisite(s): ECE 507.

ECE 511. Antennas. 3 Hours

Fundamental principles of antennas; analysis and synthesis of arrays; resonant antennas; broadband and frequency independent antennas; aperture and reflector antennas; applications to radar and communication systems. Prerequisite(s): ECE 507 or equivalent.

ECE 515. Engineering Magnetic Materials & Their Function in Green Energy. 3 Hours

Magnetic fundamentals including spontaneous magnetization; advanced magnetic materials, computer modeling of magnetic circuits using 2D/3D finite element analysis. Applications of magnetic materials in electric machines. Prerequisite(s): MAT 501; college physics or permission of instructor.

ECE 518. Electromagnetic Fields II. 3 Hours

Classification and construction of solutions. Plane cylindrical and spherical wave functions. Integral equations, mathematical theory of diffraction. Green's function. Prerequisite(s): ECE 507.

ECE 521. Digital Communications I. 3 Hours

Fundamentals of digital transmission of information over noisy channels; modulation schemes for binary and M-ary digital transmission; optimum receivers; coherent and noncoherent detection; signal design; intersymbol interference; error control coding; the Viterbi algorithm; channel capacity and Shannon limits on reliable transmission. Prerequisite(s): ECE 503.

ECE 522. Digital Communications II. 3 Hours

Fundamentals of source coding and compression, Shannon's Theorem, Huffman coding; system synchronization; equalization techniques; multiplexing and multiple access systems; spread-spectrum systems and their applications; pseudo-noise, direct sequence systems, frequency hopping, jamming; encryption and decryption systems. Prerequisite(s): ECE 521.

ECE 523. Satellite Communications. 3 Hours

Topics related to the theory, design and orbital placement of geostationary and geosynchronous satellites and their communications applications, including transmitters and receivers in the RF, microwave and optical operational windows, the associated modulation and communication strategies, system hardware and international satellite networks. Prerequisite(s): ECE 507 or permission of instructor.

ECE 531. Microelectronics Systems. 3 Hours

Introduction to the design and application of engineering microelectronics; bipolar and MOS device theory and processing technology; CMOS logic and circuitry; design principles fundamental to chip design and fabrication; case studies employing introduction to HDL. The required background for this course is ECE 304 or equivalent.

ECE 532. Embedded Systems. 3 Hours

This course will introduce the student to the concept of embedded systems and the constraints imposed on hard real-time systems. Course will consist of design, development and test of selected hard-deadline hardware and software using Altera's DE2 development boards. The student will design selected hardware interfaces and develop real-time executive and application code in assembly language and C. Each student will design and implement hardware using Verilog HDL. Prerequisite(s): ECE 501 or equivalent.

ECE 533. Computer Design. 3 Hours

Design considerations of the computer; register transfer operations; hardware implementation of arithmetic processors and ALU; instruction set format and design and its effect on the internal microengine; hardware and micro-programmed control design; comparative architectures. Prerequisite(s): ECE 501 or equivalent.

ECE 536. Microprocessor Applications. 3 Hours

Project studies, applications of microprocessors in practical implementations; logic implementation using software; memory mapped I/O problems and interrupt structure implementation; use of compilers; study of alternate microprocessor families including industrial controllers. Additional required background for this course is ECE 314 or equivalent. Prerequisite(s): ECE 501.

ECE 538. Object-Oriented Programming Applications. 3 Hours

A semi-formal approach to the engineering applications of object-oriented programming. Application of the concepts of classes, inheritance, polymorphism in engineering problems. Introduction to the use of class libraries. Effective integration of the concepts of application programmer interfaces, language features and class libraries. The required background for this course is C-programming experience.

ECE 545. Automatic Control. 3 Hours

Study of mathematical methods for control systems and analysis of performance characteristics and stability. Design topics include pole-placement, root locus, and frequency domain techniques. The student will also learn feedback loop sensitivity, basic loopshaping, performance bounds and other introductory aspects of robust control. The required background for this course is ECE 415 or equivalent.

ECE 547. Non-Linear Systems & Control. 3 Hours

Introduction to nonlinear phenomena in dynamical systems. A study of the major techniques of nonlinear system analysis including phase plane analysis and Lyapunov stability theory. Application of the analytical techniques to control system design including feedback linearization, backstepping and sliding mode control. Prerequisite(s): ECE 509 or permission of instructor.

ECE 563. Image Processing. 3 Hours

An introduction to image processing including the human visual system, image formats, two-dimensional transforms, image restoration, and image reconstruction. Prerequisite(s): ECE 561.

ECE 564. 3D Computer Vision. 3 Hours

Develop the skills needed to generate synthetic images of 3D objects and to recover 3D structure from one or more views (projections) of 3D objects. Feature recognition in 2D views (images) of a scene based either on actual photographs or synthetic images (computer graphics generated). Applications in robot pose recognition and mobile robot navigation. Prerequisite(s): Ideally students should be familiar with C++ object-oriented programming (ECE 538), MATLAB, and image processing (ECE 563). However, accommodations will be made for students with experience in only one of these areas.

ECE 567. Machine Learning & Patterning. 3 Hours

This course introduces the fundamental concepts and models of machine learning with a practical treatment of design, analysis, implementation and applications of algorithms that learn from examples. Topics include supervised and unsupervised learning, self organization, pattern association, feed-forward and recurrent architectures, manifold learning, dimensionality reduction, and model selection. Prerequisite(s): ECE 445 or permission of instructor.

ECE 572. Linear Systems & Fourier Optics. 3 Hours

Mathematical techniques pertaining to linear systems theory; Fresnel and Fraunhofer diffraction; Fourier transform properties of lenses; frequency analysis of optical systems, spatial filtering, applications such as optical information processing and holography. Prerequisite(s): Acceptance into the ECE graduate program or permission of the department chairperson.

ECE 573. Electro-Optical Devices & Systems. 3 Hours

Solid-state theory of optoelectronic devices; photoemitters; photodetectors; solar cells; detection and noise; displays; electro-optic, magneto-optic, and acousto-optic modulators; integration and application of electro-optical components in electro-optical systems of various types. Prerequisite(s): ECE 507 or permission of department chairperson.

ECE 574. Guided Wave Optics. 3 Hours

Light propagation in slab and cylindrical waveguides; signal degradation in optical fibers; optical sources, detectors, and receivers; coupling; transmission link analysis; fiber fabrication; fiber sensor and communication systems. Prerequisite(s): ECE 507 or permission of department chairperson.

ECE 575. Electro-Optic Sensors. 3 Hours

Optical sensors, including amplitude, phase, wavelength, polarization and modal interference based sensors. Photoelasticity effects in stressed optical materials. Quadrature point stabilization, linearity, dynamic range and sensitivity. Modulation and demodulation by both passive and active means. General sensor characteristics. Optical sources and detectors, optical signal-to-noise ratio analysis and general sensor characteristics. Fiber optic sensors and smart skin/structure technology. Prerequisite(s): ECE 574 or permission of department chairperson.

ECE 577L. Electro-Optics Laboratory. 1 Hour

Fiber optic principles and systems: numerical aperture, loss, dispersion, single and multimode fibers, communications and sensing systems; project oriented investigations of Electro/fiber-optic systems and devices in general, sources, detectors, image processing, sensor instrumentation and integration, Electro-optic components, display technology, and nonlinear optical devices and systems. Prerequisite(s): ECE 574 or permission of department chairperson.

ECE 581. Nanoelectronics. 3 Hours

Introduction to the physics of materials on the nanoscale; quantum confinement theory; electronic and optical properties of semiconductor nanostructures; single electron transistors (SETs); tunneling and ballistic devices; nanostructured LEDs, photodetectors, and lasers; nanophotovoltaics and nanomagnetics; quantum computing and molecular electronics; nanoelectronic fabrication, state-of-the-art and emerging nanoscale devices and applications. Prerequisite(s): ECE 506 or permission of instructor.

ECE 583. Advanced Photovoltaics. 3 Hours

Science and applications of photovoltaics, with special emphasis on inorganic and organic semiconductors, ferroelectrics, chalcopyrites, metamaterials, quantum structures and photovoltaics architecture. Prerequisite(s): ECE 506 or permission of instructor.

ECE 595. Special Problems in Electrical Engineering. 1-6 Hours

Particular assignments to be arranged and approved by the department chair.

ECE 599. Thesis. 1-6 Hours

Thesis in Electrical and Computer Engineering.

ECE 632. Contemporary Microelectron Design. 3 Hours

CMOS analog circuit design (oscillators, amplifiers, op-amps), mixed signal design (data converters), introduction to microelectron-mechanical system (MEMS) and wireless communications systems design, advanced VLSI digital design projects, seminar topics covering contemporary designs and techniques. Prerequisite(s): ECE 531.

ECE 636. Advanced Computer Architecture. 3 Hours

Examination of modern high performance computing architectures, including out-of-order execution RISC multicore processors and GPGPUs. Design projects integrate the concepts learned in class. Prerequisite(s): ECE 533.

ECE 637. Concurrent Processing. 3 Hours

Introduction to the concepts and practices of parallel processing and concurrency. Multiprogramming and multitasking. Synchronous and asynchronous events. Critical sections, mutexes and semaphores. Use of shared memory in engineering applications. Atomicity on CISC and RISC machines. Applications of interval timers. Case studies in engineering applications. Prerequisite(s): ECE 537, ECE 636, or equivalent.

ECE 642. Optimal Control & Estimation. 3 Hours

Introduction to optimal control, starting with dynamic programming for stochastic optimal control; continuous time optimal control, including Pontryagin's Minimum Principle and its application to the linear case, leading to linear optimal control. Prerequisite(s): ECE 509 or permission of instruction.

ECE 645. Adaptive Control. 3 Hours

On-line approximation based adaptive control techniques for nonlinear systems. An introduction to neural networks and fuzzy systems as part of the control loop is given, leading to a diversity of advanced methods for controlling and stabilizing nonlinear systems subject to uncertainties. Adaptive observers and adaptive output feedback are also introduced. Prerequisite(s): ECE 547 or permission of instructor.

ECE 661. Statistical Signal Processing. 3 Hours

This course studies discrete methods of linear estimation theory. Topics include random vectors, linear transformations, linear estimation theory, optimal filtering, least squares techniques, linear prediction, and spectrum estimation. Prerequisite(s): ECE 503, ECE 561.

ECE 662. Adaptive Signal Processing. 3 Hours

An overview of the theory, design, and implementation of adaptive signal processors. This includes discussions of various gradient search techniques, filter structures, and applications. An introduction to neural networks is also included. Prerequisite(s): ECE 661.

ECE 663. Statistical Pattern Recognition. 3 Hours

This course provides a comprehensive treatment of the statistical pattern recognition problem. The mathematical models describing these problems and the mathematical tools necessary for solving them are covered in detail. Prerequisite(s): ECE 661.

ECE 674. Integrated Optics. 3 Hours

Asymmetric dielectric slab wave-guides; cylindrical wave-guides; multi-layer wave-guides; dispersion, shifting and flattening; mode coupling and loss mechanisms; selected nonlinear wave-guiding effects; integrated optical devices. Prerequisite(s): ECE 574.

ECE 676. Quantum Electronics. 3 Hours

Principles of the quantum theory of electron and photon processes; interaction of electromagnetic radiation and matter; applications to solid state and semiconductor laser systems. Prerequisite(s): ECE 506, ECE 573, EOP 506, or equivalent.

ECE 682. Nano-Fabrication Laboratory. 3 Hours

This laboratory course will provide hands-on experience in state-of-the-art device fabrication technology. The course will be conducted primarily in a clean room laboratory with some classroom sessions for discussions. The students will have an opportunity to design, fabricate and test their own devices. Prerequisite(s): Permission of instructor.

ECE 695. Special Problems in Electrical Engineering. 1-3 Hours

Special topics in electrical engineering not covered in regular courses. Course sections arranged and approved by the chair of the student's doctoral advisory committee and the department chair.

ECE 696. Graduate Seminar. 0-3 Hours

Research oriented independent study course intended for doctoral level graduate students. The student will perform an in-depth research on a selected topic of mutual interest with his/her doctoral adviser, and achieve sufficient expertise to do a technical presentation about the topic in front of his/her peers. The student will prepare a report and present it in one of the graduate seminar sessions during the semester. The student is expected to attend all the seminars presented by other graduate students during the semester and to interact with them to improve the depth and breath of his/her knowledge.

ECE 698. DE Dissertation. 1-15 Hours

An original investigation as applied to electrical engineering practice. Results must be of sufficient importance to merit publication.

ECE 699. PhD Dissertation. 1-15 Hours

Original research in electrical engineering that makes a definite contribution to technical knowledge. Results must be of sufficient importance to merit publication.

Electrical Engineering

- Doctor of Engineering, Electrical Engineering
- Doctor of Philosophy in Engineering, Electrical Engineering
- Master of Science in Electrical Engineering

Guru Subramanyam, Department Chairperson

Doctor of Engineering, Electrical Engineering (ELE)

See the Doctoral Degree Requirements section on the School of Engineering page and consult with the department chair.

Doctor of Philosophy in Engineering, Electrical Engineering (ELE)

See the Doctoral Degree Requirements (https://www.udayton.edu/engineering/departments/electrical_and_computer/grad_electrical) section on the School of Engineering page and consult with the department chair.

Master of Science in Electrical Engineering (ELE)

The program of study leading to the Master of Science in Electrical Engineering must include a minimum of 30 semester hours of credit consisting of the following.

1. At least nine semester hours in electrical engineering core courses approved by the advisor/advisory committee, to be selected from:

ECE 501	Contemporary Digital Systems	3
ECE 503	Random Processes	3
ECE 505	Digital Signal Processing	3
ECE 506	Microelectronic Devices	3
ECE 507	Electromagnetic Fields I	3
ECE 509	Analysis of Linear Systems	3
2. At least nine semester hours in a concentration area such as Computing Systems, Sensors and Devices, or Signals and Systems, or as approved by the advisor/advisory committee.
3. At least six semester hours of selected technical electives. Selected courses must be approved by the advisor.
4. Six semester hours on an approved thesis or six hours of additional electrical engineering coursework. Students receiving 50% assistantship/stipend over one academic year or more will be required to pursue the thesis option.

See also Master's Degree Requirements in School of Engineering section in the bulletin.

Courses

ECE 500. Introduction to the Graduate Program in Electrical and Computer Engineering. 0 Hours

Introduction to ECE graduate program, research methods in ECE, technical writing, literature research, ethics, software.

ECE 501. Contemporary Digital Systems. 3 Hours

Introduction to sequential logic; state machines; high-performance digital systems: theory and application of modern design; alternative implementation forms and introduction to HDL; productivity, recurring and non-recurring costs, flexibility, and testability; software drivers; hardware/software integration; finite state machines. The required background for this course is ECE 215 or equivalent.

ECE 503. Random Processes. 3 Hours

Random variables as applied to system theory, communications, signal processing and controls. Topics include advanced engineering probability, random variables, random vectors and an introduction to random processes. The required background for this course is ECE 340 or equivalent.

ECE 505. Digital Signal Processing. 3 Hours

A study of one-dimensional digital signal processing, including a review of continuous system analysis and sampling. Topics include z-transform techniques, digital filter design and analysis, and fast Fourier transform processing techniques. Required background: ECE 334 or equivalent course.

ECE 506. Microelectronic Devices. 3 Hours

Crystalline structure of matter, quantum mechanics and energy band theory; bulk properties of semiconductors; p-n and metal-semiconductor junctions; bipolar junction transistors; field-effect transistors; heterostructures; optical properties of semiconductors; devices, modeling and applications. The required background for this course is ECE 304 or equivalent.

ECE 507. Electromagnetic Fields I. 3 Hours

Fundamental concepts, wave equation and its solutions; wave propagation, reflection and transmission; potential theory; construction of modal solutions; various electromagnetic theorems: concept of source, uniqueness, equivalence, induction and reciprocity theorems. The required background for this course is ECE 333 or equivalent.

ECE 509. Analysis of Linear Systems. 3 Hours

State variable representation of linear systems and its relationship to the frequency domain representation using transfer functions and the Laplace transform. State transition matrix and solution of the state equation, stability, controllability, observability, state feedback and state observers are studied.

ECE 510. Microwave Circuits for Communications. 3 Hours

Microwave transmission, planar transmission lines, microwave components and filters. Microwave tubes, microwave communication, radar systems, and electronic support measures. Prerequisite(s): ECE 507.

ECE 511. Antennas. 3 Hours

Fundamental principles of antennas; analysis and synthesis of arrays; resonant antennas; broadband and frequency independent antennas; aperture and reflector antennas; applications to radar and communication systems. Prerequisite(s): ECE 507 or equivalent.

ECE 515. Engineering Magnetic Materials & Their Function in Green Energy. 3 Hours

Magnetic fundamentals including spontaneous magnetization; advanced magnetic materials, computer modeling of magnetic circuits using 2D/3D finite element analysis. Applications of magnetic materials in electric machines. Prerequisite(s): MAT 501; college physics or permission of instructor.

ECE 518. Electromagnetic Fields II. 3 Hours

Classification and construction of solutions. Plane cylindrical and spherical wave functions. Integral equations, mathematical theory of diffraction. Green's function. Prerequisite(s): ECE 507.

ECE 521. Digital Communications I. 3 Hours

Fundamentals of digital transmission of information over noisy channels; modulation schemes for binary and M-ary digital transmission; optimum receivers; coherent and noncoherent detection; signal design; intersymbol interference; error control coding; the Viterbi algorithm; channel capacity and Shannon limits on reliable transmission. Prerequisite(s): ECE 503.

ECE 522. Digital Communications II. 3 Hours

Fundamentals of source coding and compression, Shannon's Theorem, Huffman coding; system synchronization; equalization techniques; multiplexing and multiple access systems; spread-spectrum systems and their applications; pseudo-noise, direct sequence systems, frequency hopping, jamming; encryption and decryption systems. Prerequisite(s): ECE 521.

ECE 523. Satellite Communications. 3 Hours

Topics related to the theory, design and orbital placement of geostationary and geosynchronous satellites and their communications applications, including transmitters and receivers in the RF, microwave and optical operational windows, the associated modulation and communication strategies, system hardware and international satellite networks. Prerequisite(s): ECE 507 or permission of instructor.

ECE 531. Microelectronics Systems. 3 Hours

Introduction to the design and application of engineering microelectronics; bipolar and MOS device theory and processing technology; CMOS logic and circuitry; design principles fundamental to chip design and fabrication; case studies employing introduction to HDL. The required background for this course is ECE 304 or equivalent.

ECE 532. Embedded Systems. 3 Hours

This course will introduce the student to the concept of embedded systems and the constraints imposed on hard real-time systems. Course will consist of design, development and test of selected hard-deadline hardware and software using Altera's DE2 development boards. The student will design selected hardware interfaces and develop real-time executive and application code in assembly language and C. Each student will design and implement hardware using Verilog HDL. Prerequisite(s): ECE 501 or equivalent.

ECE 533. Computer Design. 3 Hours

Design considerations of the computer; register transfer operations; hardware implementation of arithmetic processors and ALU; instruction set format and design and its effect on the internal microengine; hardware and micro-programmed control design; comparative architectures. Prerequisite(s): ECE 501 or equivalent.

ECE 536. Microprocessor Applications. 3 Hours

Project studies, applications of microprocessors in practical implementations; logic implementation using software; memory mapped I/O problems and interrupt structure implementation; use of compilers; study of alternate microprocessor families including industrial controllers. Additional required background for this course is ECE 314 or equivalent. Prerequisite(s): ECE 501.

ECE 538. Object-Oriented Programming Applications. 3 Hours

A semi-formal approach to the engineering applications of object-oriented programming. Application of the concepts of classes, inheritance, polymorphism in engineering problems. Introduction to the use of class libraries. Effective integration of the concepts of application programmer interfaces, language features and class libraries. The required background for this course is C-programming experience.

ECE 545. Automatic Control. 3 Hours

Study of mathematical methods for control systems and analysis of performance characteristics and stability. Design topics include pole-placement, root locus, and frequency domain techniques. The student will also learn feedback loop sensitivity, basic loopshaping, performance bounds and other introductory aspects of robust control. The required background for this course is ECE 415 or equivalent.

ECE 547. Non-Linear Systems & Control. 3 Hours

Introduction to nonlinear phenomena in dynamical systems. A study of the major techniques of nonlinear system analysis including phase plane analysis and Lyapunov stability theory. Application of the analytical techniques to control system design including feedback linearization, backstepping and sliding mode control. Prerequisite(s): ECE 509 or permission of instructor.

ECE 563. Image Processing. 3 Hours

An introduction to image processing including the human visual system, image formats, two-dimensional transforms, image restoration, and image reconstruction. Prerequisite(s): ECE 561.

ECE 564. 3D Computer Vision. 3 Hours

Develop the skills needed to generate synthetic images of 3D objects and to recover 3D structure from one or more views (projections) of 3D objects. Feature recognition in 2D views (images) of a scene based either on actual photographs or synthetic images (computer graphics generated). Applications in robot pose recognition and mobile robot navigation. Prerequisite(s): Ideally students should be familiar with C++ object-oriented programming (ECE 538), MATLAB, and image processing (ECE 563). However, accommodations will be made for students with experience in only one of these areas.

ECE 567. Machine Learning & Patterning. 3 Hours

This course introduces the fundamental concepts and models of machine learning with a practical treatment of design, analysis, implementation and applications of algorithms that learn from examples. Topics include supervised and unsupervised learning, self organization, pattern association, feed-forward and recurrent architectures, manifold learning, dimensionality reduction, and model selection. Prerequisite(s): ECE 445 or permission of instructor.

ECE 572. Linear Systems & Fourier Optics. 3 Hours

Mathematical techniques pertaining to linear systems theory; Fresnel and Fraunhofer diffraction; Fourier transform properties of lenses; frequency analysis of optical systems, spatial filtering, applications such as optical information processing and holography. Prerequisite(s): Acceptance into the ECE graduate program or permission of the department chairperson.

ECE 573. Electro-Optical Devices & Systems. 3 Hours

Solid-state theory of optoelectronic devices; photoemitters; photodetectors; solar cells; detection and noise; displays; electro-optic, magneto-optic, and acousto-optic modulators; integration and application of electro-optical components in electro-optical systems of various types. Prerequisite(s): ECE 507 or permission of department chairperson.

ECE 574. Guided Wave Optics. 3 Hours

Light propagation in slab and cylindrical waveguides; signal degradation in optical fibers; optical sources, detectors, and receivers; coupling; transmission link analysis; fiber fabrication; fiber sensor and communication systems. Prerequisite(s): ECE 507 or permission of department chairperson.

ECE 575. Electro-Optic Sensors. 3 Hours

Optical sensors, including amplitude, phase, wavelength, polarization and modal interference based sensors. Photoelasticity effects in stressed optical materials. Quadrature point stabilization, linearity, dynamic range and sensitivity. Modulation and demodulation by both passive and active means. General sensor characteristics. Optical sources and detectors, optical signal-to-noise ratio analysis and general sensor characteristics. Fiber optic sensors and smart skin/structure technology. Prerequisite(s): ECE 574 or permission of department chairperson.

ECE 577L. Electro-Optics Laboratory. 1 Hour

Fiber optic principles and systems: numerical aperture, loss, dispersion, single and multimode fibers, communications and sensing systems; project oriented investigations of Electro/fiber-optic systems and devices in general, sources, detectors, image processing, sensor instrumentation and integration, Electro-optic components, display technology, and nonlinear optical devices and systems. Prerequisite(s): ECE 574 or permission of department chairperson.

ECE 581. Nanoelectronics. 3 Hours

Introduction to the physics of materials on the nanoscale; quantum confinement theory; electronic and optical properties of semiconductor nanostructures; single electron transistors (SETs); tunneling and ballistic devices; nanostructured LEDs, photodetectors, and lasers; nanophotovoltaics and nanomagnetics; quantum computing and molecular electronics; nanoelectronic fabrication, state-of-the-art and emerging nanoscale devices and applications. Prerequisite(s): ECE 506 or permission of instructor.

ECE 583. Advanced Photovoltaics. 3 Hours

Science and applications of photovoltaics, with special emphasis on inorganic and organic semiconductors, ferroelectrics, chalcopyrites, metamaterials, quantum structures and photovoltaics architecture. Prerequisite(s): ECE 506 or permission of instructor.

ECE 595. Special Problems in Electrical Engineering. 1-6 Hours

Particular assignments to be arranged and approved by the department chair.

ECE 599. Thesis. 1-6 Hours

Thesis in Electrical and Computer Engineering.

ECE 632. Contemporary Microelectron Design. 3 Hours

CMOS analog circuit design (oscillators, amplifiers, op-amps), mixed signal design (data converters), introduction to microelectron-mechanical system (MEMS) and wireless communications systems design, advanced VLSI digital design projects, seminar topics covering contemporary designs and techniques. Prerequisite(s): ECE 531.

ECE 636. Advanced Computer Architecture. 3 Hours

Examination of modern high performance computing architectures, including out-of-order execution RISC multicore processors and GPGPUs. Design projects integrate the concepts learned in class. Prerequisite(s): ECE 533.

ECE 637. Concurrent Processing. 3 Hours

Introduction to the concepts and practices of parallel processing and concurrency. Multiprogramming and multitasking. Synchronous and asynchronous events. Critical sections, mutexes and semaphores. Use of shared memory in engineering applications. Atomicity on CISC and RISC machines. Applications of interval timers. Case studies in engineering applications. Prerequisite(s): ECE 537, ECE 636, or equivalent.

ECE 642. Optimal Control & Estimation. 3 Hours

Introduction to optimal control, starting with dynamic programming for stochastic optimal control; continuous time optimal control, including Pontryagin's Minimum Principle and its application to the linear case, leading to linear optimal control. Prerequisite(s): ECE 509 or permission of instructor.

ECE 645. Adaptive Control. 3 Hours

On-line approximation based adaptive control techniques for nonlinear systems. An introduction to neural networks and fuzzy systems as part of the control loop is given, leading to a diversity of advanced methods for controlling and stabilizing nonlinear systems subject to uncertainties. Adaptive observers and adaptive output feedback are also introduced. Prerequisite(s): ECE 547 or permission of instructor.

ECE 661. Statistical Signal Processing. 3 Hours

This course studies discrete methods of linear estimation theory. Topics include random vectors, linear transformations, linear estimation theory, optimal filtering, least squares techniques, linear prediction, and spectrum estimation. Prerequisite(s): ECE 503, ECE 561.

ECE 662. Adaptive Signal Processing. 3 Hours

An overview of the theory, design, and implementation of adaptive signal processors. This includes discussions of various gradient search techniques, filter structures, and applications. An introduction to neural networks is also included. Prerequisite(s): ECE 661.

ECE 663. Statistical Pattern Recognition. 3 Hours

This course provides a comprehensive treatment of the statistical pattern recognition problem. The mathematical models describing these problems and the mathematical tools necessary for solving them are covered in detail. Prerequisite(s): ECE 661.

ECE 674. Integrated Optics. 3 Hours

Asymmetric dielectric slab wave-guides; cylindrical wave-guides; multi-layer wave-guides; dispersion, shifting and flattening; mode coupling and loss mechanisms; selected nonlinear wave-guiding effects; integrated optical devices. Prerequisite(s): ECE 574.

ECE 676. Quantum Electronics. 3 Hours

Principles of the quantum theory of electron and photon processes; interaction of electromagnetic radiation and matter; applications to solid state and semiconductor laser systems. Prerequisite(s): ECE 506, ECE 573, EOP 506, or equivalent.

ECE 682. Nano-Fabrication Laboratory. 3 Hours

This laboratory course will provide hands-on experience in state-of-the-art device fabrication technology. The course will be conducted primarily in a clean room laboratory with some classroom sessions for discussions. The students will have an opportunity to design, fabricate and test their own devices. Prerequisite(s): Permission of instructor.

ECE 695. Special Problems in Electrical Engineering. 1-3 Hours

Special topics in electrical engineering not covered in regular courses. Course sections arranged and approved by the chair of the student's doctoral advisory committee and the department chair.

ECE 696. Graduate Seminar. 0-3 Hours

Research oriented independent study course intended for doctoral level graduate students. The student will perform an in-depth research on a selected topic of mutual interest with his/her doctoral adviser, and achieve sufficient expertise to do a technical presentation about the topic in front of his/her peers. The student will prepare a report and present it in one of the graduate seminar sessions during the semester. The student is expected to attend all the seminars presented by other graduate students during the semester and to interact with them to improve the depth and breadth of his/her knowledge.

ECE 698. DE Dissertation. 1-15 Hours

An original investigation as applied to electrical engineering practice. Results must be of sufficient importance to merit publication.

ECE 699. PhD Dissertation. 1-15 Hours

Original research in electrical engineering that makes a definite contribution to technical knowledge. Results must be of sufficient importance to merit publication.

Electro-Optics

- Doctor of Philosophy in Electro-Optics
- Master of Science in Electro-Optics

Partha Banerjee, Program Director

The interdisciplinary programs of study leading to the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) in electro-optics are administered by the School of Engineering with the cooperative support of the College of Arts and Sciences.

Doctor of Philosophy in Electro-Optics (EOP)

To be considered for admission to the Ph.D. program in Electro-Optics, a student must have received a M.S. degree in Electro-Optics or equivalent. Only the most promising student with a graduate GPA of 3.5 out of 4, or higher, or equivalent, may be admitted.

The minimum semester-hour requirement for the doctoral degree is 90 semester hours beyond the bachelor's degree (which must include the EO core or its equivalent), or 60 semester hours beyond the EO M.S. degree or equivalent. This includes the credit for the doctoral dissertation. Doctoral candidates are required to register for two semester hours of dissertation during the semester in which the dissertation is defended.

The Plan of Study of a student seeking the Ph.D. in Electro-Optics must successfully complete a minimum of 90 semester hours beyond the bachelor's degree which must include the following:

1. Core courses as given in the EO Master's program or equivalent
2. Twelve semester hours of approved 600-level Electro-Optics courses.
3. Six semester hours of approved graduate mathematics courses.
4. Twelve semester hours of Technical Electives.
4. Thirty semester hours of Ph.D. dissertation credits in Electro-Optics.

See also the Doctoral Degree Requirements in School of Engineering section in the bulletin and consult with the director of the electro-optics program.

Master of Science in Electro-Optics (EOP)

The individual Plan of Study will include the specific courses and all other requirements of the M.S. EO degree the student is expected to complete. The Plan of Study must be filed with the School of Engineering Office of Graduate Studies prior to registration for the tenth graduate credit hour or before registration for the third semester. The Plan of Study and any amendments thereto must be approved by the advisor, the Program Director, and the Associate Dean of the School of Engineering Office of Graduate Studies.

EOP 500	Introduction to Research in Electro-Optics	0
EOP 501	Geometric Optics	3
EOP 502	Optical Radiation & Matter	3
EOP 505	Introduction to Lasers	3

EOP 506	Electro-Optical Devices & Systems	3
EOP 513	Linear Systems & Fourier Optics	3
EOP 514	Guided-Wave Optics	3
EOP 541L	Geometric & Physical Optics Laboratory	1
EOP 542L	Electro-Optic System Laboratory	1
EOP 543L	Advanced Electro-Optics Laboratory	1
Technical Elective		3
Thesis Option: Six semester hours of EO thesis credits; Non-Thesis Option: Six approved additional credits of Technical Electives in EOP or ECE		6
Total Hours		30

See also Master's Degree Requirements in School of Engineering section in the bulletin and consult with the director of the electro-optics program.

Courses

EOP 500. Introduction to Research in Electro-Optics. 0 Hours

Introduction to research methods, laboratory safety, ethics, proposal writing, technical presentations.

EOP 501. Geometric Optics. 3 Hours

Wavefronts and rays; Fermat's principle; Gaussian optics of axially symmetrical systems; aperture stops; pupils and field lenses; Lagrange invariant; angular and visual magnification; optical systems; plane mirrors and prisms; aberration theory; introduction to computer ray tracing. Prerequisite(s): Acceptance into the graduate EO program or permission of program director.

EOP 502. Optical Radiation & Matter. 3 Hours

Maxwell's equations; electromagnetic waves; interaction of radiation with atomic electrons; molecular and lattice vibration; study of phenomena related to the interaction of optical radiation with matter; polarization; crystal optics; nonlinear dielectric effects. Prerequisite(s): Acceptance into the graduate EO program or permission of program director.

EOP 505. Introduction to Lasers. 3 Hours

Laser theory; coherence; Gaussian beams; optical resonators; properties of atomic and molecular radiation; laser oscillation and amplification; methods of excitation of lasers; characteristics of common lasers; laser applications. Prerequisite(s): (EOP 502 or a working knowledge of Maxwell's Equations; physical optics) or permission of instructor or program director.

EOP 506. Electro-Optical Devices & Systems. 3 Hours

Solid state theory of optoelectronic devices; photoemitters; photodetectors; solar cells; detection and noise; displays; electro-optic, magneto-optic, and acousto-optic modulators; integration and application of electro-optical components in electro-optical systems of various types. Prerequisite(s): EOP 502 or permission of instructor.

EOP 513. Linear Systems & Fourier Optics. 3 Hours

Mathematical techniques pertaining to linear systems theory; Fresnel and Fraunhofer diffraction; Fourier transform properties of lenses; frequency analysis of optical systems, spatial filtering, application such as optical information processing and holography. Prerequisite(s): Acceptance into the graduate EO program or permission of program director.

EOP 514. Guided-Wave Optics. 3 Hours

Light propagation in slab and cylindrical wave guides; signal degradation in optical fibers; optical sources, detectors, and receivers; coupling; transmission link analysis; fiber fabrication and cabling; fiber sensor system. Prerequisite(s): EOP 502 or permission of program director.

EOP 541L. Geometric & Physical Optics Laboratory. 1 Hour

Geometric optics; characterization of optical elements; diffraction; interference; birefringence and polarization. Prerequisite(s): EOP 501 or permission of program director.

EOP 542L. Electro-Optic System Laboratory. 1 Hour

Fiber optic principles and systems: numerical aperture, loss, dispersion, single and multimode fibers, communications and sensing systems. Project oriented investigations of electro-fiber-optic systems and devices in general: sources, detectors, image processing, sensor instrumentation and integration, electro-optic component, display technology, nonlinear optical devices and systems. Prerequisite(s): EOP 514 or permission of program director.

EOP 543L. Advanced Electro-Optics Laboratory. 1 Hour

Project-oriented investigations of laser characterization, interferometry, holography, optical pattern recognition and spectroscopy. Emphasis is on the applications of optics, electronics, and computer data acquisition and analysis to measurement problems. Prerequisite(s): EOP 541L or permission of program director.

EOP 595. Special Problems. 1-6 Hours

Special problems in Electro-Optics.

EOP 599. Thesis. 1-6 Hours

Thesis in Electro-Optics.

EOP 601. Optical Design. 3 Hours

Chromatic aberrations: doublet lens; telephoto, wide-angle, and normal lenses; triplet lens design and variations; optimization methods and computer lens design; optical transfer functions; telescopes and microscopes; two-mirror telescope design: aspheric surfaces; prism and folded optical systems, rangefinders; gratings and holographic optical elements; anamorphic optical systems; zoom systems. Prerequisite(s): EOP 501.

EOP 603. Interferometry. 3 Hours

No description available.

EOP 604. Integrated Optics. 3 Hours

Review of electromagnetic principles; dielectric slab waveguides; cylindrical dielectric waveguides; dispersion, shifting and flattening; mode coupling and loss mechanism; selected nonlinear waveguiding effects; integrated optical devices. Prerequisite(s): EOP 514.

EOP 621. Statistical Optics. 3 Hours

Optical phenomena and techniques requiring statistical methods for practical understanding and application; relevant statistical techniques for the analysis of image processing systems and the design of laser radar systems; engineering applications of statistical techniques. Prerequisite(s): Completion of the core courses of the graduate electro-optics program or permission of program director.

EOP 624. Nonlinear Optics. 3 Hours

Introduction and overview nonlinear optical interactions, classical and harmonic oscillator model, symmetry properties of nonlinear susceptibility tensor, coupled-mode formalism, sum- and difference-frequency generation, parametric oscillators, four-wave mixing, phase conjugation, optical solutions, stimulated Brillouin and Raman scattering, photorefractive effect, and resonant nonlinearities. Prerequisite(s): EOP 502 or equivalent.

EOP 626. Quantum Electronics. 3 Hours

Principles of the quantum theory of electron and photon processes; interaction of electromagnetic radiation and matter; applications to solid state and semiconductor laser systems. Prerequisite(s): (ELE 506 or ELE 573 or EOP 506) or equivalent.

EOP 631. Nanophotonics. 3 Hours

The fundamentals of nanoscale light-matter interactions, basic linear and nonlinear optical properties of photonic crystals and metals; nanoscale effects in photonic devices; computational and modeling techniques used in nanophotonics; nanofabrication and design tools; nanoscale optical imaging; principles of nanocharacterization tools. Prerequisite(s): EOP 501, EOP 502, knowledge of electromagnetism and radiation-matter interactions or permission from instructor.

EOP 632. Nano-Fabrication Laboratory. 3 Hours

This laboratory course will provide hands-on experience in state-of-the-art device fabrication technology. The course will be conducted primarily in a clean room laboratory with some classroom sessions for discussions. The students will have an opportunity to design, fabricate and test their own devices. Prerequisite(s): Permission of instructor.

EOP 655. Optical Communications. 3 Hours

No description available.

EOP 656. Free Space Optical Communications. 3 Hours

Laser beam propagation, random processes, wave propagation in turbulence, turbulence spectra, structure function, coherence length, anisoplanatism, Strehl ratio, scintillation index, long-time and short-time spot size, and beam wander, bit-error rates, adaptive optics corrections, performance analysis. Prerequisite(s): EOP 513, EOP 502, or knowledge of electromagnetism and radiation-matter interactions or permission from instructor.

EOP 665. Polarization of Light: Fundamentals & Applications. 3 Hours

The fundamentals and applications of the polarization properties of light; description of state of polarization; propagation of state of polarization; polarization devices; polarization in guided waves; polarization in multilayer thin films; ellipsometry and polarimetry; birefringent filters; spatially variant polarization; polarization in subwavelength structures. Prerequisite(s): EOP 502; basic knowledge of electromagnetism and linear algebra or permission of instructor.

EOP 690. Selected Readings in Electro-Optics. 1-3 Hours

Directed readings in electro-optics areas to be arranged and approved by the chair of the student's advisory committee and the program director.

EOP 695. Special Problems in Electro-Optics. 1-3 Hours

Special topics in electro-optics not covered in regular courses. Course sections arranged and approved by the chair of the student's advisory committee and program director.

EOP 699. PhD Dissertation. 1-15 Hours

Original research in electro-optics which makes a definite contribution to technical knowledge. Results must be of sufficient importance to merit publication.

Engineering

- Master of Science in Engineering

Eddy M. Rojas, Dean

The Master of Science in engineering allows flexibility for general or specialized program construction according to the needs of the individual student in conformance with the requirements of the School of Engineering and the University of Dayton.

Master of Science in Engineering (EGR)

The program of study leading to the Master of Science in engineering must include a minimum of 33 semester hours of the following:

Fifteen semester hours in a major area	15
Fifteen semester hours of electives	15
Three semester hours of research on an approved project	3
Total Hours	33

See also Master's Degree Requirements in School of Engineering section in the bulletin and consult with the director of the Master of Science in engineering program.

Courses

EGR 590. Selected Readings. 1-6 Hours

Directed readings on an interdisciplinary engineering topic approved by the student's academic advisor and the department chair. May be repeated. Possible topics include: (a) Research Ethics, (b) Engineering Innovation, (c) Entrepreneurship, or (d) Multidisciplinary Design. Prerequisite(s): Variable.

Engineering Management

- Master of Science in Engineering Management
- Certificate, Design of Experiments
- Certificate, Six Sigma
- Certificate, Systems Engineering

Edward F. Mykytka, Department Chairperson

The program of study leading to the Master of Science in Engineering Management is designed to prepare engineers and aspiring engineers for leadership roles in engineering activities in industry, government, business and the military. Graduates should be able to model, analyze and make the difficult decisions required of engineering leaders, after learning course methodologies in statistics, operations research and simulation, and practicing these methodologies by using data and current analytical tools to solve real-world problems. For more information see: <http://engineering.udayton.edu/programs/management>

Most courses are simulcast (offered in the classroom at the same time as they are offered via distance learning over the Internet at 11:30 a.m., 4:30 p.m., and 6:00 p.m.). These classes meet twice per week, typically Monday and Wednesday or Tuesday and Thursday. Nearly every course is live in the classroom, live on the Internet, and recorded for future reference for the students.

In 2012, *U.S. News & World Report* ranked our department second in the nation in faculty credentials and training, 26th in student services and technology, and 35th in student engagement and accreditation.

Master of Science in Engineering Management (ENM)

The program includes a minimum of 36 semester hours consisting of the following:

Core Courses

ENM 500	Probability & Statistics for Engineers	3
ENM 505	Management of Engineering Systems	3
MSC 521	Introduction to Operations Research	3
ENM 530	Engineering Economy	3
MSC 572 or MSC 555	System Simulation System Dynamics I	3
ENM 582	Engineering Organizational Development	3

ENM 590	Case Studies in Engineering Management	3
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Group I Management-focused ENM Electives

Select one of the following:	3
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ENM 515	Human Factors Engineering
ENM 517	Legal Aspects of Engineering
ENM 539	System Engineering/Project Management
ENM 585	Engineering Organizational Systems
ENM 587	Leading in Technical Environments

Group II Application-focused ENM Electives

Select two of the following:	6
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ENM 534	Decision Making
ENM 541	Production Engineering
ENM 560	Quality Assurance
ENM 561	Design & Analysis of Experiments
ENM 563	Advanced Engineering Design
ENM 565	Reliability Engineering I
MSC 555	System Dynamics I ¹
or MSC 572	System Simulation

Electives

Indicate two of the following courses or choose from ENM Group I or Group II Electives or from other fields of engineering.	6
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ENM 503	Engineering Analysis - Methods & Models
ENM 566	Reliability Engineering II
ENM 595	Spcl Prj in Engr Mgmt

Total Hours	36
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¹ Whichever is not taken as core.

See Master's Degree Requirements in the School of Engineering Bulletin, in the General Information section, and consult with the program director. When applying for the ENM degree, please note that the Department of Engineering Management & Systems does not require the three letters of recommendation, a personal statement or resume, or GRE results as required by many other University of Dayton departments and programs.

The supporting classes and electives within the engineering program of study allows concentrations in areas such as six sigma quality, manufacturing, artificial intelligence, reliability engineering, operations research, and systems engineering, and simulation.

Certificates

Programs of study leading to three graduate-level certificates are also available.

Certificate in Six Sigma (SXS)

The Certificate in Six Sigma is designed to offer practicing engineers and other technically-educated professionals the opportunity to master Six Sigma concepts by studying their theoretical roots and conceptual foundations through coursework at the graduate level. Upon successful completion, students are expected to be able to demonstrate an in-depth understanding of the statistical concepts underlying the methods & tools of Six Sigma, correctly apply those methods & tools, correctly analyze and interpret the results, and pursue further research or coursework in the area.

The certificate program is comprised of the following four courses:

ENM 500	Probability & Statistics for Engineers	3
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ENM 560	Quality Assurance	3
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ENM 561	Design & Analysis of Experiments	3
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ENM 565	Reliability Engineering I	3
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Total Hours	12
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Certificate in Systems Engineering (SYE)

Systems engineering is an interdisciplinary approach and means to enable the realization of successful systems. It focuses on defining customer needs and required functionality early in the development cycle, documenting requirements, and then proceeding with design synthesis and system validation while considering the system as a whole.

The certificate program is comprised of the following four courses:

ENM 505	Management of Engineering Systems	3
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ENM 530	Engineering Economy	3
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ENM 539	System Engineering/Project Management	3
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ENM 582	Engineering Organizational Development	3
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Total Hours	12
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Certificate in Design of Experiments (DEX)

This certificate is offered to those technical professionals in the engineering and scientific community to furnish them with efficient techniques to solve challenging problems in key processes and product quality experimentation and design.

The certificate program is comprised of the following three courses:

ENM 500	Probability & Statistics for Engineers	3
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ENM 561	Design & Analysis of Experiments	3
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ENM 590	Case Studies in Engineering Management	3
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Total Hours	9
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Courses

ENM 500. Probability & Statistics for Engineers. 3 Hours

This is an introductory course in the concepts and applications of probability and statistics. Emphasis is on applications and examples that an engineer or analyst would encounter in practice. Probability is presented as the fundamental tool for modeling uncertainty as well as the logical connection between a population of data and its samples. Descriptive statistics are introduced to describe and characterize data. Inferential statistics provide the means of generalizing to a population from a sample, thus enabling solutions and conclusions that otherwise would not be obtained. Modern software provides the leverage to tackle problems of realistic size and complexity. The concepts and methods covered have direct application to forecasting, queuing, inventory, production, scheduling, equipment replacement, reliability, availability, quality control, experimental design, robust engineering, six sigma, and more. Prerequisite(s): An undergraduate course sequence in calculus.

ENM 501. Applied Engineering Statistics. 3 Hours

Concepts and applications of advanced probability modeling and statistical techniques used in the study and solution of operations research/management science problems. The focus of this course is on the application of probability and statistics in the formulation and solution of models found in OR studies and in engineering design studies. This course builds upon the foundation established in the ENM 500 course. Prerequisite(s): ENM 500 or equivalent.

ENM 503. Engineering Analysis - Methods & Models. 3 Hours

Mathematical methods and models used in the study and solution of decision problems found in engineering and operations research/management science. The methods and models presented build on the student's mathematical foundation and are motivated by their use in solving real-world problems. This is not a concept-theory course but rather a course designed to enhance the modeling and analysis skills of the student. Prerequisite(s): An undergraduate course sequence in calculus.

ENM 505. Management of Engineering Systems. 3 Hours

This course addresses customer, systems, and operational requirements with allocation to the component level, using the iterative process of analysis, evaluation and synthesis with life-cycles for systems, product, process and disposal. Decision-making for alternatives is covered with the 'ilities' under risk and uncertainty. Optimization topics and the time value of money are included.

ENM 515. Human Factors Engineering. 3 Hours

Treatment of theory, data, and methods that can be applied to improve the interface between humans and the systems and products that they use. Human capabilities and limitations are studied to support the design of systems and products for safe and efficient use by the human operator.

ENM 517. Legal Aspects of Engineering. 3 Hours

An introductory course to provide the engineer with some insight into the areas of law that will impact an engineer's professional practice. Special emphasis is given to the area of Contract Law due to the important and pervasive interaction that it has with engineering design and project work. Systems of law, legal reasoning, and the court systems are introduced. Product liability and business relationships are discussed. Courtroom experience is achieved through interaction with the UD Law School and local judges with participation in mock trials.

ENM 530. Engineering Economy. 3 Hours

This is an introductory course in the concept of time value of money and financial management for engineering managers. The course includes learning curves, cost estimating, managerial accounting, balance sheet and income statement, financial ratios, investment alternatives, depreciation, inflation, capital budgeting and other related topics.

ENM 534. Decision Making. 3 Hours

Introduction to rational decision-making with applications in the analysis and design of engineering and management systems. Topics explored are decision-making under uncertainty and risk as well as under certainty, group decision-making, multiple-criteria decision-making, naturalistic and practical decision making. Prerequisite(s): ENM 500 or equivalent.

ENM 539. System Engineering/Project Management. 3 Hours

This course addresses the concepts, techniques and procedures used to manage engineering programs and projects. This course provides a complete overview of the systems engineering and project management tools and methodologies used to plan, control and execute programs or projects. Included are SE requirements, SE architecture, SE integration, project screening and selection; multiple-criteria methods for evaluation; work breakdown structures (WBS) and organization; configuration selection, management and control; project scheduling; project budgets; resource management; research and development projects; and computer support for project management.

ENM 541. Production Engineering. 3 Hours

Study of the integration of man, machine, and material in producing a marketable product. The use of engineering techniques to design, develop, and implement the production system are covered. Topics include break-even analysis, learning curve theory, forecasting, resource balancing, inventory and production control, facility layout and location, job sequencing and scheduling, and assembly line balancing. Modern production techniques such as just-in-time (JIT), MRP systems flexible manufacturing, and computer-integrated manufacturing are discussed. Prerequisite(s): MSC 521 or permission of instructor.

ENM 560. Quality Assurance. 3 Hours

Introduction to the fundamental concepts and methods of modern approaches to quality assurance, with emphasis on statistical methods for process control, process capability analysis, and sampling inspection. The course introduces relevant methods of experimental design and current issues in quality improvement. Prerequisite(s): ENM 500 or equivalent.

ENM 561. Design & Analysis of Experiments. 3 Hours

This course introduces advanced topics in experimental design and analysis, including full and fractional factorial designs, response surface analysis, multiple and partial regression, and correlation. Prerequisite(s): ENM 500 or equivalent.

ENM 562. Robust Engineering. 3 Hours

Robust engineering methods lead to products and processes that function well in spite of variable customer environments and usage patterns, internal deterioration and ageing of components, and unit-to-unit variation in subassemblies. The key concept is using experimental design to neutralize these sources of performance variability. This course presents the still vital Taguchi methods that pioneered the methodology as well as modern work to improve on and expand Taguchi's principals. Prerequisite(s): ENM 500 or equivalent.

ENM 563. Advanced Engineering Design. 3 Hours

This graduate-level course seeks to develop in students the ability to integrate dynamic mechanisms (i.e., heat transfer, fluid dynamics, electrical responses, etc.) into system modeling and analyses with uncertainty supporting the verification and validation of systems. Additionally, statistically-based analysis, design, and optimization will be addressed through open-ended problems with explicit considerations of system-level impacts, engineering tradeoffs, and system integration. A course project is required that must demonstrate application of the statistically-based design process. Prerequisite(s): ENM 561 or equivalent; Instructor permission.

ENM 565. Reliability Engineering I. 3 Hours

An introduction to reliability engineering concepts and methodology.

The reliability, maintainability, and availability of components and multi-component systems are analyzed. Topics include exponential, Weibull, lognormal and normal failure laws, static reliability, hazard rate functions, state dependent failure rate models, redundancy, censoring, empirical models, curve fitting to failure data, and reliability growth testing.

Prerequisite(s): ENM 500 or equivalent.

ENM 566. Reliability Engineering II. 3 Hours

Continuation of ENM 565 with emphasis on the design of systems to meet specified reliability, availability, and maintainability requirements.

Prerequisite(s): ENM 565 or equivalent.

ENM 582. Engineering Organizational Development. 3 Hours

This course addresses individual, group behavior, and organizational design examined within the structure of technical operations, including the systems engineering environment. The objectives are to provide the participants with an understanding of behavioral science and design principles, their effect on organizational performance, and how one applies this science in the management of technical personnel and projects, especially in the systems engineering environment.

ENM 585. Engineering Organizational Systems. 3 Hours

Introduction to organizational theory and practice with emphasis on the design of organizational structures for the effective integration of production, research and development, and engineering activities. Special topics include high performing systems, the technical ad-hoc committee, matrix organization, and project management and other current issues.

ENM 587. Leading in Technical Environments. 3 Hours

Understanding and utilizing the keys to leading in technical organizations represents a distinct advantage to individuals and the institutions they serve. Students will be exposed to the underpinning of leadership in engineering environments including tenets, theories, debates, strategies, and innovative techniques. Opportunities to interact with technical leaders from government and industry will be provided. Practical application skills will be developed.

ENM 590. Case Studies in Engineering Management. 3 Hours

This capstone course emphasizes the completion of an engineering management project or study under the direction of a faculty advisor. A well-written report is required. Prerequisite(s): Completion of the engineering management core courses or equivalent.

ENM 595. Special Problems in Engineering Management. 1-3 Hours

This course covers special assignments in engineering management as arranged and approved by the advisor and the program director.

Engineering Mechanics

- Master of Science in Engineering Mechanics

Donald V. Chase, Department Chairperson

Master of Science in Engineering Mechanics (EME)

The program of study for the degree of Master of Science in Engineering Mechanics requires 30 semester hours of credit consisting of the following:

EGM 503	Introduction to Continuum Mechanics	3
EGM 533	Theory of Elasticity	3
EGM 546	Finite Element Analysis I	3

MTH 535	Partial Differential Equations	3
MTH 551	Methods of Mathematical Physics	3
Three elective semester hours in 1) engineering mechanics, 2) mathematics, and 3) engineering or basic science		9
Six semester hours of research on an approved thesis. Thesis credit may be replaced by six semester hours of coursework only with the approval of both the advisor and the department chair.		6
Total Hours		30

See also Master's Degree Requirements in School of Engineering section in the bulletin and consult with the advisor.

Courses

EGM 500. Introduction to Numerical Methods. 3 Hours

Numerical analysis topics include the solution of systems of linear and nonlinear algebraic equations; matrix eigenvalue problems; ordinary differential equations; optimization techniques; numerical integration and interpolation. Engineering applications presented. Computer programming required.

EGM 502. Advanced Engineering Analysis. 3 Hours

Detailed analysis of engineering problems using laws of nature, fundamental engineering principles, mathematics, computers, and practical experience to construct, resolve, and test analytic models of physical events. Emphasis is on the use of the professional engineering approach which includes formulation of the problem, assumptions, plan or method of attack, solving the problem, and checking and generalizing results.

EGM 503. Introduction to Continuum Mechanics. 3 Hours

Tensors, calculus of variations, Lagrangian and Eulerian descriptions of motion. General equations of continuum mechanics, constitutive equations of mechanics, thermodynamics of continua. Specialization to cases of solid and fluid mechanics. Prerequisite(s): EGM 303 or equivalent.

EGM 504. Fundamentals of Fluid Mechanics. 3 Hours

An advanced course in fluid mechanics with emphasis on the derivation of conservation equations and the application of constitutive theory. Navier-Stokes equations. Ideal fluid approximation. Exact and approximate solutions to classical viscous and inviscid problems. Compressible and incompressible flows. Prerequisite(s): EGM 503.

EGM 506. Mechanical Behavior of Materials. 3 Hours

Fundamental relationships between the structure and mechanical behavior of materials. Includes fundamentals of stress and strain, the physical basis for elastic deformation, elementary dislocation theory and plastic deformation, strengthening mechanisms, yield criteria and their application to biaxial and multi-axial behavior and failure, fracture and toughening mechanisms, creep and creep rupture, behavior and failure of cellular solids, and fatigue. Prerequisite(s): EGM 303.

EGM 511. Experimental Stress Analysis. 3 Hours

Study of the experimental analysis of stress as an aid to design for strength and economy with emphasis on electrical strain gages. Also, photoelasticity, brittle coatings, analogies, structural similitude. Two hours lecture and one three-hour laboratory period per week. Prerequisite(s): EGM 303 or equivalent.

EGM 519. Analytic Dynamics. 3 Hours

Dynamical analysis of a system of particles and rigid bodies; Lagrangian and Hamiltonian formulation of equations of motion; classical integrals of motion. Stability analysis of linear and nonlinear systems. Prerequisite(s): EGM 202, MTH 219 or equivalent; or permission of instructor.

EGM 531. Linear Viscoelasticity. 3 Hours

Principles of viscoelasticity; Kelvin and Maxwell models of viscoelastic materials; creep and relaxation phenomena; application of hereditary integral and complex compliance; correspondence principle wave propagation and vibrational response. Prerequisite(s): MTH 219 and EGM 303 or equivalent.

EGM 533. Theory of Elasticity. 3 Hours

Three-dimensional stress and strain at a point; equations of elasticity in Cartesian and curvilinear coordinates; methods of formulation of equations for solution, plane stress and plane strain; energy formulations; numerical solution procedures. Prerequisite(s): EGM 303 or equivalent. Corequisite(s): EGM 503.

EGM 534. Theory: Plates & Shells. 3 Hours

Theory of plates: small and large displacement theories of thin plates; shear deformation; buckling; sandwich plate theory. Thin shell theory: theory of surfaces; thin shell equations in orthogonal curvilinear coordinates; bending, membrane, and shallow shell theories. Prerequisite(s): EGM 533.

EGM 536. Random Vibrations. 3 Hours

Introduction to probability distribution; characterization of random vibrations; harmonic analysis; auto- and cross-correlation and spectral density; coherence; response to single and multiple loadings; Fast Fourier Transform (FFT); applications in vibrations, vehicle dynamics, fatigue, etc. Prerequisite(s): MEE 319; computer programming; permission of instructor.

EGM 538. Introduction to Aeroelasticity. 3 Hours

Study of the effect of aerodynamic forces on a flexible aircraft. Flexibility coefficients and natural modes of vibration. Quasi-steady aerodynamics. Static aeroelastic problems; wing divergence and dynamic aeroelasticity; wing flutter. An introduction to structural stability augmentation with controls. Prerequisite(s): AEE 501.

EGM 540. Composite Design. 3 Hours

Design with fiber reinforced composite materials. Fiber and resin selection, laminate design, bending and torsion of stiffening elements, open and filled holes, joining methods, fatigue, damage tolerance, building block approach, design Prerequisite(s): EGM 303 or equivalent.

EGM 541. Composite Materials. 3 Hours

Introduction to the mechanical response of fiber-reinforced composite materials with emphasis on the development of experimental methodology. Analytical topics include stress-strain behavior of anisotropic materials, laminate mechanics, and strength analysis. Theoretical models are applied to the analysis of experimental techniques used for characterizing composite materials. Lectures are supplemented by laboratory sessions in which characterization tests are performed on contemporary composites. Prerequisite(s): EGM 303 or equivalent.

EGM 543. Analytical Mechanics Composite Materials. 3 Hours

Analytical models are developed for predicting the mechanical and thermal behavior of fiber-reinforced composite materials as a function of constituent material properties. Both continuous and discontinuous fiber-reinforced systems are considered. Specific topics include basic mechanics of anisotropic materials, micro-mechanics and lamination theory, free edge effects, and failure criteria. Prerequisite(s): EGM 303 or equivalent.

EGM 545. Computational Methods Design. 3 Hours

Modeling of mechanical systems and structures, analysis by analytical and numerical methods, development of mechanical design criteria and principles of optimum design and analysis, use of the digital computer as an aid in the design of mechanical elements. Prerequisite(s): Computer programming.

EGM 546. Finite Element Analysis I. 3 Hours

Fundamental development of the Finite Element Method (FEM) and solution of field and structural problems. Variational principles and weak forms; finite element discretization; shape functions; finite elements for field problems; bar, beam, plate, and shell elements; isoparametric finite elements; stiffness, nodal force, and mass matrices; matrix assembly procedures; computer coding techniques; modeling decisions; program output interpretation. Emphasis on a thorough understanding of FEM theory and modeling techniques. Prerequisite(s): EGM 503 or EGM 533.

EGM 547. Finite Element Analysis II. 3 Hours

Advanced topics: heat transfer; transient dynamics; nonlinear analysis; substructuring and static condensation; effects of inexact numerical integration and element incompatibility; patch test; frontal solution techniques; selected topics from the recent literature. Prerequisite(s): EGM 546.

EGM 548. Energy Methods: Solid Mechanics. 3 Hours

Development of fundamental energy principles; virtual displacements, strain energy, Castigliano's theorems, minimum potential energy principles. Applications to engineering problems; redundant structures, buckling, static and dynamic analysis. Prerequisite(s): EGM 503 or EGM 533.

EGM 549. Theory of Elastic Stability. 3 Hours

Introduction to stability theory; buckling of plates and shells; influence of initial imperfections; nonlinear analysis; numerical solution methods. Prerequisite(s): EGM 533.

EGM 552. Boundary Layers. 3 Hours

Development of the Prandtl boundary layer approximation in two and three dimensions for both compressible and incompressible flow. Exact and approximate solutions for laminar flows. Unsteady boundary layers. Linear stability theory and transition to turbulence. Empirical and semi-empirical methods for turbulent boundary layers. Higher order boundary layer theory. Prerequisite(s): EGM 504 or equivalent.

EGM 553. Compressible Flow. 3 Hours

Fundamental equations of compressible flow. Introduction to flow in two and three dimensions. Two-dimensional supersonic flow, small perturbation theory, method of characteristics, oblique shock theory. Introduction to unsteady one-dimensional motion and shock tube theory. Method of surface singularities. Prerequisite(s): EGM 503.

EGM 570. Fracture Mechanics. 3 Hours

Application of the principles of fracture mechanics to problems associated with fatigue and fracture in engineering structures. Development of models that apply to a range of materials, geometries, and loading conditions. Prerequisite(s): EGM 506 or permission of instructor.

EGM 575. Fracture & Fatigue of Metals & Alloys I. 3 Hours

Effects of microstructure on the fracture and fatigue behavior of engineering metals and alloys with the special emphasis on static and dynamic brittle and ductile failures and static and fatigue crack initiation. Alloy fracture resistance, fracture toughness, fatigue behavior, and methods to improve fracture and fatigue behavior will be discussed in detail. Various analytical techniques for failure analysis of structural components will be presented. A practical failure analysis project will be performed. Prerequisite(s): MAT 501 or EGM 506 or permission of instructor.

EGM 576. Fracture & Fatigue II. 3 Hours

This course will cover the areas of the effects of microstructure on fatigue crack propagation on fracture and fatigue. This includes fatigue life prediction, damage tolerance approach to component design and microstructural and structural synthesis for optimum behavior. Specific material-related aspects of fatigue mechanisms, fracture mechanics approach, and failure analysis will also be covered. Prerequisite(s): EGM 575 or equivalent.

EGM 590. Selected Readings in Engineering Mechanics. 3 Hours

Directed readings in a designated area, arranged and approved by the student's faculty advisor and the department chair. May be repeated.

EGM 595. Special Problems in Engineering Mechanics. 3 Hours

Special topics arranged and approved by the student's faculty advisor and the department chair.

EGM 598. Project. 3 Hours

Project in Engineering Mechanics.

EGM 599. Thesis. 3-6 Hours

Thesis in Engineering Mechanics.

Management Science

- Master of Science in Management Science
- Certificate, Design of Experiments
- Certificate, Six Sigma
- Certificate, Systems Engineering

Edward F. Mykytka, Department Chairperson

The program of study leading to the Master of Science in management science is an interdisciplinary program administered by the School of Engineering, with the cooperative support of the College of Arts and Sciences, the School of Business Administration and the School of Education and Health Sciences. Applications are invited from college graduates in all fields of study - business, education, engineering, liberal arts, physical sciences and social sciences. The applicant whose preparation does not include at least three semesters of analytic geometry and calculus will be expected to complete appropriate prerequisite courses prior to admission to the program. Check us out at <http://engineering.udayton.edu/programs/management>

The management scientist is the manager or staff specialist who is trained in the quantitative methodologies of operations research, systems analysis, and the decision sciences. Graduates must be proficient in problem solving and decision-making, system modeling and optimization and the application of probability and statistical theory to management problems. Graduates must also be familiar with a variety of other topics, such as quality control, inventory planning and control, reliability and maintainability, and system simulation.

The objective of this program is to develop quantitative management skills and capabilities appropriate to each student's needs and objectives.

The program emphasizes the practical application of management science techniques in our modern society.

Most courses are simulcast (offered in the classroom at the same time as they are offered via distance learning over the Internet at 11:30 a.m., 4:30 p.m., and 6:00 p.m.). These classes meet twice per week, typically Monday and Wednesday or Tuesday and Thursday. Nearly every course is live in the classroom, live on the internet, and recorded for future reference for the students.

In 2012, *U.S. News & world Report* ranked our department second in the nation in faculty credentials and training, 26th in student services and technology, and 35th in student engagement and accreditation.

Master of Science in Management Science (MSC)

The program of study must include a minimum of 36 semester hours consisting of the following:

ENM 500	Probability & Statistics for Engineers	3
MSC 521	Introduction to Operations Research	3
MSC 535	Applied Operations Research/Management Science	3
MSC 572	System Simulation	3

Group I - Probabilistic Modeling Electives

Select at least two of the following: 6

ENM 501	Applied Engineering Statistics
ENM 505	Management of Engineering Systems
ENM 560	Quality Assurance
ENM 561	Design & Analysis of Experiments
ENM 563	Advanced Engineering Design
ENM 565	Reliability Engineering I
MSC 544	Forecasting & Time Series Analysis
MSC 546	Queueing Theory & Application

Group II - Deterministic Modeling Electives

Select at least two of the following: 6

ENM 515	Human Factors Engineering
ENM 530	Engineering Economy
ENM 539	System Engineering/Project Management
ENM 541	Production Engineering
ENM 565	Reliability Engineering I
ENM 582	Engineering Organizational Development
MSC 522	Topics in Operations Research
MSC 523	Nonlinear Optimization
MSC 526	Linear & Integer Optimization
MSC 527	Advanced Topics in Optimization
MSC 542	Inventory Theory & Application
MSC 555	System Dynamics I
MSC 556	System Dynamics II
MSC 575	Introduction to Artificial Intelligence
MSC 577	Introduction to Expert Systems
MSC 579	Special Topics: Artificial Intelligence
MSC 595	Current Problems
MSC 599	Thesis

Twelve semester hours in a cognate field-or additional in-depth MSC 12 courses- appropriate to the student's objectives, as approved by the advisor. Approved fields of study for the cognate field include applied mathematics, artificial intelligence, business administration, computer science, educational administration, engineering, and manufacturing. Two of these courses may be replaced by a 6-semester hour Master's thesis.

Students admitted conditionally will first take the ENM 503 course and then the ENM 500 course the following term. Grades of "B" or better must be earned in each course so the student can be removed from conditional standing. The ENM 503 course will replace one of the program's free electives.

Total Hours	36
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When applying for the MSC degree, please note that the Department of Engineering Management and Systems does not require the three letters of recommendation, a personal statement or resume, or GRE results as required by other University of Dayton departments and programs.

Certificates

Programs of study leading to three graduate-level certificates are also available. These certificates are based on a complete knowledge of calculus. Students seeking any of these graduate certificates must apply to and be accepted for admission into a University of Dayton graduate degree program. All Graduate School policies pertaining to admission apply.

Certificate in Six Sigma (SXS)

The Certificate in Six Sigma is designed to offer practicing engineers and other technically-educated professionals the opportunity to master Six Sigma concepts by studying their theoretical roots and conceptual foundations through coursework at the graduate level. Upon successful completion, students are expected to be able to demonstrate an in-depth understanding of the statistical concepts underlying the methods & tools of Six Sigma, correctly apply those methods & tools, correctly analyze and interpret the results, and pursue further research or coursework in the area.

The certificate program is comprised of the following four courses:

ENM 500	Probability & Statistics for Engineers	3
ENM 560	Quality Assurance	3
ENM 561	Design & Analysis of Experiments	3
ENM 565	Reliability Engineering I	3
Total Hours		12

Certificate in Systems Engineering (SYE)

Systems engineering is an interdisciplinary approach and means to enable the realization of successful systems. It focuses on defining customer needs and required functionality early in the development cycle, documenting requirements, and then proceeding with design synthesis and system validation while considering the system as a whole.

The certificate program is comprised of the following four courses:

ENM 505	Management of Engineering Systems	3
ENM 530	Engineering Economy	3
ENM 539	System Engineering/Project Management	3
ENM 582	Engineering Organizational Development	3
Total Hours		12

Certificate in Design of Experiments (DEX)

This certificate is offered to those technical professionals in the engineering and scientific community to furnish them with efficient techniques to solve challenging problems in key processes and product quality experimentation and design.

This certificate program is comprised of the following three courses:

ENM 500	Probability & Statistics for Engineers	3
ENM 561	Design & Analysis of Experiments	3
ENM 590	Case Studies in Engineering Management	3
Total Hours		9

Courses

MSC 521. Introduction to Operations Research. 3 Hours

This course covers methods, principles and fundamentals of deterministic and stochastic operations research. Emphasis is on the formulation and solution of mathematical models in decision making environments, the search for optimal solutions to these decisions, and the explicit treatment of uncertainty through the use of probabilistic modeling and statistical analysis. Models include linear and non linear programs, inventory and production models, decision analysis, forecasting, and queuing. Corequisite(s): ENM 500.

MSC 522. Topics in Operations Research. 3 Hours

In depth study of the methods, principles and fundamentals of operations research, designed to provide additional depth and breadth in selected operations research subject areas. The selection of topics is based upon their usefulness in solving real world problems and their capability to enhance the student's model-building and model-solving skills. This course will further enable the student to pursue studies in operations research through the elective program, self-study and review of the published operations research literature. Prerequisite(s): MSC 521 or equivalent.

MSC 523. Nonlinear Optimization. 3 Hours

This course concentrates on methods and engineering/management science applications of nonlinear optimization. Both single- and multi-variable methods as well as unconstrained and constrained problems are addressed. The course blends theoretical results such as the Kuhn-Tucker conditions and numerical search techniques such as conjugate directions with applications.

MSC 526. Linear & Integer Optimization. 3 Hours

This course covers advanced topics in linear and integer programming with application to real-world problems. Topics include the revised simplex method, the dual-simplex method, interior point algorithms, duality and sensitivity analysis, decomposition principle, and goal and integer programming. Prerequisite(s): MSC 521 or equivalent.

MSC 527. Advanced Topics in Optimization. 3 Hours

This course emphasizes advanced topics in nonlinear or linear optimization with application to the solution of real-world problems. Topics reflect the state of the art in mathematical programming and optimization. Prerequisite(s): MSC 521; permission of instructor.

MSC 535. Applied Operations Research/Management Science. 3 Hours

This is a capstone course focused on the art rather than the 'science' of problem solving in management science and operations research. Emphasis is placed on the techniques of problem solving and model building, examination of unique problem cases, and a course project requiring modeling, data collection, and analysis. Prerequisite(s): Completion of the management science core courses or equivalent.

MSC 542. Inventory Theory & Application. 3 Hours

In-depth coverage of inventory theory including both deterministic and stochastic models. Topics include EOQ models, quantity discounting, constrained inventory, the fixed reorder point model, the fixed review model, repairable inventory systems, and dynamic inventory/production models. Also discussed are system backorder and availability models. Both public and private sector applications are covered. Prerequisite(s): MSC 521 or equivalent.

MSC 544. Forecasting & Time Series Analysis. 3 Hours

Concentration on statistical techniques for modeling and predicting discrete time-series phenomena, with emphasis on understanding and applying forecasting tools in analysis and management settings. Both classical smoothing methods and the Box-Jenkins methodology for model identification, estimation, and prediction are presented. Prerequisite(s): MSC 500 or equivalent.

MSC 546. Queuing Theory & Application. 3 Hours

Emphasis on application of queuing theory to engineering problems. Machine interference, mathematical queuing models, marketing models, servicing problems, Monte Carlo techniques, and computer simulation models are covered. Prerequisite(s): MSC 521 or equivalent.

MSC 555. System Dynamics I. 3 Hours

Introduction to the methodology for modeling the dynamics of complex engineering, business, and socioeconomic systems. These models are used to study the effect of organizational policies and design in higher-order, multiple-loop, nonlinear feedback systems.

MSC 556. System Dynamics II. 3 Hours

Continuation of MSC 555 with emphasis on the study of large-scale corporate, urban, educational, and ecological systems. Prerequisite(s): MSC 555 or equivalent.

MSC 572. System Simulation. 3 Hours

This course is an introduction to stochastic discrete event simulation of complex systems and human performance. Topics covered include model creation, 2D and 3D animation, the process of generating random numbers and random variables, the analysis of input data, the computer modeling of real systems, validation and variation, and the analysis of simulation output. ARENA is the primary software used and Micro Saint Smart is demonstrated and is the secondary software used.

MSC 575. Introduction to Artificial Intelligence. 3 Hours

Introduction to the methods of artificial intelligence with an emphasis on engineering design and analysis. Topics include logical and probabilistic reasoning, pattern matching, knowledge representation, search, rule-based systems, natural language processing, and computer vision. Concepts and applications are illustrated with Lisp programs.

MSC 577. Introduction to Expert Systems. 3 Hours

Introduction to the development and application of rule-based systems using an integrated environment of commands, rules, databases, spreadsheets, text processing, and forms. Topics include knowledge representation, inference, search, ID3 algorithm, and logic along with suitable applications and their subsequent implementations.

MSC 579. Special Topics: Artificial Intelligence. 1-6 Hours

Special topics include engineering applications using neural net architecture, object-oriented programming, genetic algorithm and advanced search methods illustrated in Common Lisp and a rule-based environment. Prerequisite(s): MSC 575, 577, or permission of instructor.

MSC 595. Current Problems. 1-3 Hours

Topics of current interest in specialized areas of Management Science.

MSC 599. Thesis. 6 Hours

Thesis in Management Science.

Materials Engineering

- Doctor of Engineering, Materials Engineering
- Doctor of Philosophy in Engineering, Materials Engineering
- Master of Science in Materials Engineering

Charles Browning, Program Director

Doctor of Engineering, Materials Engineering (MAT)

See the Doctoral Degree Requirements section on the School of Engineering page and consult with the department chair.

Doctor of Philosophy in Engineering, Materials Engineering (MAT)

See the Doctoral Degree Requirements section on the School of Engineering page and consult with the department chair.

Master of Science in Materials Engineering (MAT)

The program of study leading to the Master of Science in materials engineering must include a minimum of 30 semester hours consisting of the following:

Twelve semester hours in the major field	12
Twelve semester hours of approved electives from current course offerings which best suit the student's requirements.	12
Six semester hours of research on a materials engineering project or thesis. Upon the request of the student and with the approval of the advisor and the program director, this may be replaced by six semester hours of additional coursework.	6
Total Hours	30

See also Master's Degree Requirements in School of Engineering section in the bulletin and consult with the advisor.

Courses

MAT 501. Principles of Materials I. 3 Hours

Structure of engineering materials from electronic to atomic and crystallographic considerations. Includes: atomic structure and interatomic bonding, imperfections, diffusion, mechanical properties, strengthening mechanisms, failure, phase diagrams, phase transformations and processing. Prerequisite(s): MTH 219; college chemistry; college physics.

MAT 502. Principles of Materials II. 3 Hours

Structure, behavior, and processing of metal alloys, ceramics, polymers, and composites to include: mechanical behavior, corrosion, electrical, magnetic, and optical properties. Prerequisite(s): MAT 501 or equivalent.

MAT 504. Techniques of Materials Analysis. 3 Hours

Fundamentals and applications of the traditional analytical methods such as x-ray analysis, electron microprobe, and scanning microscopy. Techniques such as NMR, atomic absorption, Raman, Mossbauer, and field ion microscopy will be covered. Emphasis on applicability. Prerequisite(s): MAT 501 or permission of instructor.

MAT 506. Mechanical Behavior of Materials. 3 Hours

Fundamental relationships between the structure and mechanical behavior of materials. Includes fundamentals of stress and strain, the physical basis for elastic deformation, elementary dislocation theory and plastic deformation, strengthening mechanisms, yield criteria and their application to biaxial and multi-axial behavior and failure, fracture and toughening mechanisms, creep and creep rupture, behavior and failure of cellular solids, and fatigue. Prerequisite(s): (MAT 501, MAT 502) or permission of instructor.

MAT 507. Introduction to Ceramic Materials. 3 Hours

Course presents the fundamentals of ceramics from early classical clay-based technology to today's advanced application of modern ceramic materials (i.e. protective armor, Mars rover Curiosity's nuclear fuel, high temperature fuel cells and fuel saving turbine engine blades). The physics and chemistry fundamentals associated with modern ceramic technology are first discussed followed by an understanding of the important role composition and processing technologies have on many of the physical and mechanical properties of ceramics. Prerequisite(s): MAT 501.

MAT 508. Principles of Material Selection. 3 Hours

Basic scientific and practical consideration involved in the intelligent selection of materials for specific applications. Impact of new developments in materials technology and analytical techniques. Prerequisite(s): MAT 501 or permission of instructor.

MAT 509. Introduction to Polymer Science-Thermoplastics. 3 Hours

Broad technical overview of the nature of synthetic macromolecules, including the formation of polymers and their structure, structure-property relationships, polymer characterization and processing, and applications of polymers. Fundamental topics such as viscoelasticity, the glassy state, time-temperature superposition, polymer transitions, and free volume will also be reviewed. The course focuses on thermoplastic polymers. Prerequisite(s): Organic chemistry; college physics; differential equations.

MAT 510. High Performance Thermoset Polymers. 3 Hours

Survey of high performance thermosetting resins, focusing on chemistry, processing, and properties of six general resin families: vinyl ester, epoxy, phenolic, cyanate ester, bismaleimide, and polyimides. The course will include fundamental discussions of polymerization mechanisms, network structure development, rheology and time-temperature transformation, resin toughening, and structure-processing-property relationships. Characterization techniques will also be reviewed briefly. Prerequisite(s): Organic chemistry.

MAT 511. Principles of Corrosion. 3 Hours

Theoretical and practical application of electrochemical principles to the field of corrosion covering thermodynamics, kinetics, forms of corrosion and methods for characterizing and controlling corrosion in areas of biomedical engineering, aerospace, automotive, and marine environments. Prerequisite(s): MAT 501.

MAT 521. NDE/SHM. 3 Hours

Introduction to theory and application of methods for nondestructive flaw detection and materials characterization for metals, polymers, ceramics and advanced composites using x-ray, ultrasonic, electromagnetic (magnetic particle, eddy current), thermal, and optical techniques. Also, statistical analysis of reliability, probability of detection and quality assurance provided. Prerequisite(s): Permission of instructor.

MAT 527. Methods of Polymer Analysis. 3 Hours

Modern laboratory techniques used in preparation and characterization of polymers; experimental investigations of polymer structure-property relations; measurement of molecular weight averages and distributions, thermal and mechanical properties, viscoelastic and rheological properties; transitions and crystallinity. Prerequisite(s): MAT 509 or MAT 510.

MAT 528. Chemical Behavior of Materials. 3 Hours

This course will address chemical behavior as a subject complementary to mechanical behavior of materials. A special emphasis will be given to structure-property relationships of the major classes of materials. Physical/chemical periodicity, bonding, processing chemistry, and chemical behavior in the application environment will be addressed. Each major class of materials will be discussed with specific case studies for each. Prerequisite(s): College chemistry or permission of the instructor.

MAT 529. Computational Chemistry. 3 Hours

Introduction to computational chemistry including a discussion of ab initio, semiempirical, and DFT methods and an overview of molecular mechanics and molecular simulation methods. Lectures are supplemented by simulation exercises using commercial programs such as Gaussiari and Molecular Studio. Prerequisite(s): CHM124, or consent of instructor.

MAT 530. Biomaterials. 3 Hours

The course introduces students with engineering materials used in dentistry, manufacture of surgical devices, prosthetics, and repair of tissues. Topics include bonding and atomic arrangement in materials, material selection, testing, and characterization, biocompatibility, tissue response to materials, and failure analysis. A spectrum of materials including metals, polymers, ceramics, and composites used in biomedical applications will be considered.

MAT 535. High Temperature Materials. 3 Hours

This course will provide students with the basic material behavior concepts which control high-temperature properties of metals and alloys. A special emphasis will be given to creep behavior of metals and alloys including a comprehensive study of relationships between microstructure and high-temperature creep deformation of pure metals, single-phase alloys, multi-phase alloys, and dispersion-strengthened materials. In addition, the properties and applications of high-temperature materials will be discussed, especially those alloys used in the aerospace industry for gas turbine engine rotating-component, such as titanium and nickel-based superalloys. Prerequisite(s): MAT 501 or equivalent.

MAT 540. Composite Design. 3 Hours

Design with composite materials. Micromechanics. Lamination theory. Joining. Fatigue. Environmental effects. Prerequisite(s): EGM 303 or EGM 330.

MAT 541. Experimental Mechanics of Composite Materials. 3 Hours

Introduction to the mechanical response of fiber-reinforced composite materials with emphasis on the development of experimental methodology. Analytical topics include stress-strain behavior of anisotropic materials, laminate mechanics, and strength analysis. Theoretical models are applied to the analysis of experimental techniques used for characterizing composite materials. Lectures are supplemented by laboratory sessions in which characterization tests are performed on contemporary composite materials. Prerequisite(s): EGM 303 or EGM 330.

MAT 542. Advanced Composites. 3 Hours

Materials and processing. Comprehensive introduction to advanced fiber reinforced polymeric matrix composites. Constituent materials and composite processing will be emphasized with special emphasis placed on structure-property relationships, the role of matrix in composite processing, mechanical behavior and laminate processing. Specific topics will include starting materials, material forms, processing, quality assurance, test methods, and mechanical behavior. Prerequisite(s): (MAT 501 or MAT 509) or permission of instructor.

MAT 543. Analytical Mechanics of Composite Materials. 3 Hours

Analytical models are developed for predicting the mechanical and thermal behavior of fiber-reinforced composite materials as a function of constituent material properties. Both continuous and discontinuous fiber-reinforced systems are considered. Specific topics include basic mechanics of anisotropic materials, micro-mechanics and lamination theory, free-edge effects, and failure criteria. Prerequisite(s): EGM 303 or EGM 330.

MAT 544. Mechanics of Composite Materials. 3 Hours

Comprehensive treatment of laminated beams, plates, and sandwich structures. Effect of heterogeneity and anisotropy on bending under lateral loads, buckling, and free vibration are emphasized. Shear deformation and other higher-order theories and their range of parametric applications also considered. Prerequisite(s): MAT 543 or permission of instructor.

MAT 570. Fracture Mechanics. 3 Hours

Application of the principles of fracture mechanics to problems associated with fatigue and fracture in engineering structures. The course will cover the development of models that apply to a range of materials, geometries, and loading conditions. Prerequisite(s): MAT 506 or permission of instructor.

MAT 575. Fracture & Fatigue of Metals & Alloys I. 3 Hours

This course will cover the effects of microstructure on the fracture and fatigue behavior of engineering metals and alloys, with a special emphasis on static and dynamic brittle and ductile failures and static and fatigue crack initiation. Alloy fracture resistance, fracture toughness, fatigue behavior, and methods to improve fracture and fatigue behavior will be discussed in detail. The role of materials reliability in life management of advanced alloys in turbine engines and aircraft will be reviewed, and key practical aspects will be discussed. Various analytical techniques for failure analysis of structural components will be presented. Prerequisite(s): (MAT 501 or MAT 506) or permission of instructor.

MAT 576. Fracture & Fatigue of Metals & Alloys II. 3 Hours

This course will cover the areas of the effects of microstructure on fatigue crack propagation and on final fracture by fatigue. This will include fatigue life prediction, using damage-tolerance approach to component-design and microstructural and structural synthesis for optimum behavior. Specific material-related aspects of fatigue crack propagation mechanisms for optimum damage tolerant behavior, and the related reliability and failure analysis, will also be covered. A comprehensive project in failure-analysis of aerospace metallic components will also be conducted. Prerequisite(s): MAT 575 or equivalent.

MAT 577. Light Structural Metals. 3 Hours

This course is an introduction and review of light structural metals, commonly used throughout the aerospace and automotive industries. It will include the metallurgy of light metals, from ore extraction, smelting, alloying and shape making to heat-treatment. Design and applications of light structural metals and a comprehensive technology and economic comparisons with other groups of metals will be presented. Prerequisite(s): MAT 501, MAT 502.

MAT 579. Materials for Advanced Energy Applications. 3 Hours

Successful long-term application of many advanced energy technologies is ultimately based on the utilization of materials in 'real world' environmental conditions. The physical/mechanical properties and application of various materials (i.e. superalloys, refractory metal alloys, ceramics) being employed in advanced energy applications are discussed. Several advanced energy technologies (i.e. fuel cells, nuclear energy, and others) are covered with emphasis on how the selection of advanced materials enhances their commercial application. Prerequisite(s): MAT 501 AND MAT 502 or permission of instructor.

MAT 580. Polymer Durability. 3 Hours

An in-depth study of the mechanisms leading to polymer decomposition and degradation, as well as methods for analyzing and preventing or minimizing these processes and thereby improving polymer durability. Topics include thermal / pyrolytic, thermo-oxidative, hydrolysis, photo/UV/weathering, flammability, mechanical, degradation in earth orbit. Prerequisite(s): MAT 509/CME 509 or MAT 510/CME 510.

MAT 581. Introduction to Nanoelectronics. 3 Hours

Introduction to the physics of materials on the nanoscale; quantum confinement theory; electronic and optical properties of semiconductor nanostructures; single electron transistors (SETs); tunneling and ballistic devices; nanostructured LEDs, photodetectors, and lasers; nanophotovoltaics and nanomagnetism; quantum computing and molecular electronics; nanoelectronic fabrication, state-of-the-art and emerging nanoscale devices and applications. Prerequisite(s): ECE 506.

MAT 589. Graduate Seminar Series. 1 Hour

Graduate seminars on various current material topics presented by guest speakers.

MAT 590. Selected Readings in Materials Engineering. 1-3 Hours

Directed readings in selected areas of materials engineering arranged and approved by the student's advisor and the program director.

MAT 595. Special Problems in Materials Engineering. 1-3 Hours

Special assignments arranged by the materials engineering faculty.

MAT 597. Research Methods. 3 Hours

This course will provide students the ability to apply research methods and problem solving skills to identify and define a research problem, develop hypotheses and research plans to test those hypotheses. Students will write and present an original research proposal.

MAT 599. Thesis. 3-6 Hours

Thesis.

MAT 601. Surface Chemistry of Solids. 3 Hours

The nature of solid surfaces as determined by the techniques of x-ray photoelectron and Auger electron spectroscopy, secondary ion mass spectrometry, and ion scattering spectroscopy. Prerequisite(s): MAT 504 or permission of instructor.

MAT 603. Materials Science of Thin Films. 3 Hours

An introduction to the basic physics of film formation processes including physical vapor deposition and chemical vapor deposition, film properties, and applications. Nucleation theory, film interdiffusion and reaction, metallurgical and protective coatings, electrical, magnetic, and optical properties of thin films. Emphasis on applicability. Prerequisite(s): College physics; fundamental physical and chemical properties of materials.

MAT 604. Nanostructured Materials. 3 Hours

Graduate-level course covering the fundamental physics, properties, and applications of nanostructured materials. Includes carbon nanotubes, nanostructured ceramics, metals, and semiconductor materials. Prerequisite(s): College physics; fundamental physical and chemical properties of materials.

MAT 605. Introduction to Carbon Nanotechnology. 3 Hours

Graduate-level course covering the fundamental and applied aspects of Carbon Nanoscale Science and Technology. The course has three goals: (1) an overview of the current development in carbon science and technology (2) an introduction to the surface science as a means to understand the surface interaction at molecular scale, and (3) to provide some explicit links between macro, micro, and nanoscale technologies. Some of the medical field, structural and friction application will be addressed. This course is aimed at both science and engineering students.

MAT 699. PHD Dissertation. 1-15 Hours

An original research effort which makes a definite contribution to technical knowledge. Results must be of sufficient importance to merit publication.

Mechanical Engineering

- Doctor of Engineering, Mechanical Engineering
- Doctor of Philosophy in Engineering, Mechanical Engineering
- Master of Science in Mechanical Engineering

Kelly Kissock, Department Chairperson

Doctor of Engineering, Mechanical Engineering (MEE)

See the Doctoral Degree Requirements section on the School of Engineering page and consult with the department chair.

Doctor of Philosophy in Engineering, Mechanical Engineering (MEE)

See the Doctoral Degree Requirements section on the School of Engineering page and consult with the department chair.

Master of Science in Mechanical Engineering (MEE)

The program of study leading to the Master of Science in Mechanical Engineering degree, developed by the student in conjunction with her/his advisor, must include a minimum of 30 semester hours. The program of study must include 18 or more semester hours of MEE/AEE/RCL credits and a minimum of 3 semester hours of mathematics. Students may pursue a thesis or non-thesis option. A thesis option requires 6 semester

hours of MEE 599 Mechanical Engineering Thesis credits, which includes both an oral defense and a written thesis.

Students may elect to include an area of concentration in their program of study by selecting courses from these areas:

Materials

MEE 501	Principles of Materials I
MEE 502	Principles of Materials II
MEE 503	Introduction to Continuum Mechanics
MEE 505	Thermodynamics of Solids
MEE 506	Mechanical Behavior of Materials
MEE 508	Principles of Material Selections
MEE 509	Introduction to Polymer Science-Thermoplastics
MEE 525	Principles in Corrosion
MEE 541	Experimental Mechanics of Composite Materials
MEE 542	Advanced Composites
MEE 543	Analytical Mechanics of Composite Materials
MEE 544	Mechanics of Composite Structures
MEE 570	Fracture Mechanics
MEE 575	Fracture & Fatigue of Metals & Alloys I
MEE 576	Fracture & Fatigue of Metals & Alloys II

Thermo-Fluids

MEE 503	Introduction to Continuum Mechanics
MEE 504	Fundamentals of Fluid Mechanics
MEE 505	Thermodynamics of Solids
MEE 511	Advanced Thermodynamics
MEE 512	Microscopic Thermodynamics
MEE 513	Propulsion
MEE 514	Physical Gas Dynamics with Aerospace Applications
MEE 515	Conduction Heat Transfer
MEE 516	Convection Heat & Mass Transfer
MEE 517	Radiation Heat Transfer
MEE 540	Tribology
MEE 552	Boundary Layer Theory
MEE 553	Compressible Flow
MEE 555	Turbulence
MEE 558	Computational Fluid Dynamics
MEE 565	Fundamentals of Fuels & Combustion
MEE 566	Combustion Theory
MEE 567	Smart Structures & Materials Overview
MEE 568	Internal Combustion Engines
MEE 569	Energy Efficient Buildings
AEE 501	Fundamental Aerodynamics
AEE 502	Advanced Aerodynamics
AEE 556	Hypersonic Aerodynamics
AEE 558	Computational Fluid Dynamics

Solid Mechanics

MEE 503	Introduction to Continuum Mechanics
MEE 519	Analytical Dynamics
MEE 533	Theory of Elasticity
MEE 534	Theory of Plates & Shells
MEE 535	Advanced Mechanical Vibrations

MEE 536	Random Vibrations
MEE 538	Introduction to Aeroelasticity
MEE 539	Theory of Plasticity
MEE 543	Analytical Mechanics of Composite Materials
MEE 544	Mechanics of Composite Structures
MEE 545	Computational Methods for Design
MEE 546	Finite Element Analysis I
MEE 547	Finite Element Analysis II
MEE 548	Energy Methods in Solid Mechanics
MEE 549	Theory of Elastic Stability
MEE 570	Fracture Mechanics
MEE 575	Fracture & Fatigue of Metals & Alloys I
Design and Manufacturing	
MEE 503	Introduction to Continuum Mechanics
MEE 506	Mechanical Behavior of Materials
MEE 520	Theoretical Kinematics
MEE 521	Kinematic Principles in Design
MEE 522	Geometric Methods in Kinematics
MEE 523	Engineering Design Optimization
MEE 527	Automatic Control Theory
MEE 533	Theory of Elasticity
MEE 534	Theory of Plates & Shells
MEE 535	Advanced Mechanical Vibrations
MEE 536	Random Vibrations
MEE 537	Mechatronics
MEE 538	Introduction to Aeroelasticity
MEE 539	Theory of Plasticity
MEE 540	Tribology
MEE 545	Computational Methods for Design
MEE 546	Finite Element Analysis I
MEE 547	Finite Element Analysis II
MEE 551	Noise & Vibration Control
MEE 570	Fracture Mechanics
MEE 572	Design for Environment
MEE 574	Virtual Prototyping of Products & Processes
MEE 575	Fracture & Fatigue of Metals & Alloys I
MEE 577	Robotics & Numerically Controlled Machines
MEE 579	Computer Aided Mechanical Design
MEE 582	Automated Design
MEE 585	Design for Producibility
MEE 587	Lean Manufacturing

See also Master's Degree Requirements in School of Engineering section in the catalog and consult with the advisor.

Courses

MEE 500. Advanced Engineering Analysis. 3 Hours

Detailed analysis of engineering problems using laws of nature, fundamental engineering principles, mathematics, computers, and practical experience to construct, resolve, and test analytic models of physical events. Emphasis is on the use of the professional engineering approach which includes formulation of the problem, assumptions, plan or method of attack, solving the problem, checking and generalizing the results.

MEE 501. Principles of Materials I. 3 Hours

Structure of engineering materials from electronic to atomic and crystallographic considerations. Includes atomic structure and interatomic bonding, imperfections, diffusion, mechanical properties, strengthening mechanisms, failure, phase diagrams, phase transformations and processing. Prerequisite(s): MTH 219; college chemistry; college physics.

MEE 502. Principles of Materials II. 3 Hours

Structure, behavior and processing of metal alloys, ceramics, polymers, and composites to include: mechanical behavior, corrosion, electrical, magnetic, and optical properties. Prerequisite(s): MEE 501 or equivalent.

MEE 503. Introduction to Continuum Mechanics. 3 Hours

Tensors, calculus of variations, Lagrangian and Eulerian descriptions of motion. General equations of continuum mechanics, constitutive equations of mechanics, thermodynamics of continua. Specialization to cases of solid and fluid mechanics. Prerequisite(s): EGM 303 or EGM 330.

MEE 504. Fundamentals of Fluid Mechanics. 3 Hours

An advanced course in fluid mechanics with emphasis on the derivation of conservation equations and the application of constitutive theory. Navier-Stokes equations. Ideal fluid approximation. Exact and approximate solutions to classical viscous and inviscid problems. Compressible and incompressible flows. Prerequisite(s): MEE 503.

MEE 505. Thermodynamics of Solids. 3 Hours

Laws of thermodynamics, auxiliary functions, thermodynamic relations, phase transitions, thermodynamic equilibrium, thermodynamic properties of solid solutions, surfaces and interfaces. Prerequisite(s): MEE 501 or permission of instructor.

MEE 506. Mechanical Behavior of Materials. 3 Hours

Fundamental relationships between the structure and mechanical behavior of materials. Includes fundamentals of stress and strain, the physical basis for elastic deformation, elementary dislocation theory and plastic deformation, strengthening mechanisms, yield criteria and their application to biaxial and multi-axial behavior and failure, fracture and toughening mechanisms, creep and creep rupture, behavior and failure of cellular solids and fatigue. Prerequisite(s): (MAT 501, MAT 502) or permission of instructor.

MEE 507. Materials for Advanced Energy Applications. 3 Hours

Various advanced energy technologies (AMTEC, Fuel Cells, Thermoelectrics, Nuclear, etc.) will be discussed with an emphasis on the role that materials have/will play in their development. Critical 'bottlenecks' in materials development delaying the introduction of new advanced energy systems will be identified. In addition, how material selections are made based on operational system environments in 'real world' scenarios will be presented.

MEE 508. Principles of Material Selections. 3 Hours

Basic scientific and practical considerations involved in the intelligent selection of materials for specific applications. Impact of new developments in materials technology and analytical techniques. Prerequisite(s): MEE 501 or permission of instructor.

MEE 509. Introduction to Polymer Science-Thermoplastics. 3 Hours

Broad technical overview of the nature of synthetic macromolecules, including the formation of polymers and their structure - property relationships, polymer characterization and processing, and the application of polymers. Fundamental topics such as viscoelasticity, the glassy state, time-temperature superposition, polymer transitions, and free volume will also be reviewed. The course focuses on thermoplastic polymers. Prerequisite(s): Organic chemistry; college physics, differential equations.

MEE 510. Biomaterials. 3 Hours

The course introduces students with engineering materials used in dentistry, manufacture of surgical devices, prosthetics, and repair of tissues. Topics include bonding and atomic arrangement in materials, material selection, testing, and characterization, biocompatibility, tissue response to materials, and failure analysis. A spectrum of materials including metals, polymers, ceramics, and composites used in biomedical applications will be considered.

MEE 511. Advanced Thermodynamics. 3 Hours

Equilibrium, first law, second law, state principle, and zeroth law; development of entropy and temperature from availability concepts; chemical potential, chemical equilibrium, and phase equilibrium. Thermodynamics of irreversible processes; Onsager reciprocal relations; application of these concepts to direct energy conversion.

MEE 512. Microscopic Thermodynamics. 3 Hours

Microscopic thermodynamics; kinetic theory; virial theorem of Clausius; transport phenomena; Gibbs, Boltzmann, Bose-Einstein, Fermi-Dirac statistics. Connection between statistical and thermodynamic quantities. Applications to perfect and real gases, liquids, crystalline solids, and thermal radiation. Irreversible thermodynamics.

MEE 513. Propulsion. 3 Hours

Principles of propulsive devices, aerothermodynamics; diffuser and nozzle flow; energy transfer in turbo-machinery; turbojet, turbo-fan, prop-fan engines; and turbo-prop and turboshaft engines. RAM and SCRAM jet analysis and a brief introduction to related materials and air frame-propulsion interaction. Prerequisite(s): MEE 418.

MEE 514. Physical Gas Dynamics with Aerospace Applications. 3 Hours

Physical Gas Dynamics: The basic elements of kinetic theory, chemical thermodynamics, and statistical mechanics. Emphasis is placed on the application of these molecular theories for analyzing thermodynamic and transport phenomena, as they pertain to the modeling of 'real gas effects' in high temperature flows. The course assumes material media in local equilibrium in the gaseous state but some non-equilibrium behavior will also be considered. The equilibrium topics include kinetic theory and concepts related to microscopic, molecular collisions, macroscopic chemical thermodynamics, the law of mass action, internal molecular structure and quantum energy states, general statistical mechanics applied to the prediction of thermodynamic properties of monatomic and diatomic gases, chemically reacting mixtures, and the dissociation and ionization of gases. Prerequisite(s): Background in fluid mechanics, thermodynamics, and compressible flow or permission of instructor.

MEE 515. Conduction Heat Transfer. 3 Hours

Steady state and transient state conduction. Evaluation of temperature fields by formal mathematics and numerical analysis. Emphasis on approximate solution techniques.

MEE 516. Convection Heat & Mass Transfer. 3 Hours

Development of governing differential equations for convection. Methods of solution including similarity methods, integral methods, superposition of solutions, eigenvalue problems. Turbulent flow convection; integral methods, eddy diffusivities for heat and momentum. Extensions to mass transfer. Prerequisite(s): MEE 410 or equivalent.

MEE 517. Radiation Heat Transfer. 3 Hours

Fundamental relationships of radiation heat transfer. Radiation characteristics of surfaces. Geometric considerations in radiation exchange between surfaces. Emissivity and absorptivity of gases. Introduction to radiative exchange in gases.

MEE 518. Phase Change Heat Transfer & Interfacial Phenomena. 3 Hours

Interfacial thermodynamics of liquid-vapor-solid systems; surface wetting statics and dynamics; interfacial and phase stability; homogeneous and heterogeneous nucleation; and boiling heat transfer. Application to liquid-vapor phase change.

MEE 519. Analytical Dynamics. 3 Hours

Dynamical analysis of a system of particles and rigid bodies; Lagrangian and Hamiltonian formulation of equations of motion; classical integrals of motion. Stability analysis of linear and nonlinear systems. Prerequisite(s): (EGM 202; MTH 219) or equivalent.

MEE 520. Theoretical Kinematics. 3 Hours

Introduction to the mathematical theory underlying the analysis of general spatial motion. Analysis of mechanical systems including robots, mechanisms, walking machines and mechanical hands using linear algebra, quaternion and screw formulations. Fundamental concepts include forward and inverse kinematics, workspace, Jacobians, and singularities.

MEE 521. Kinematic Principles in Design. 3 Hours

Study of the use of kinematic principles in the design of mechanical systems including robots, planar and spatial mechanisms, robotic platforms and systems modeled by jointed rigid bodies. The formulation and solution of design problems involving the sizing and placement of these mechanical systems to accomplish specific tasks is the primary goal. Mathematical tools are introduced to account for singularity avoidance and joint limitations.

MEE 522. Geometric Methods in Kinematics. 3 Hours

Trajectories and velocities of moving bodies are designed and analyzed via the principles of classical differential and algebraic geometry. Fundamentals include centrodes, instantaneous invariants, resultants and center point design curves. Curves, surfaces, metrics, manifolds and geodesics in spaces of more than three dimensions are analyzed to study multi-parameter systems.

MEE 523. Engineering Design Optimization. 3 Hours

Introduction to the theory and algorithms of nonlinear optimization with an emphasis on applied engineering problems. Fundamentals include Newton's method, line searches, trust regions, convergence rates, and linear programming. Advanced topics include penalty, barrier, and interior-point methods.

MEE 524. Electrochemical Power. 3 Hours

The course will cover fundamental as well as engineering aspects of fuel cell technology. Specifically, the course will cover basic principles of electrochemistry, electrical conductivity (electronic and ionic) of solids, and development/design of major fuel cells (alkaline, polymer electrolyte, phosphoric acid, molten carbonate, and solid oxide). A major part of the course will focus on solid oxide fuel cells (SOFC), as it is emerging to be dominant among various fuel cell technologies. The SOFC can readily and safely use many common hydrocarbon fuels such as natural gas, diesel, gasoline, alcohol, and coal gas. Prerequisite(s): MEE 301, MEE 312, or permission of instructor.

MEE 525. Principles in Corrosion. 3 Hours

Theoretical and practical application of electrochemical principles to the field of corrosion covering thermodynamics, kinetics, forms of corrosion in areas of biomedical engineering, aerospace, automotive and marine environments. Prerequisite(s): MEE 501.

MEE 526. Aerospace Fuels Science. 3 Hours

Basic elements of hydrocarbon fuel production including petroleum based fuels and alternative fuels. Fuel properties, specifications, handling, and logistics. Introduction to chemical kinetics and the chemistry associated with liquid phase thermal-oxidative degradation of fuels. Introduction to the computational modeling of fuel thermal stability and fuel systems. Prerequisite(s): Permission of instructor.

MEE 527. Automatic Control Theory. 3 Hours

Stability and performance of automatic control systems. Classical methods of analysis including transfer functions, time-domain solutions, root locus and frequency response methods. Modern control theory techniques including state variable analysis, transformation to companion forms, controllability, pole placement, observability and observer systems. Prerequisite(s): ELE 432 or MEE 435 or equivalent.

MEE 530. Biomechanical Engineering. 3 Hours

Application of engineering principles to clinical, occupational, and sports biomechanics topics. The course focuses on biomechanical analysis, particularly kinematics and kinetics of human movement, with emphasis on both research and product design. Prerequisite(s): EGM 202; EGR 201.

MEE 531. Experimental Methods in Biomechanics. 3 Hours

This course is focused on developing and applying advanced experimentation skills with a specific focus on techniques associated with the study of human movement. Emphasis on equipment and technology, data analysis and interpretation, statistical methods, and technical reporting.

MEE 533. Theory of Elasticity. 3 Hours

Three-dimensional stress and strain at a point; equations of elasticity in Cartesian and curvilinear coordinates; methods of formulation of equations for solution; plane stress and plane strain; energy formulations; numerical solution procedures. Prerequisite(s): EGM 303 or EGM 330. Corequisite(s): MEE 503.

MEE 534. Theory of Plates & Shells. 3 Hours

Theory of plates: small and large displacement theories of thin plates; shear deformation; buckling; sandwich plate theory. Thin shell theory: theory of surfaces; thin shell equations in orthogonal curvilinear coordinates; bending, membrane, and shallow shell theories. Prerequisite(s): MEE 533.

MEE 535. Advanced Mechanical Vibrations. 3 Hours

Review of undamped, damped, natural and forced vibrations of one and two degrees of freedom systems. Lagrange's equation, eigenvalue/eigenvector problem, modal analysis for discrete and continuous systems. Computer application for multi-degree of freedom, nonlinear problems. Prerequisite(s): MEE 319; computer programming.

MEE 536. Random Vibrations. 3 Hours

Introduction to probability distribution; characterization of random vibrations; harmonic analysis; auto- and cross-correlation and spectral density; coherence; response to single and multiple loadings; Fast Fourier Transform (FFT); applications in vibrations, vehicle dynamics, fatigue, etc. Prerequisite(s): MEE 319; computer programming.

MEE 537. Mechatronics. 3 Hours

Emphasis on the integration of sensors, micro-controllers, electromechanical actuators, and control theory in a 'smart' system for a semester-long design project. Topics include: sensor signal processing, electromechanical actuator fundamentals, interfacing of sensors and actuators to micro-controllers, digital logic, and programming of micro-controllers, programmable logic controllers and programmable logic devices. Equal mix of lecture and laboratory. Prerequisite(s): Undergraduate electronics course. Corequisite(s): Course in controls.

MEE 538. Introduction to Aeroelasticity. 3 Hours

Study of the effect of aerodynamic forces on a flexible aircraft. Flexibility coefficients and natural modes of vibration. Quasi-steady aerodynamics. Static aeroelastic problems; wing divergence and dynamic aeroelasticity; wing flutter. An introduction to structural stability augmentation with controls. Prerequisite(s): AEE 501.

MEE 539. Theory of Plasticity. 3 Hours

Fundamentals of plasticity theory including elastic, viscoelastic, and elastic-plastic constitutive models; plastic deformation on the macroscopic and microscopic levels; stress-strain relations in the plastic regime; strain hardening; limit analysis; numerical procedures. Prerequisite(s): MEE 503 or MEE 533.

MEE 540. Tribology. 3 Hours

Theoretical aspects of lubrication; determination of pressure distribution in bearings from viscous flow theory; application of hydrodynamic and hydrostatic bearing theories to the design of bearings; high-speed bearing design problems; properties of lubricants; methods of testing.

MEE 541. Experimental Mechanics of Composite Materials. 3 Hours

Introduction to the mechanical response of fiber-reinforced composite materials with emphasis on the development of experimental methodology. Analytical topics include stress-strain behavior of anisotropic materials, laminate mechanics, and strength analysis. Theoretical models are applied to the analysis of experimental techniques used for characterizing composite materials. Lectures are supplemented by laboratory sessions in which characterization tests are performed on contemporary composites. Prerequisite(s): EGM 303 or EGM 330.

MEE 542. Advanced Composites. 3 Hours

Materials and processing. Comprehensive introduction to advanced fiber reinforced polymeric matrix composites. Constituent materials and composite processing will be emphasized with special emphasis placed on structure-property relationships, the role of the matrix in composite processing, mechanical behavior and laminate processing. Specific topics will include starting materials, material forms, processing, quality assurance, test methods and mechanical behavior. Prerequisite(s): (MEE 501 or MEE 509) or permission of instructor.

MEE 543. Analytical Mechanics of Composite Materials. 3 Hours

Analytical models are developed to predicting the mechanical and thermal behavior of fiber-reinforced composite materials as a function of constituent material properties. Both continuous and discontinuous fiber-reinforced systems are considered. Specific topics include basic mechanics of anisotropic materials, micromechanics, lamination theory, free-edge effects, and failure criteria. Prerequisite(s): EGM 303 or EGM 330.

MEE 544. Mechanics of Composite Structures. 3 Hours

Comprehensive treatment of laminated beams, plates, and sandwich structures. Effect of heterogeneity and anisotropy on bending under lateral loads, buckling, and free vibration are emphasized. Shear deformation and other higher-order theories and their range of parametric application are also considered. Prerequisite(s): MEE 543 or permission of instructor.

MEE 545. Computational Methods for Design. 3 Hours

Modeling of mechanical systems and structures, analysis by analytical and numerical methods, development of mechanical design criteria and principles of optimum design, selected topics in mechanical design and analysis, use of the digital computer as an aid in the design of mechanical elements. Prerequisite(s): Computer programming.

MEE 546. Finite Element Analysis I. 3 Hours

Fundamental development of the Finite Element Method (FEM), and solution of field problems and comprehensive structural problems, variational principles and weak-forms; finite element discretization; shape functions; finite elements for field problems; bar, beam, plate, and shell elements; isoparametric finite elements; stiffness, nodal force, and mass matrices; matrix assembly procedures; computer dosing techniques; modeling decisions; program output interpretation. Course emphasis on a thorough understanding of FEM theory and modeling techniques. Prerequisite(s): MEE 503 or MEE 533.

MEE 547. Finite Element Analysis II. 3 Hours

Advanced topics: heat transfer; transient dynamics; nonlinear analysis; substructuring and static condensation; effects of inexact numerical integration and element incompatibility; patch test; frontal solution techniques; selected topics from the recent literature. Prerequisite(s): MEE 546.

MEE 548. Energy Methods in Solid Mechanics. 3 Hours

Development of fundamental energy principles; virtual displacements, strain energy, Castigliano's theorems, minimum potential energy principles. Applications to engineering problems; redundant structures, buckling, static and dynamic analysis. Prerequisite(s): MEE 503 or MEE 533.

MEE 549. Theory of Elastic Stability. 3 Hours

Introduction to stability theory: buckling of plates and shells; influence of initial imperfections; nonlinear analysis: numerical solutions methods. Prerequisite(s): MEE 533.

MEE 551. Noise & Vibration Control. 3 Hours

The concepts of noise and vibration control applied to mechanical systems. Methodologies covered will include: passive treatments using resistive elements (sound absorbers, vibration damping) and reactive elements (tailoring of material stiffness and mass); active control of sound and vibration; and numerical analysis. Prerequisite(s): MEE 319 or MEE 439.

MEE 552. Boundary Layer Theory. 3 Hours

Development of the Prandtl boundary layer approximation in two and three dimensions for both compressible and incompressible flow. Exact and approximate solutions for laminar flows. Unsteady boundary layers. Linear stability theory and transition to turbulence. Empirical and semi-empirical methods for turbulent boundary layers. Higher-order boundary layer theory. Prerequisite(s): MEE 504 or equivalent.

MEE 553. Compressible Flow. 3 Hours

Fundamental equations of compressible flow. Introduction to flow in two and three dimensions. Two-dimensional supersonic flow, small perturbation theory, method of characteristics, oblique shock theory. Introduction to unsteady one-dimensional motion and shock tube theory. Method of surface singularities. Prerequisite(s): MEE 504 or equivalent.

MEE 555. Turbulence. 3 Hours

Origin, evolution, and dynamics of fully turbulent flows. Description of statistical theory, spectral dynamics, and the energy cascade. Characteristics of wall-bounded and free turbulent shear flows. Reynolds stress models. Prerequisite(s): MEE 504 or equivalent.

MEE 558. Computational Fluid Dynamics. 3 Hours

Numerical solution to Navier-Stokes equations and approximations such as the boundary layer equations for air-flow about a slender body. Numerical techniques for the solution of the transonic small disturbance equations. Numerical determination of fluid instabilities. Prerequisite(s): MEE 504 or permission of instructor.

MEE 560. Propulsion Systems. 3 Hours

Introduction and history, types of propulsion systems, thermodynamics review and simple cycle analysis, thermodynamics of high speed gas flow, aircraft gas turbine engine, parametric cycle analysis of various types of gas turbine engines, component and engine performance analyses (inter-turbine burners), advanced cycles with regeneration, reheating, and inter-cooling, variable and inverse cycle engines, hybrid propulsion systems (turbo-ramjets, rocket-ram-scamjets, etc.) advanced propulsion systems, pulse detonation engine theory and concepts, thermal management of high-speed flight, energy management and vehicle synthesis. Prerequisite(s): (MEE 413 or MEE 513) or permission of instructor.

MEE 565. Fundamentals of Fuels & Combustion. 3 Hours

Heat of combustion and flame temperature calculations; rate of chemical reaction and Arrhenius relationship; theory of thermal explosions and the concept of ignition delay and critical mass; phenomena associated with hydrocarbon-air combustion; specific applications of combustion.

MEE 566. Combustion Theory. 3 Hours

Theory of detonation (Rankine-Hugoniot relationships) and flame propagation rates in pre-gas mixed systems; turbulent flames and the well stirred reactor; theory of diffusion flames; fuel droplet combustion; steady burning of solid materials, ignition and flame spreading across solid materials.

MEE 567. Smart Structures & Materials Overview. 3 Hours

Smart structures and materials overview. Components of materials, sensing, actuation, and modeling. Electro-mechanical and thermo-mechanical modeling of SMA and piezo-ceramic materials. Elements of control, sensing, and vibration theory. Examples of using piezo-ceramic and shape memory alloy (SMA) based structures for actuation, vibration, position, and shape control with applications in automotive, aircraft, and satellites. Prerequisite(s): Background in materials, electronics, vibrations, and controls or instructor's consent. MEE 312 or instructor's consent.

MEE 568. Internal Combustion Engines. 3 Hours

Study of combustion and energy release processes. Applications to spark and compression ignition, jet, rocket, and gas turbine engines. Special emphasis given to understanding of air pollution problems caused by internal combustion engines. Idealized and actual cycles are studied in preparation for laboratory testing of internal combustion engines.

MEE 569. Energy Efficient Buildings. 3 Hours

Provides knowledge and skills necessary to design and operate healthier, more comfortable, more productive, and less environmentally destructive buildings; A specific design target of E/3 (typical energy use divided by three) is established as a goal. Economic, thermodynamic, and heat transfer analyses are utilized. Extensive software development. Prerequisite(s): MEE 410.

MEE 570. Fracture Mechanics. 3 Hours

Application of the principles of fracture mechanics to problems associated with fatigue and fracture in engineering structures. The course will cover the development of models that apply to a range of materials, geometries, and loading conditions. Prerequisite(s): MEE 506 or permission of instructor.

MEE 571. Design of Thermal Systems. 3 Hours

Integration of thermodynamics, heat transfer, engineering economics, and simulation and optimization techniques in a design framework. Topics include design methodology, energy analysis, heat exchanger networks, thermal-system simulation, and optimization techniques.

MEE 572. Design for Environment. 3 Hours

Emphasis on design for environment over the life cycle of a product or process, including consideration of mining, processing, manufacturing, use, and post-life stages. Course provides knowledge and experience in invention for the purpose of clean design, life cycle assessment strategies to estimate the environmental impact of products and processes, and cleaner manufacturing practices. Course includes a major design project.

MEE 573. Renewable Energy Systems. 3 Hours

Introduction to the impact of energy on the economy and environment. Engineering models of solar thermal and photovoltaic systems. Introduction to wind power. Fuel cells and renewable sources of hydrogen.

MEE 574. Virtual Prototyping of Products & Processes. 3 Hours

The use of virtual prototyping for validating/optimizing the product design and the corresponding manufacturing process(es) before building the physical prototype will be practiced. Prerequisite(s): MEE 427.

MEE 575. Fracture & Fatigue of Metals & Alloys I. 3 Hours

This course will cover the effects of microstructure on the fracture and fatigue behavior of engineering metals and alloys with a special emphasis on static and dynamic brittle and ductile failures and crack initiation. Alloy fracture resistance, fracture toughness, fatigue behavior, and methods to improve fracture and fatigue behavior will be discussed in detail. Various analytical techniques for failure of structural components will be presented. A practical failure-analysis project will be performed. Prerequisite(s): (MEE 501 or MEE 506) or permission of instructor.

MEE 576. Fracture & Fatigue of Metals & Alloys II. 3 Hours

This course will cover the areas of the effects of microstructure on fatigue crack propagation on fracture and fatigue. This will include fatigue life prediction using damage tolerance approach to component design and microstructural and structural synthesis for optimum behavior. Specific material-related aspects of fatigue crack propagation mechanisms for optimum damage tolerant behavior, and the analysis of aerospace metallic components will also be conducted. Prerequisite(s): MEE 575 or equivalent.

MEE 577. Robotics & Numerically Controlled Machines. 3 Hours

Introduction to robots. Design and analysis of wrist mechanisms and grippers. Robot kinematics and trajectory planning. Sensors and vision systems. Implementation and applications of robotics. Robot cell design and control. Interaction of robot with the environment. NC and CNC machines and machining centers. Fundamentals of rapid prototyping. Prerequisite(s): MEE 435 or equivalent.

MEE 578. Energy Efficient Manufacturing. 3 Hours

This course presents a systematic approach for improving energy efficiency in the manufacturing sector. Current patterns of manufacturing energy use, the need for increased energy efficiency, and models for sustainable manufacturing are reviewed. The lean-energy paradigm is applied to identify energy efficiency opportunities in industrial electrical, lighting, space conditioning, motor drive, compressed air, process heating, process cooling, and combined heat and power systems. Prerequisite(s): Thermodynamics MEE 310 and Heat Transfer MEE 410.

MEE 579. Computer Aided Mechanical Design. 3 Hours

Introduction to computer methods used to facilitate mechanical design. Design using the finite element method, mechanism design, and statistical techniques. Design of components (shafts, springs, etc.) using computer techniques will be combined with the design process to design mechanical systems. Integration of manufacturer's literature into the design. Team design project will be included. Prerequisite(s): (MEE 427, MEE 432) or equivalent.

MEE 580. Statistical Process Control by Feedback Adjustment. 3 Hours

Process monitoring using standard quality control techniques provides an ongoing check on the stability of the process and points to problems whose elimination can reduce variation and permanently improve the system. Process adjustment uses feedback control to compensate for those sources of drifting variation that cannot be eliminated in this way. Clearly the two approaches are complementary and considerable advantage is to be gained by augmenting the more commonly used quality control techniques with feedback methods. Prerequisite(s): Background in statistics or permission of instructor.

MEE 582. Automated Design. 3 Hours

Examine, discuss, and apply enabling design technologies, methodologies and computer tools to various mechanical product design and manufacturing process design projects. Address selected design topics and how they are used in Product Development Cycle. Model, simulate, and evaluate various mechanical products and manufacturing process designs.

MEE 584. Integrated Manufacturing Systems. 3 Hours

Treatment of topics associated with the design, implementation, planning and control of fixed and flexible manufacturing and assembly systems in conjunction with communications and computer technologies. Discuss issues associated with group technology and systems integration.

MEE 585. Design for Producibility. 3 Hours

Concurrent treatment of product design and manufacturing process issues. Application of various methodologies, tools, and evaluation schemes on various product design, manufacturing, and assembly-related activities.

MEE 587. Lean Manufacturing. 3 Hours

Introduction to lean manufacturing and waste elimination. Dynamics of team formation: participation, leadership, communication, and conflict resolution. Concepts of work standardization. Process flow mapping techniques. Setup reduction: reduction of cycle time and inventory in manufacturing operations. Design of lean manufacturing work cells: basic work motions, applied ergonomics, and time studies. Just-in-time. Pull production: Kanbans and their effect on reducing inventory and lead-time. Error proofing: error detection, feedback, corrective and preventive actions. Value added vs. non-value added analysis. Prerequisite(s): MEE 344 or equivalent.

MEE 590. Special Problems in Mechanical Engineering. 1-6 Hours

Special assignments in mechanical engineering subject matter to be approved by the student's faculty advisor and the department chair.

MEE 595. Mechanical Engineering Project. 1-6 Hours

Student participation in a departmental research, design, or development project under the direction of a project advisor. The student must show satisfactory progress as determined by the project advisor and present a written report at the conclusion of the project.

MEE 599. Mechanical Engineering Thesis. 1-6 Hours

Mechanical Engineering Thesis.

MEE 604. Nanostructured Materials. 3 Hours

Graduate-level course covering the fundamental physics, properties, and applications of nanostructured materials. Includes carbon nanotubes, nanostructured ceramics, metals, and semiconductor materials. Prerequisite(s): College physics; fundamental physical and chemical properties of materials.

MEE 605. Introduction to Carbon Nanotechnology. 3 Hours

Graduate-level course covering the fundamental and applied aspects of Carbon Nanoscale Science and Technology. The course has three goals: (1) an overview of the current development in carbon science and technology (2) an introduction to the surface science as a means to understand the surface interaction at molecular scale, and (3) to provide some explicit links between macro, micro, and nano scale technologies. Some of the medical field, structural and friction applications will be addressed. This course is aimed at both science and engineering students.

MEE 690. Selected Readings in Mechanical Engineering. 1-6 Hours

Directed readings in a designated area arranged and approved by the student's doctoral advisory committee and the department chair. May be repeated. (A) Materials, (B) Thermal Sciences, (C) Fluid Mechanics, (D) Solid Mechanics (E) Mechanical Design, or (F) Integrated Manufacturing.

MEE 698. DE Dissertation. 1-15 Hours

An original investigation as applied to mechanical engineering practice. Results must be of sufficient importance to merit publication.

MEE 699. PHD Dissertation. 1-15 Hours

An original research effort which makes a definite contribution to technical knowledge. Results must be of sufficient importance to merit publication.

Renewable and Clean Energy

- Master of Science in Renewable and Clean Energy

Kelly Kissock, Department Chairperson

Master of Science in Renewable and Clean Energy (RCL)

The program of study leading to the Master of Science in Renewable and Clean Energy engineering degree, developed by the student in

conjunction with her/his advisor, must include a minimum of 30 semester hours. The program of study must include 18 or more semester hours of RCL/MEE/AEE credits and a minimum of 3 semester hours of mathematics. The program accepts courses taken at DAGSI partner universities, Wright State University and the Air Force Institute of Technology. At least one-half of the courses must be taken at the University of Dayton. Students may pursue a thesis or non-thesis option. A thesis option requires 6 semester hours of RCL 599 credits, which includes both an oral defense and a written thesis.

See also Master's Degree Requirements in School of Engineering section in the bulletin and consult with the advisor.

Courses

RCL 507. Materials Advanced Energy Applications. 3 Hours

Various advanced energy technologies (AMTEC, Fuel Cells, Thermoelectrics, Nuclear, etc.) will be discussed with an emphasis on the role that materials have/will play in their development. Critical 'bottlenecks' in materials development delaying the introduction of new advanced energy systems will be identified. In addition, how material selections are made based on operational system environments in 'real world' scenarios will be presented.

RCL 511. Advanced Thermodynamics. 3 Hours

Equilibrium, first law, second law, state principle, and zeroth law; development of entropy and temperature from availability concepts; chemical potential, chemical equilibrium, and phase equilibrium. Thermodynamics of irreversible processes; Onsager reciprocal relations; application of these concepts to direct energy conversion.

RCL 524. Electrochemical Power. 3 Hours

The course will cover fundamental as well as engineering aspects of fuel cell technology. Specifically, the course will cover basic principles of electrochemistry, electrical conductivity (electronic and ionic) of solids, and development/design of major fuel cells (alkaline, polymer electrolyte, phosphoric acid, molten carbonate, and solid oxide). A major part of the course will focus on solid oxide fuel cells (SOFC), as it is emerging to be dominant among various fuel cell technologies. The SOFC can readily and safely use many common hydrocarbon fuels such as natural gas, diesel, gasoline, alcohol, and coal gas. Prerequisite(s): (MEE 301, MEE 312) or permission of instructor.

RCL 533. Biofuel Production Processes. 3 Hours

This course will provide an overview of the range of fuels derived from biological materials and processes, with a focus on anaerobic digestion, bioethanol and biodiesel and production of synthetic fuel from biological materials. The course will include an overview of the biochemistry of energy production in biological systems, discussions of the economics and environmental sustainability of biofuels, and a review of reactor and separation systems concepts relevant to biofuel production. Prerequisite(s): EGR 202, CHM 123, or consent of instructor.

RCL 556. Energy Systems Engineering. 3 Hours

This course is aimed at providing fundamental knowledge of thermodynamics, fluid mechanics, and heat transfer in context of Energy Systems Engineering. A Just-in-Time approach to learning and applying these topics will be used. Projects will anchor all class activities. In addition to providing knowledge and experience of thermodynamics, fluid mechanics, and heat transfer, this course seeks to provide students the analysis skills necessary to determine the importance of energy conversion technologies, with special emphasis on energy efficiency and renewable energy (tidal, hydroelectric, wind, solar and geothermal).

RCL 557. Building Energy Informatics. 3 Hours

The focus of the course is the collection and analysis of energy data sets to reduce energy consumption and/or energy demand. Students will typically utilize monthly energy data from multiple buildings, real time energy data, and building energy audit data. Students will disaggregate/aggregate data to develop energy use benchmarks, identify priority buildings/actions for energy reduction, identify problems, and estimate savings. Programming in Matlab and an introduction to sql dbase management are covered.

RCL 561. Solar Energy Engineering. 3 Hours

This course will cover the theory, design, and application of two broad uses of solar energy: (i) direct thermal and (ii) electrical energy generation. The majority of the course will focus on thermal applications, with emphasis on system simulation and design for buildings and other systems. The course will expose students to the development and use of solar design and simulation tools. Most of the tools will be implemented in Excel and TRNSYS, but students are welcome to use other software tools such as Engineering Equation Solver (EES) or MATLAB. Some of the class time will be devoted to demonstrate the development and use of these tools to solve homework problems.

RCL 562. Geothermal Energy Engineering. 3 Hours

This course will cover the theory and design of the three broad uses of geothermal energy: (i) heat pump applications, (ii) direct uses, and (iii) electrical energy generation. The majority of the course will focus on heat pump applications, with emphasis on ground heat exchanger simulation and design for buildings and other systems. Closed-loop, open-loop, and hybrid geothermal heat pump systems will be examined. Heating, cooling, and electricity generating applications using hot geothermal reservoirs will also be discussed. The course will expose students to the development and use of geothermal design and simulation tools. Most of the tools will be implemented in Excel, but students are welcome to use other software tools such as Engineering Equation Solver (EES) or MATLAB. The course notes explain the development and use of these tools, which will be used to solve homework problems. Prerequisite(s): Undergraduate thermodynamics and heat transfer courses.

RCL 563. Wind Energy Engineering. 3 Hours

Introduction to wind energy engineering, including wind energy potential and its application to power generation. Topics include wind turbine components; turbine fluid dynamics and aerodynamics; turbine structures; turbine dynamics; wind turbine controls; fatigue; connection to the electric grid; maintenance; wind site assessment; wind economics; and wind power legal, environmental, and ethical issues. Prerequisite(s): Undergraduate fluid mechanics course.

RCL 564. Sustainable Energy Systems. 3 Hours

Survey of conventional fossil-fuel and renewable energy with an emphasis on system integration. Basic concepts of climate physics will be addressed along with estimates of fossil resources.

RCL 568. Internal Combustion Engines. 3 Hours

Study of combustion and energy release processes. Applications to spark and compression ignition, jet, rocket, and gas turbine engines. Special emphasis given to understanding of air pollution problems caused by internal combustion engines. Idealized and actual cycles are studied in preparation for laboratory testing of internal combustion engines.

RCL 569. Energy Efficient Buildings. 3 Hours

Provides knowledge and skills necessary to design and operate healthier, more comfortable, more productive, and less environmentally destructive buildings; A specific design target of E/3 (typical energy use divided by three) is established as a goal. Economic, thermodynamic, and heat transfer analyses are utilized. Extensive software development. Prerequisite(s): MEE 410.

RCL 571. Design of Thermal Systems. 3 Hours

Integration of thermodynamics, heat transfer, engineering economics, and simulation and optimization techniques in a design framework. Topics include design methodology, energy analysis, heat exchanger networks, thermal-system simulation, and optimization techniques.

RCL 572. Design for Environment. 3 Hours

Emphasis on design for environment over the life cycle of a product or process, including consideration of mining, processing, manufacturing, use, and post-life stages. Course provides knowledge and experience in invention for the purpose of clean design, life cycle assessment strategies to estimate the environmental impact of products and processes, and cleaner manufacturing practices. Course includes a major design project.

RCL 573. Renewable Energy Systems. 3 Hours

Introduction to the impact of energy on the economy and environment. Engineering models of solar thermal and photovoltaic systems. Introduction to wind power. Fuel cells and renewable sources of hydrogen. Corequisite(s): MEE 410 or equivalent.

RCL 578. Energy Efficient Manufacturing. 3 Hours

This course presents a systematic approach for improving energy efficiency in the manufacturing sector. Current patterns of manufacturing energy use, the need for increased energy efficiency, and models for sustainable manufacturing are reviewed. The lean-energy paradigm is applied to identify energy efficiency opportunities in industrial electrical, lighting, space conditioning, motor drive, compressed air, process heating, process cooling, and combined heat and power systems. Prerequisite(s): EGR 202, MEE 410.

RCL 583. Advanced Photovoltaics. 3 Hours

This theoretical course will cover science and applications of photovoltaics, with special emphasis on inorganic and organic semiconductors, ferroelectrics, chalcopyrites, metamaterials, and quantum structures. Prerequisite(s): ECE 506 or permission of instructor.

RCL 590. Special Problems in Renewable & Clean Energy. 1-6 Hours

Special problems in a designated area of energy systems arranged and approved by the student's faculty advisor and the departmental chair.

RCL 595. Renewable & Clean Energy Project. 1-6 Hours

Student participation in an energy related design or development project under the direction of a project advisor. The student must show satisfactory progress as determined by the project advisor and must present a written report at the conclusion of the project.

RCL 599. Renewable & Clean Energy Thesis. 1-6 Hours

Original research in energy systems which makes a definite contribution to technical knowledge. Results must be of sufficient importance to merit publication.

Bachelor's-Plus-Master's Programs

Approved Bachelor's-Plus-Master's (BPM) degree programs typically allow qualified students at the University of Dayton to earn both a B.S./B.A. and an M.S./M.A./MBA degree in an accelerated fashion, often enabling them to earn a master's degree with only twelve additional months of study subsequent to completing their baccalaureate degree. This is achieved in part through careful program coordination and, in many cases, by allowing BPM undergraduates to take up to 6 credit hours of graduate coursework to simultaneously satisfy both undergraduate and graduate program requirements. While BPM programs are often referred to as "5-Year" programs, completing both degrees may in some cases require more than five years of study. The total period of study will be influenced by several factors including whether or not a student changes undergraduate majors, participates in a co-op program, drops and re-takes multiple courses or pursues a thesis option master's degree.

Interested undergraduates are encouraged to consult with their Department Chair or Dean to learn more about BPM programs that may be available to them.

Admission to the BPM Degree Program

Admission to a BPM program will typically occur during the first semester of the junior year. However, a student may be admitted anytime subsequent to completion of 60 semester hours of undergraduate coursework and prior to being awarded the baccalaureate degree.

Admission to a BPM program requires a minimum cumulative undergraduate grade-point-average (GPA) of 3.00. Continued enrollment in the BPM program requires maintenance of an undergraduate cumulative GPA of at least 3.00 and, when applicable, a graduate GPA of at least 3.00 as well. Individual programs may require additional or more stringent criteria according to their needs (e.g., higher minimum GPA's, standards for performance within the undergraduate or graduate program, or the completion of specific coursework).

Admission to the Master's Degree Program

Subsequent to admission to a BPM program, students must also apply for admission to the master's program through the Office of Admission. This application must be completed prior to enrollment in more than six hours of coursework intended for credit at the graduate level.

Following review of the graduate program application, students who satisfy all standards for continued enrollment in the BPM program and who also meet all additional admission requirements that are normally associated with the intended master's program (e.g., satisfactory performance on the Graduate Record Exam), will be conditionally admitted to the graduate program. While conditional admission does not guarantee ultimate admission to the master's program, admission on regular status will typically be granted upon conferral of the baccalaureate degree, provided that all requirements for admission to the master's program have been satisfied.

Transcript Considerations

Joint-degree graduate course hours will be credited to both the undergraduate and graduate degree program requirements. Transcription of graduate only degree credit will, however, be contingent upon matriculation into the graduate degree program. If a conditionally admitted student does not achieve regular admission to the graduate

program, any graduate work already completed will be noted on the undergraduate transcript only.

Joint-degree graduate course hours will be shown only on the undergraduate portion of a BPM student's transcript and are included only in undergraduate quality point-average calculations. As a result, the graduate portion of a BPM student's transcript will show up to 6 credit hours fewer than would be otherwise shown and the final graduate cumulative quality-point average will be calculated based upon a correspondingly fewer number of graduate credit hours. The following notation will also be included at the beginning of the graduate portion of a BPM student's transcript:

"[Specific number] semester hours of graduate program requirements were satisfied as an undergraduate student."

International Marian Research Institute

- Pontifical Degrees
- Master's Degree in Theological Studies
- Certificate, Marian Studies
- Certificate, Marianist Studies

Fr. Johann G. Roten, S.M. Program Director

Founded by the Marianists of the University of Dayton, the Marian Library/International Marian Research Institute has the universal mission to make the Virgin Mary, Mother of Jesus Christ, better known, loved and served. This global, scholarly and pastoral privilege is fulfilled above all through the operation of the Marian Library, founded in 1943 and today recognized as the world's largest and most comprehensive collection of printed materials on the Blessed Virgin Mary, as well as through the International Marian Research Institute (IMRI).

The International Marian Research Institute was established in 1975 at the University of Dayton in affiliation with the Pontifical Theological Faculty *Marianum* in Rome. IMRI offers a graduate program from the *Marianum* leading to a Licentiate of Sacred Theology (S.T.L.) and a Doctorate of Sacred Theology (S.T.D.). The program is accredited by the *Marianum* and approved by the Congregation for Catholic Education at the Vatican. Presently there are only two places in the world, Rome and Dayton, where students can earn the Licentiate of Sacred Theology (S.T.L.) and the Doctorate of Sacred Theology (S.T.D.) with specialization in Mariology.

Pontifical Degrees (S.T.L./S.T.D.)

As an American affiliate of the Pontifical Faculty of Theology *Marianum*, our academic program is empowered to offer courses leading to the STL and STD degrees. Such programs of study are governed by the rules and directives issued by the Sacred Congregation for Catholic Education, and their application by the *Marianum*.

Master's Degree In Theological Studies

The University of Dayton offers in joint venture with the IMRI a master's degree in Theological Studies with a Marian concentration. The concentration in Marian Studies is available for those who take a minimum of twelve hours up to a maximum of sixteen hours of specially designated courses in Marian disciplines.

Certificate In Marian Studies

A Certificate Program is available for qualified students who do not wish to pursue the full rigors of the STL/STD courses of study, or who may be lacking in some of the basic requirements for admission into these programs. The Certificate Program involves basic courses (thirty-six quarter credits) giving a broad foundation in the study of Mariology and the writing of a research paper or project. The research paper (thirty pages) is elaborated under the direction of a moderator and must be original.

The Certificate Program is available as a guided studies program. The suggested time frame for the completion of the program is two to four years.

Certificate In Marianist Studies

The Marianist Studies Program is open especially to Marianists, their affiliates and to all those interested in learning more about the Marianist religious heritage. This program (thirty-six quarter credits) involves basic coursework giving a broad foundation in the study of Mariology, specialized coursework in the Marianist religious heritage, and the writing of a research paper (thirty pages) or project on a topic related to the Marianist religious heritage.

The certificate program in Marianist Studies is available as a guided studies program. The suggested timeframe for the completion of the program is two to four years.

Introductory Courses

MRI 600	Introduction to Mariology	1
MRI 601	Research & Bibliography	1
MRI 602	Methods in Theology	1
MRI 603	Monographic Study of Marian Text	1

Core Courses

MRI 610	Mary & the Old Testament	3
MRI 611	Mary in the New Testament	3
MRI 612	Mary & the Apocrypha	3
MRI 620	Christ in Patristics	3
MRI 621	Church in Patristics	3
MRI 622	Mary in Patristics	3
MRI 625	Mary in the Medieval Period I	3
MRI 626	Mary in the Medieval Period II	3
MRI 627	Mary in the Modern Period I	3
MRI 628	Mary in the Modern Period II	3
MRI 629	Mary in the Contemporary Period I	3
MRI 630	Mary in the Contemporary Period II	3
MRI 631	Marian Doctrine	3
MRI 632	Marian Spirituality	3
MRI 633	Mary in the Liturgy	3
MRI 634	Mary & the Church	3
MRI 636	Mary in Ecumenism	3
MRI 638	Mary & Theology & Anthropology	3
MRI 640	Ecclesiology	3
MRI 641	Christology	3
MRI 642	Spirituality	3

Special Courses

MRI 639	Thomas Aquinas & Spirituality	1
MRI 650	Special Marian Topics	1
MRI 652	Monographic Studies	1
MRI 654	Mary in Art	1
MRI 656	Mary in Music	1
MRI 658	Mary in Literature	1
MRI 660	Mary's Place in Contemporary Catchetics	1
MRI 662	Mary & the Holy Land	1
MRI 664	Mary & the Human Sciences	1
MRI 665	Mary & Social History	1
MRI 668	Philosophy	3
MRI 691	Mary in Asian Spirituality	1
MRI 694	Mary in the Media	1

MRI 700	Year of Faith Symposium IMRI	2
Dissertation		
MRI 790	Dissertation Guidance	12
Marianist Courses		
MRI 670	Chaminade & Mary	3
MRI 671	Chaminade on Mary	3
MRI 672	History of Marianist Spirituality	3
MRI 673	Adele's Spirituality	3

Courses

MRI 600. Introduction to Mariology. 1 Hour

Designed for students who are new to the program or who simply have an interest in Mariology, this course explores the basic Marian issues within the framework of contemporary theology and emphasizes the major developments in Mariology since Vatican II.

MRI 601. Research & Bibliography. 1 Hour

This course introduces students to the resources and bibliography for theological studies, with attention to research in Mariology. It offers suggestions for organization and information management.

MRI 602. Methods in Theology. 1 Hour

This course deals with various methods used in the study of contemporary theology. It points to their specific focus and philosophical foundation, as well as to advantages and limitations. Their application to research in Mariology will be examined.

MRI 603. Monographic Study of Marian Text. 1 Hour

This course leads the student to the understanding of Marian texts of various periods, genres, literary styles, and contents. The focus of this course will be a guided reading of *The Hail Mary: A Verbal Icon* of Mary by Nicholas Ayo.

MRI 610. Mary & the Old Testament. 3 Hours

This course studies the principal Old Testament texts with reference to the history of salvation. A special emphasis will be given to the Protoevangelium, symbols and types such as New Eve, Hannah, Daughter of Zion, Ark of the Covenant, etc. The course will further show the impact that some of these symbols and figures had on the New Testament and the apocryphal literature.

MRI 611. Mary in the New Testament. 3 Hours

Study of the principal New Testament texts with reference to Mary as person, as Mother of the Redeemer, as figure of the Church, and associate of Christ in the history of salvation.

MRI 612. Mary & the Apocrypha. 3 Hours

Study of the place and role of Mary in the apocryphal literature of the Old and New Testament, this course prepares students for the understanding of Marian symbols and topics in devotion, religious culture, and art.

MRI 620. Christ in Patristics. 3 Hours

Study of selected patristic texts regarding the person and redemptive work of Christ.

MRI 621. Church in Patristics. 3 Hours

Study of selected patristic texts regarding the Church as instrument and sacrament of salvation.

MRI 622. Mary in Patristics. 3 Hours

Study of initial developments of Marian doctrine and devotion in Greek, Latin, and Oriental patristics.

MRI 625. Mary in the Medieval Period I. 3 Hours

Study of the development of Mariology from the 7th century to the 12th century: Marian doctrines, Marian devotions, Mary in art and liturgy, Marian feasts, and principal Marian literary works.

MRI 626. Mary in the Medieval Period II. 3 Hours

Study of the development of Mariology from the 12th century to the Renaissance: Marian doctrines, Marian devotions, Mary in art and liturgy, Marian feasts, and principal Marian literary works.

MRI 627. Mary in the Modern Period I. 3 Hours

Developments in Marian devotion, liturgy, and doctrine are traced from the late medieval period, through the Reformation, Tridentine, Counter Reformation and the Baroque periods, as well as in the Byzantine writers, the early missionary movement, Jansenism, and the French School of Spirituality.

MRI 628. Mary in the Modern Period II. 3 Hours

Developments in Marian devotion, liturgy, and doctrine traced through the 18th century Enlightenment, the French Revolution and the Catholic Restoration, as well as the 19th century theologians (Newman, Scheeben, Terrien), the Scholastic revival, the Mariological Movement, the dogma of the Immaculate Conception, and the significance of the Marian Apparitions.

MRI 629. Mary in the Contemporary Period I. 3 Hours

Study of the development in Marian doctrine, devotion, and culture from the beginning of the 20th century to the eve of the Second Vatican Council.

MRI 630. Mary in the Contemporary Period II. 3 Hours

Study of the teaching of Vatican II about the Blessed Virgin Mary, especially in chapter VIII of *Lumen Gentium* and its implications and developments in contemporary Marian doctrine and devotion. The study includes magisterial pronouncements, theological reflection, and historical developments in Marian thinking since Vatican II.

MRI 631. Marian Doctrine. 3 Hours

Historical, theological, and anthropological study of the principal Marian doctrines: Divine maternity, Virginity, Immaculate Conception, and Assumption. Special emphasis is given to the meaning and importance of dogma, as well as to the study of the question of Mary's spiritual maternity, intercession, and mediation.

MRI 632. Marian Spirituality. 3 Hours

This course studies the various historical expressions and methods of Marian spirituality, Mary's role as model of Christian spirituality and devotion, her virtues, and her active presence in the life of the Church and that of the faithful.

MRI 633. Mary in the Liturgy. 3 Hours

This course studies the importance and significance of Mary's presence in the mysteries of Jesus Christ celebrated throughout the liturgical year as well as their influence on Marian doctrine, spirituality, and devotion through the centuries.

MRI 634. Mary & the Church. 3 Hours

Not the least of Vatican II's merits was to point out Mary's place at the heart of the Church. In reassessing the Mary-Church relationship the Council retrieved a Patristic theme of great importance. This course attempts to explore the Mary-Church theme from both a historical and doctrinal point of view. It will also highlight some pastoral aspects.

MRI 636. Mary in Ecumenism. 3 Hours

This course proposes the study of Mary and her place in the Church and related questions as seen by the various Christian and other religious traditions.

MRI 638. Mary & Theology & Anthropology. 3 Hours

This course presents an anthropological approach to the understanding of Mary and examines its challenges and limitations in light of a theological study of the human person as paradox and mystery. Special emphasis is given to the relationship between theological anthropology and Marian dogmas.

MRI 639. Thomas Aquinas & Spirituality. 1 Hour

Thomas Aquinas provides a theological infrastructure for Christian spiritualities and the spiritual lives of Christians. In this course, we will consider Thomas' principles as they apply to spirituality, such as his Trinitarian thrust, his positive conception of human nature with a holistic approach to the body/soul unity, his recognition of the value of the emotions, his virtue-based morality, etc.

MRI 640. Ecclesiology. 3 Hours

While giving special attention to the writings of major theologians regarding their understanding of the Church, this course also studies recent developments in African, Asian, Latin American and North Atlantic ecclesiologies. It will discuss the relationship between the Church as mystery and historical reality.

MRI 641. Christology. 3 Hours

Study of the scriptural foundations, the doctrinal developments and accompanying theological reflection about Jesus Christ's person and mission. Various christological developments of recent times are examined as to their doctrinal content and pastoral significance.

MRI 642. Spirituality. 3 Hours

Study of historical and systematic aspects of Christian spirituality, this course includes the presentation of various schools of spirituality, with special emphasis on the French School of spirituality. It also attempts an evaluation of contemporary trends in spirituality.

MRI 643. Grace & Soteriology. 3 Hours**MRI 645. Moral Theology. 1-3 Hours**

No description available.

MRI 650. Special Marian Topics. 1 Hour

Study of a particular contemporary Marian topic or question: Marian apparitions, Mary and Feminism, Mary and Liberation Theology, etc.

MRI 652. Monographic Studies. 1 Hour

Detailed study of the Marian writings of a father or doctor of the Church or of a modern writer.

MRI 653. Marianist Topics. 1 Hour

Study of the place of Mary in Marianist spirituality and tradition.

MRI 654. Mary in Art. 1 Hour

Study of the place of Mary in art with a concentration on specific themes or periods.

MRI 655. Fundamental Theology. 3 Hours**MRI 656. Mary in Music. 1 Hour**

Study of the place of Mary in music with a concentration on specific themes or periods.

MRI 658. Mary in Literature(Recent Novels). 1 Hour

Since most readers today become acquainted with Mary not through religious or theological books but through best-selling novels, this course will examine the kind of Mary that is encountered in that type of work, chiefly as it is found in English (American) literature. A brief glance at other literatures will round out the picture. The challenge that this presents to professional theologians will also be considered.

MRI 660. Mary's Place in Contemporary Catechetics. 1 Hour

Study of Mary's place in the Catechism of the Catholic Church, catechetical directives, and in textbooks as well as pastoral tools.

MRI 662. Mary & the Holy Land. 1 Hour

Study of the history, geography, and archeology relevant to Mary's life and Marian tradition.

MRI 664. Mary & the Human Sciences. 1 Hour

Study of sociological and psychological aspects of Marian culture and their impact on religious behavior and values.

MRI 665. Mary & Social History. 1 Hour

This course examines Mary's place in some aspects of social history. Mary's cultural role is undisputed. Thus, how did her person and mission influence social history? What was her role in the history of ideas, of laws and customs, values, and fashion? Where and how is the impact of her presence noticeable? How does the Church deal with it?.

MRI 667. Doctrine of Trinity. 1-3 Hours

No description available.

MRI 668. Philosophy. 3 Hours

Graduate level Philosophy in logic, epistemology, rational psychology, and/or metaphysics as prerequisite to degree program.

MRI 691. Mary in Asian Spirituality. 1 Hour

Asian religions and philosophies have had great impact on Christianity. This course attempts to situate Mary's place and role in a fruitful exchange between religions and the Christian message.

MRI 694. Mary in the Media. 1 Hour

This course attempts to assess Mary's place in the electronic media. News reports and websites with Marian themes from around the world will be shown and critiqued in light of Catholic teaching on the mass media.

MRI 700. Year of Faith Symposium IMRI. 2 Hours

IMRI students will receive 2 quarter credits for attending and participating in this event.

MRI 790. Dissertation Guidance. 1-12 Hours

Doctoral students register for 12 credits of dissertation guidance.

MRI 946. ssasect. 3 Hours

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