

# **VI Interdisciplinary and Joint Studies**

## **INDIVIDUAL INTERDISCIPLINARY STUDIES**

George B. Noland, Associate Provost

The University of Dayton, under the direction of the Dean for Graduate Studies and Research, offers individual interdisciplinary programs. Applicants must have a bachelor's degree and a general cumulative point average of 2.8. The student must write a formal request to the Graduate Council to begin such a program.

The degree will be a Master of Arts or a Master of Science with a major in the interdisciplinary area. The program should involve three disciplines and 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 chairmen of the departments involved.

Fifteen semester hours must be taken in courses offered by the three departments. Nine semester hours may be divided between directed study and thesis but must be related to the interdisciplinary area. Six semester hours of related electives may be chosen.

An oral or written examination should take place after 12 to 15 semester hours of course work to insure the integration of the disciplines. The examining committee is chosen by the advisory committee.

It is recommended that the student discuss the proposed program with the Dean for Graduate Studies and Research before proceeding to draw up the formal proposal for the Graduate Council. This request must contain the following:

1. A general description of the proposed program and the reasons for choosing such a program.
2. The courses (at least 15 semester hours) which will be taken and the departments 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.
4. The names of three faculty members as suggestions for the advisory committee. The appointment of the committee, however, rests with the Graduate Council. (The student is urged to discuss the proposal with each of the three before submitting it to the Graduate Council.)

## **AMERICAN STUDIES (AMS)**

Francis J. Henninger, Director of the Program

The College of Arts and Sciences, under the guidance of the program director and an advisory committee composed of the representatives of several supporting disciplines offers the Master of Arts in American Studies. These supporting disciplines include: Economics, English, Foundations of Education, History, Philosophy, Political Science, Psychology and Religious Studies. See Chapter VII for details of the program.

## **CLINICAL LABORATORY TECHNOLOGY (CLT)**

Stephen A. Sonstein, Director of the Program

The Master of Clinical Laboratory Technology program has as its goal the training of practicing scientists in health science administration or health science education. It involves an interdisciplinary core approach under the direction of the program director and cooperating faculty members in the Schools of Education and Business Administration.

Direct application of the material gained in coursework is insured during a hospital-based practicum under the direction of clinical faculty. See Chapter VII for details of the program.

## **COMMUNICATION ARTS (COM) INTERDISCIPLINARY STUDY**

Donald Morlan, Director of the Program

The Communication Arts Interdisciplinary Study program leads to the Master of Arts. It requires 12 semester hours of study in Communication Arts, 12 semester hours of study in one of several designated interdisciplinary areas, and six semester hours of thesis credit, followed by oral comprehensive examinations on both the course work and the thesis. See Chapter VII.

## **FOUNDATIONS OF EDUCATION AND RESEARCH (EDF) INTERDISCIPLINARY STUDIES**

John O. Geiger, Director of the Program

The Department of Educational Foundations and Research in the School of Education offers a program which enables students to attain a broad understanding of the field of education and also concentrate in a specific area. With the assistance of the faculty, students develop their own individualized program through a selection of graduate offerings in Education and other disciplines. See Chapter IX and consult with director for further details.



## **LAW AND BUSINESS ADMINISTRATION (LAW / MBA)**

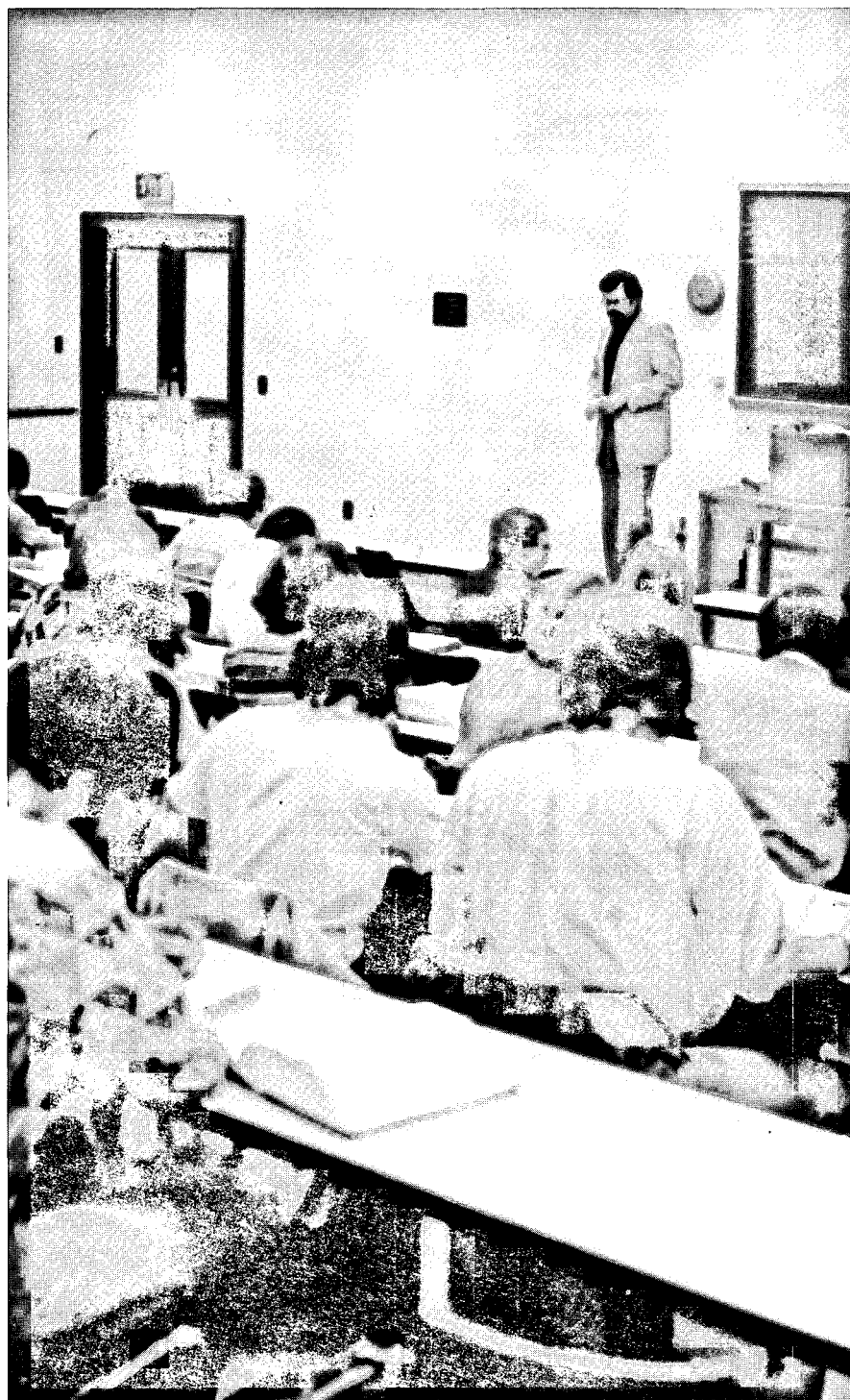
In cooperation with the School of Law, the School of Business Administration offers a joint program leading to the conferment of a Juris Doctor and the Master of Business Administration. By coordinating the scheduling of courses required for the joint program, the student is able to complete all work one semester sooner than would be necessary if the two degrees were pursued independently. The resulting combination of skills provides a strong background of increasing utility in today's environment. See Chapter VI; also see Chapter XI, and consult the directors of both programs.

## **LAW AND EDUCATION (LAW / EDU)**

The Law School and the School of Education cooperate in offering a joint program leading to both the Juris Doctor and the Master of Science in Education. Because the program provides sufficient flexibility to accommodate particular needs and plans, its design and plan can be determined for each student individually. For further information, students interested in this joint program should consult program directors in both the Law School and the School of Education.

## **LAW AND PHILOSOPHY (LAW / PHL)**

The School of Law and the Department of Philosophy in the College of Arts and Sciences cooperate in offering a joint degree program — concurrent studies in two disciplines that result in the Juris Doctor and the Master of Arts. Students interested in this combination must make separate application for admission to the law and the philosophy programs and satisfy the requirements of both, some of which, however, may overlap. See also Chapter VII and XI.



## MANAGEMENT SCIENCE (MSC)

Landis S. Gephart, Director of the Program

The program leading to the Master of Science in Management Science, which is interdisciplinary, is administered by the Dean for Graduate Studies and Research of the University, with the cooperative support of the College of Arts and Sciences, the School of Business Administration, the School of Education, and the School of Engineering.

The objective of this program is to develop managerial capability and skill appropriate to each student's preferences and goals. The general methodologies of management science include system analysis, model building, information systems, planning and control, and the varied techniques of operations research, such as decision analysis, reliability engineering, mathematical optimization, and applied probability and statistics. The program emphasizes the models, techniques, and quantitative methods that are useful in the solution of real problems.

In most years the demand for current graduates in the Management Science program has greatly exceeded the number of students available. Graduates are sought in all areas of the public and private sector, from engineering to business to medicine.

All courses are offered in the evening. Thus the Management Science program is fully accessible to those who work full time and want to satisfy both occupational and academic objectives.

### FINANCIAL AID

Assistantships are available at the University of Dayton for the encouragement of graduate work and the promotion of research. Detailed information may be secured from the Director of the Management Science Graduate Program.

### ADMISSION

Applications are welcome from college graduates in all fields — engineering, the liberal arts, the physical sciences, and the social sciences. Advice on eliminating deficiencies in undergraduate backgrounds may be obtained by individual inquiry. There are three types of admission:

*Regular admission* is granted to applicants who are holders of the bachelor's degree from accredited colleges or universities and have demonstrated superior academic performance in their respective major fields. In general, they must be well trained in mathematics and statistics and must understand the use of computers.

*Conditional admission* is granted to applicants who do not qualify for regular admission but show promise of being able to complete the requirements of the management science program. Conditional admission may be granted to the following applicants:

1. The candidate for graduate work whose background does not include at least three terms of analytic geometry and calculus, two terms of statistics, and

competence in a computer language. Such an applicant may be required to complete certain prerequisite courses before admission to the program. These courses must be completed with a minimum grade of B. Any student requiring in excess of nine semester hours of prerequisites will be considered as unclassified.

2. The candidate whose preparation cannot be determined adequately and for whom any part of the qualifying education was obtained more than seven years before the proposed date of initiation studies in the graduate program.

3. The candidate in the final term of work toward a bachelor's degree pending the filing of supplementary transcripts and evidence of the awarding of the degree.

4. An undergraduate at the University of Dayton who is within six semester hours of graduation and who has permission of the department to register for graduate credit. The combined elections in both the undergraduate and graduate courses for one term may not exceed 12 semester hours, and only students who have excellent records should seek such approval.

Applicants in categories 1 and 2 above may be required to complete additional qualifying work beyond the normal degree requirements. If, after the completion of 15 semester hours of graduate work, the cumulative grade point average is not B (3.00) or better, dismissal from the graduate course may result. Applicants in categories 3 and 4 will be subject to reevaluation and reclassification upon completion of the bachelor's degree.

*Unclassified* students will be permitted to register for a maximum of 12 semester hours of graduate work.

## GENERAL REQUIREMENTS

Each student admitted to graduate study in the program will be assigned a member of the department as a permanent advisor. The advisor will guide the student in the development of a program of study deemed best for his particular interest and objectives. The program of study, approved by the advisor and the department head, must be filed with and approved by the director of the Management Science program.

It is the student's responsibility to meet with the department head as soon as possible after acceptance into a graduate program through formal notification by the Office for Graduate Studies. Conditional attendance for one term is permissible until the program of study has been filed. Amendments to the original program of study are permissible with the approval of the advisor and program director.

All programs and amendments must be prepared in quintuplicate. A copy will be returned to the student. A copy will be retained by the Director's Office and one by the Office for Graduate Studies.

A student admitted to the master's program must have met the requirements for the bachelor's degree. He must successfully complete the minimum number of hours of graduate work which are approved by his advisor and which are required in the program for which he is registered. He must obtain a cumulative average of B (3.00) or better. At the discretion of the advisor an oral or written examination may be required to confirm the student's ability to complete the program satisfactorily.

**PROGRAM OF STUDY**

The Management Science program (MSC) is a master's degree program design of complex technological systems. This concentration, with its many options, would prepare them for careers in the service professions of management, analysis, and policy research. The program emphasizes the practical application of the techniques of management science / operations research in modern society. The program of study must include a minimum of 36 semester hours consisting of 18 semester hours in Management Science, 9 semester hours in a cognate field, and 9 semester hours in electives.

**Major Field: Management Science**

A minimum of 18 semester hours must be selected. The emphasis is on the techniques of management science / operations research / systems analysis.

**Cognate Fields**

*Applied Mathematical Systems.* Courses in this specialization are in the Departments of Mathematics and Electrical Engineering. One course, 3 semester hours, is to be selected from the following:

MTH 519, 531, 565.

Two courses, 6 semester hours, are to be selected from the following:

MTH 519, 520, 521, 522, 525, 526, 531, 532, 561, 562, 565.

ELE 509, 514, 515, 531, 532, 533, 534, 535.

*Business Administration and Systems.* This cognate field allows the student to prepare for a career in the management and administration of economic and business systems. Courses are taken from the MBA program of the School of Business. Two courses, 6 semester hours, are to be selected from the following:

MBA 520, 530, 540, 550, 560.

One course, 3 semester hours, is to be selected from the following:

MBA 581, 583, 587.

*Computer Science* allows the student to prepare for a career in the management, design, and / or administration of computer systems. Courses in this cognate field are in the Department of Computer Science. Three courses, 9 semester hours, are to be selected from the following:

CPS 510, 528, 532, 536, 544-545, 553-554.

*Educational Administration and Systems* as a cognate field allows the student to prepare for a career as a policy and management analyst for school districts and institutions of higher learning. Courses are in the School of Education. EDA 506 is required of all students; another course may be substituted only with approval. Two courses, 6 semester hours, are to be selected from the following:



EDF 501, 503, 518, 590, 596 or 597 (with permission).  
 EDA 509, 511 or 512, 513 or 514, 517, 521.  
 EDC 533.  
 EDS 589.

*Engineering* as a cognate field allows the student to take courses (approved by the advisor) from any approved graduate program in the School of Engineering. The engineering programs available are as follows:

Aerospace	Civil	Materials
Chemical	Electrical	Mechanical

*Public Administration and Systems* courses allow the student to prepare for a career as a policy and management analyst for governmental and public organizations. Courses in this cognate field are from the Public Administration program of the Department of Political Science. POL 510 is required of all students. Two courses, 6 semester hours, are to be selected from the following:

POL 521, 535, 540, 545, 552, 575, 576, 578, 595.

### Electives

Nine semester hours can be taken as electives. These graduate courses, which are to be approved by the advisor, may be selected from any approved graduate programs of the University. These programs include the major or cognate fields, as well as other areas as diverse as biology and communication arts. Possible areas of study are as follows:

Reliability	Optimization Theory
Maintainability	Production Systems
General Systems Theory	Stochastic Systems
Information Management	Systems Analysis
Inventory Theory	Systems Simulation
Marketing Analysis	Urban Policy Analysis
Mathematical Modeling	Educational Policy Analysis
Operations Research	

### COURSES OF INSTRUCTION

MSC 501. DECISION THEORY AND APPLICATIONS: A study of utility theory and decision making under certainty, risk, and uncertainty. Application of Bayesian analysis to multistage decision problems. Application of these techniques to various engineering and industrial problems. 3 sem. hrs.

MSC 502. SIMULATION TECHNIQUES IN OPERATIONS RESEARCH: The construction of models which simulate real systems, the use of random numbers in obtaining sample observation of the model, and the inference of system properties from samples of observations of the model. 3 sem. hrs.

MSC 508. QUALITY CONTROL: Principles and applications of the latest quality control procedures. Design of quality control systems and procedures. Recent developments in statistical quality control such as multi-level continuous acceptance sampling, variable sampling, and life testing. 3 sem. hrs.

**MSC 515. QUEUING THEORY AND APPLICATION:** Emphasis on application of theory to industrial engineering. Machine interference, mathematical queuing models, a study of case histories (with solutions) including marketing models, servicing problems, Markovian models. Monte Carlo techniques and computer simulation models. *3 sem. hrs.*

**MSC 516. INVENTORY THEORY AND APPLICATION:** Theory and application of inventory control with respect to costs of ordering and manufacturing, holding and storage, shortage-penalty costs, revenues, and discount rates. Forecasting, material control, input capacity and scheduling, stochastic inventory models, and dynamic inventory models including real time computerized inventory control models. *3 sem. hrs.*

**MSC 521-522. OPERATIONS RESEARCH:** Study of methods of operations research, including formulating problems, weighing the objectives, construction of models, deriving solutions, testing the models and implementing results. Emphasis on applications to industrial problems. *6 sem. hrs.*

**MSC 524. DISCRETE TIME SERIES:** Emphasis on industrial applications of open loop statistical forecasts. Techniques of describing a time series by very general classes of functions, including trigonometric functions. *3 sem. hrs.*

**MSC 525. SYSTEM RELIABILITY AND MAINTAINABILITY:** Application of probability and statistical theory to the design of reliability systems in the broadest sense; theory behind and techniques to be used in designing evaluation methods and procedures for determining reliability of component parts and total systems. *3 sem. hrs.*

**MSC 528. DESIGN AND ANALYSIS OF EXPERIMENTS:** Advanced topics in statistical experiments with emphasis on the design aspects. Topics include confounding, fractional replication, factorial and nested designs. *3 sem. hrs.*

**MSC 540. INPUT-OUTPUT ANALYSIS:** A study of the basic ideas of input-output analysis, with emphasis on its application to economic and technological planning in public and private sectors of the economy. *3 sem. hrs.*

**MSC 545. PRODUCTION PLANNING AND CONTROL:** Study of principles of managerial control and evaluation of various systems of control as to applicability not only to various types of production but also to maintenance activities, to engineering, and to research and development. *3 sem. hrs.*

**MSC 550. TECHNOLOGICAL FORECASTING:** This course presents state-of-the-art techniques for technological forecasting in R and D and other related areas. Topics covered include the Delphi Method, techniques of technological forecasting, growth curves and various relevant mathematical models. Areas of application are tailored to student interests. *3 sem. hrs.*

**MSC 551. TECHNOLOGY ASSESSMENT:** Examines the impacts of technological change on society. Reviews the impacts of several major technological changes of the past, including both anticipated and unanticipated changes. Presents methods for assessing and predicting the consequences of technological change. *3 sem. hrs.*

**MSC 555. HUMAN FACTORS CRITERIA IN SYSTEMS DESIGN: A MANAGERIAL OVERVIEW:** This course will provide the student with a managerial overview of human factors criteria than should be considered in the design of man-machine systems, work situations, and man's physical environment. *3 sem. hrs.*

MSC 585. ORGANIZATIONAL SYSTEMS: Application of systems theory to the operation of governmental, business, and educational organizations. conventional theories related to the systems approach to an understanding of organizations. 3 sem. hrs.

MSC 595. CURRENT PROBLEMS: (Subject will vary) Topics of current interest in specialized areas of Management Science. 3 sem. hrs.

MSC 599. THESIS 6 sem. hrs.

MSC 630. ADVANCED TOPICS IN LINEAR PROGRAMMING: Emphasis on computational techniques and applications of linear programming to industrial problems, primal-dual algorithm, decomposition principle, assignment, transportation and trans-shipment problems, network flow algorithm, and integer programming. Prerequisite: MSC 521. 3 sem. hrs.

MSC 631. NONLINEAR AND DYNAMIC PROGRAMMING: Development of the theory and computational techniques of nonlinear and dynamic programming. Applications of optimization methods, nonlinear programming problems, stochastic programming, gradient methods, dynamic programming. Kuhn-Tucker theory and quadratic programming. Prerequisite: MSC 630. 3 sem. hrs.

MSC 640. ADVANCED TOPICS IN RELIABILITY AND MAINTAINABILITY: The exact content of this course varies from year to year. The major emphasis is to study the latest research in the field and evaluate the impact on future practices in reliability and maintainability. Prerequisite: MSC 525 or equivalent. 3 sem. hrs.

