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## 1971-1972 Bulletin

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# University of Dayton Bulletin



GRADUATE CATALOG ISSUE • 1971-1972



DAYTON, OHIO 45409

THE UNIVERSITY OF DAYTON BULLETIN

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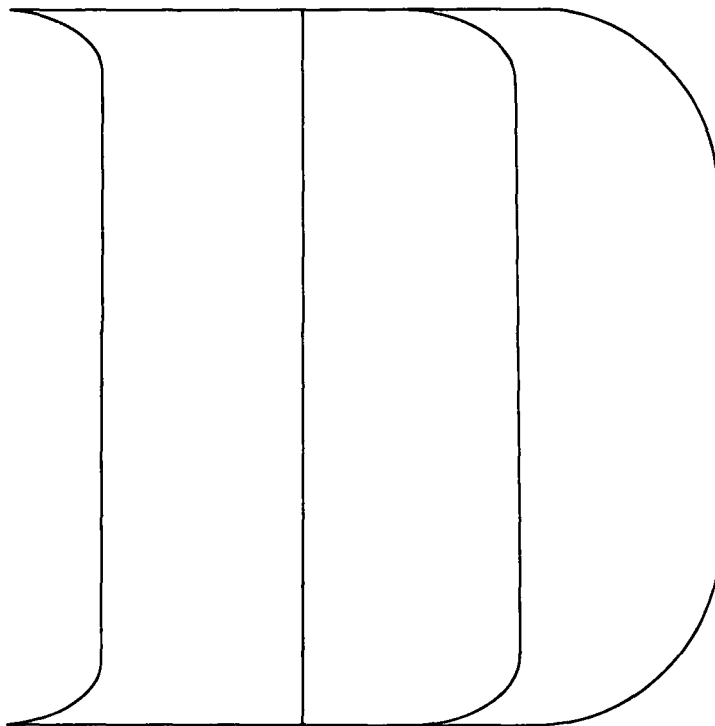
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The University of Dayton Bulletin includes the admissions catalog issue, the undergraduate catalog issue, the graduate catalog issue, the evening session announcements, and the summer session announcements.

The provisions of the various issues of this Bulletin are to be considered directive in character and not as an irrevocable contract between the student and the University. The University reserves the right to make any changes that seem necessary or desirable.

The current number of any of these publications may be obtained by applying to the office of the Provost.

# University of Dayton Bulletin



## The Graduate Catalog Issue 1971-72

College of Arts and Sciences  
School of Business Administration  
School of Education  
School of Engineering

DAYTON, OHIO 45409

# Academic Calendar

## 1971-1972

## FIRST TERM

Aug. 30	Mon.	Classes begin at 8 a.m.
Sept. 6	Mon.	Labor Day—no class meetings
Sept. 8	Tues.	Last day for add in schedules
Oct. 16	Sat.	Homecoming—Graduate and Saturday only classes conducted
Oct. 23	Sat.	Graduate Record Exam (file application 4 weeks in advance)
Nov. 24	Wed.	Thanksgiving recess begins after the last evening class
Nov. 29	Mon.	All classes resume
Dec. 8	Wed.	Feast of the Immaculate Conception—No class meetings
Dec. 11	Sat.	Graduate Record Exam (file application 4 weeks in advance)
Dec. 13-16		Examinations in evening classes conducted during final class meeting
Dec. 13-17		Day Examinations—Term ends after the last examination
Dec. 18	Sat.	Diploma exercises

## SECOND TERM

Jan. 5	Wed.	Classes begin at 8 a.m.
Jan. 13	Thurs.	Last day for add in schedules
Jan. 15	Sat.	Graduate Record Exam (file application 4 weeks in advance)
Mar. 29	Wed.	Easter recess begins after the last evening class

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## 1971-1972

Apr. 4	Tues.	All classes resume
Apr. 18-21		Examinations in evening classes conducted during final class meeting
Apr. 14-21		Day Examinations—Term ends after the last examination
Apr. 15	Sat.	Examinations—Sat. courses
Apr. 22	Sat.	Graduate Record Exam (file application 4 weeks in advance)
Apr. 23	Sun.	Commencement exercises

### **\*THIRD TERM (First Session)**

May 4	Thurs.	Classes begin at 8 a.m.
May 12	Fri.	Last day for add in schedule
June 15-16		Examinations in evening classes conducted during final class meeting
June 12-16		Day Examinations—Session ends after the last examination
June 17	Sat.	Examinations—Saturday classes only
June 17	Sat.	Graduate Record Exam (file application 4 weeks in advance)

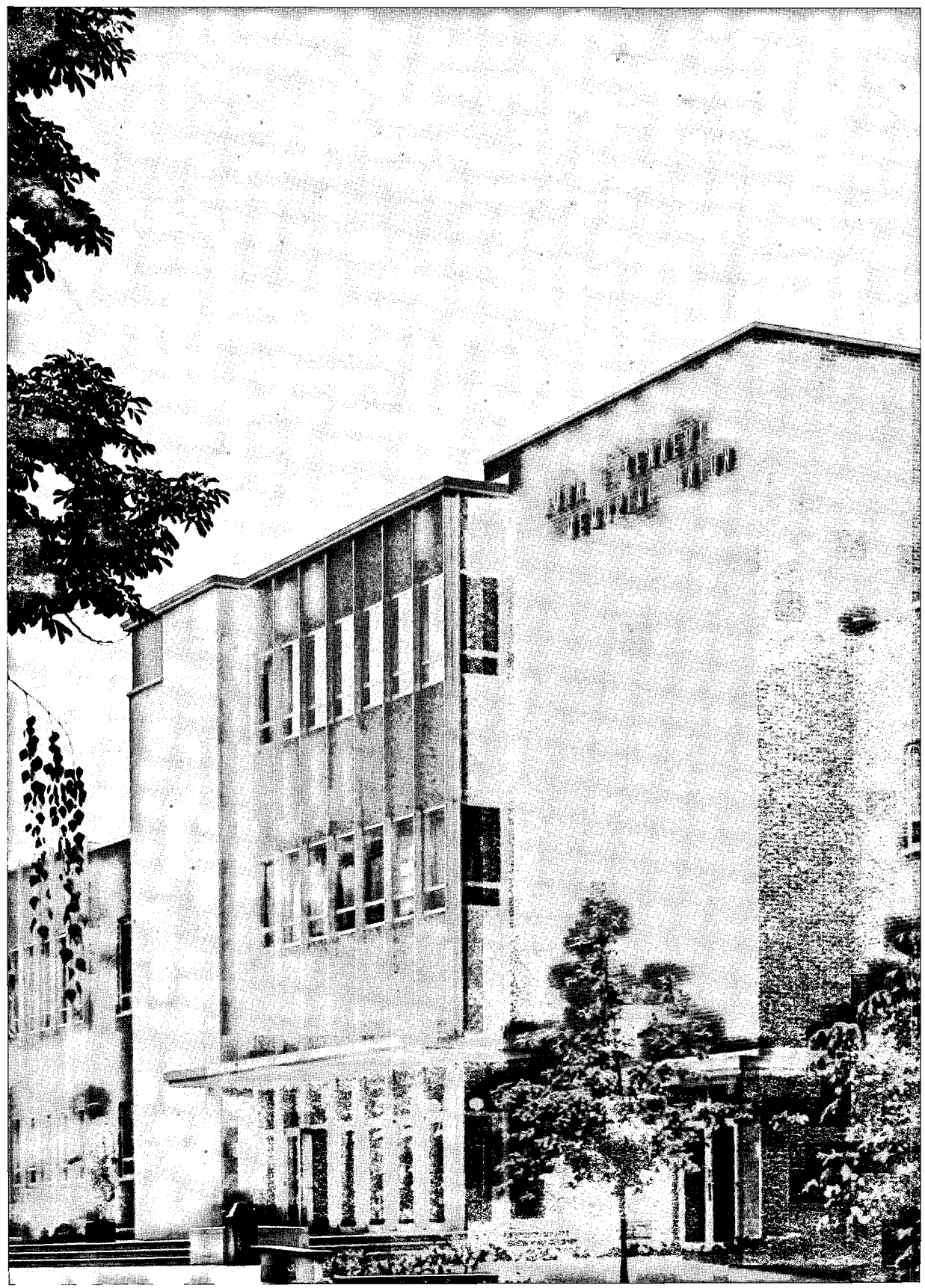
\*Courses in the MBA program start earlier. Please contact the Office for Graduate Studies.

### **\*THIRD TERM (Summer Session)**

June 19	Mon.	Classes begin at 8 a.m.
June 23	Fri.	Last day for add in schedules
July 3	Mon.	National holiday
July 15	Sat.	Graduate Record Exam (file application 4 weeks in advance)
July 24-28		Examinations in evening classes conducted during final class meeting. Session ends after the last examination
July 29	Sat.	Examinations—Saturday courses only
July 30	Sun.	Diploma exercises

\*Courses in the MBA program will run longer. Please contact the Office for Graduate Studies.





# I General Information

## STATEMENT OF PURPOSE

The University of Dayton, operating in a pluralistic environment, 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 ultimate purpose of graduate work at the University is identical with this purpose.

The immediate objectives of a graduate school distinguish it from every other type or level of educational institution. Through its faculty, it seeks to create and maintain an academic atmosphere that is essential to graduate work. Its influence, therefore, extends first to its own membership, by promoting all forms of scholarly activity.

It labors further to give its students a thorough grasp of a chosen field of knowledge, special skills in methods of research, and sharpened powers of independent thought. Under the guidance and inspiration of a scholarly staff, students are given the constant use of library, laboratories, and other educational facilities. Above all, a graduate student is expected to bring marked initiative to his work and to assume full responsibility for the progress of his studies. The courses of instruction can be no more than the point of departure and a basis for wide reading and personal investigation.

The number of credit hours demanded for a graduate degree is merely the material requirement; the form and substance of graduate work are conceived as the mastery of a subject-matter with understanding of its relations to kindred branches of knowledge.

In short, graduate work, for the student at the University of Dayton, has for its purpose an integrated program of advanced study based on adequate undergraduate preparation in a specific field of study. It presupposes academic and personal maturity and makes more than average demand upon the initiative, the industry, and the scholarship of the candidates for an advanced degree.

## **ACCREDITATION**

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

The State of Ohio, Department of Education.

The North Central Association of Colleges and Secondary Schools.

The National Council for Accreditation of Teacher Education (for preparation of elementary and secondary school teachers).

The Engineers' Council for Professional Development for Chemical, Civil, Electrical, and Mechanical Engineering curricula; also for programs of Electrical, Industrial, and Mechanical Technology in the Technical Institute.

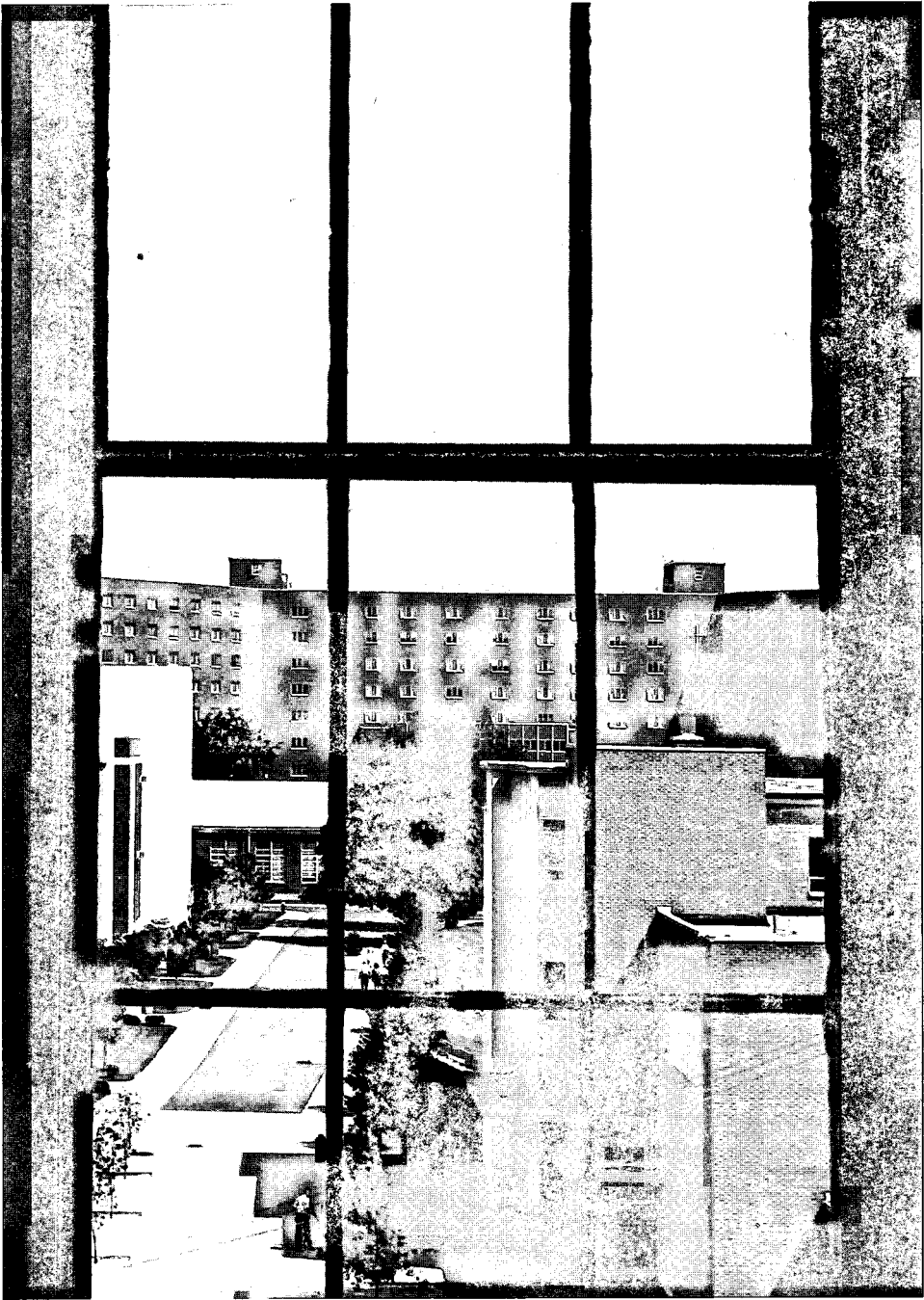
The University has the approval of the American Medical Association for its Pre-Medical program and of the American Chemical Society for its program in Chemistry.

## **INSTITUTIONAL MEMBERSHIP**

The University holds institutional membership in the following associations: The Association of American Colleges; The American Association of Colleges for Teacher Education; The American Council on Education; The American Society for Engineering Education; Association of Graduate Schools in Catholic Universities; Council of Graduate Schools; The Institute for International Education; The International Council on Education for Teaching; Midwest Conference on Graduate Study; National Association of Foreign Student Affairs; The National Catholic Educational Association; The Ohio Association of Counselor Educators; The Ohio College Association; The Council on Social Work Education; The Ohio Council for the Advancement of Educational Administration; Ohio Council on Advanced Placement; National Association of Schools of Public Affairs and Administration.

## **CONSORTIUM MEMBERSHIP**

The University is a member of the following Consortia: Dayton-Miami Valley Consortium (DMVC); Consortium for Higher Education in Religious Studies (CHERS); Consortium of the Hebrew Union College Biblical and Archeological School of Jerusalem.





## II Academic Information

### ADMISSION

Men and women graduates of approved colleges or universities with a Bachelor's degree are eligible for admission. Applicants must have had an adequate undergraduate preparation in their proposed field of study and must show promise for pursuing higher studies satisfactorily. Additional requirements of specific curricula are noted in their respective portions of this bulletin.

A student is expected to assume full responsibility for knowing the regulations and pertinent procedures of the Graduate School as set forth in this publication and for meeting the standards and requirements expressed by these regulations.

### APPLICATION FOR ADMISSION

Inquiries concerning admission and requests for application forms should be addressed to the Office for Graduate Studies or to the office of the Dean of the College or School. The application for admission to graduate work 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 his application, with all the necessary supporting documents, be complete and in order. Registration as a graduate student will not be permitted, otherwise. Students anticipating use of the University Health Services must also file a medical record along with the application.

*Students from foreign countries* may be admitted to graduate courses for which they are prepared and, if found capable, may pursue a program leading to a degree. In addition to the information required of all students, the foreign student must submit an Institute for International Education request for application material form for evaluation before an admission application can be furnished. A foreign student must submit the following information along with his application for admission:

1. Test scores of the Graduate Record Examination (GRE) and the Test of English as a Foreign Language (TOEFL);
2. A medical questionnaire completed by a responsible medical authority certifying that the student's physical, mental, and emotional balance is adequate for the work he intends to undertake.
3. Evidence of sufficient funds to cover tuition costs for the first year, room and board and return transportation costs. Moreover, the foreign student must carry health insurance and be prepared to pay the first annual premium (\$21.00) upon arrival at the University.

Foreign students should complete the application for admission to graduate work by July 1 for the first term, by November 1 for the second term, by March 1 for the third term. Original inquiries should be made at least one year before the term to which the student seeks admission.

There are no exceptions for foreign students to the above rules.

## CLASSIFICATION OF STUDENTS

### *Regular Status*

On regular status are students who have met satisfactorily all the general requirements of the school and the specific requirements of the department in which they are working.

### *Conditional Status*

On conditional status are applicants who must fulfill some prerequisite imposed by the school or department before their admission to regular status. Included likewise are students from foreign countries whose native language is not English and students whose preparation cannot be adequately determined.

### *Unclassified Status*

Students who belong to any of the following categories are considered as unclassified. These individuals will be considered as students of a school or the college but will not be officially enrolled in a graduate program leading toward a degree.

1. Non-programmed students, that is, students who fulfill all the requirements and are taking courses for credit, but are not seeking a degree;
2. Auditors, that is, properly qualified students who wish to follow graduate courses without working for credit. Auditors may be admitted to graduate courses with the permission of, and under the conditions required by the Dean. Tuition for auditors is the same as for students on regular status;
3. Transient students, that is, properly qualified students working toward a degree in another institution who have written authorization from the Dean of that institution to take specific courses at the University of Dayton for transfer of credit. Such students must satisfy all registration requirements in the given course that are mandatory for students working toward a degree at the University of Dayton.

### *Full Time-Part Time Status*

The determination of the status as full or part time of Graduate Assistants, those engaged in research, and in general of all graduate students is made by the respective Dean.

## DEGREES

The University of Dayton offers advanced studies leading to a degree of Master of Arts, Master of Business Administration, Master of Clinical Chemistry, Master of Public Administration, Master of Science, Master of Science in Education, Master of Science in Engineering, Master of Science in Engineering Management, Master of Science in Chemical Engineering, Master of Science in Civil Engineering, Master of Science in Electrical Engineering, and Master of Mechanical Engineering, Doctor of Philosophy, (at present, in Biology.)

## SPECIFIC REQUIREMENTS FOR ALL DEGREES

### *Course Requirements*

The College of Arts and Sciences and the Schools of Business Administration, Education, and Engineering offer programs variously distributed in time, leading to the Master's and Doctor's (Biology) degrees. Specific requirements are listed in those sections of this Bulletin which describe these degrees.

### *Individual Interdisciplinary Program*

A person desiring an individualized Interdisciplinary Program should contact the Dean for Graduate Studies and Research. A special form will be required along with the regular application form.

### *Residence Requirements*

Residence requirements at the University of Dayton call for the equivalent of time normally demanded by the successful completion of twenty-four credit hours of graduate work. During the initial years of operation of any program, exceptions to this limitation may be made with the approval of the Dean concerned.

Minimum residence time requirement for students attending various combinations of terms is shown in the following table:

COMBINATION of TERMS	MINIMUM RESIDENCE
Students attending <i>ONLY</i> during regular academic year.	Two terms.
Students attending <i>BOTH</i> during regular academic year and third term.	Two terms or one term and two half terms.
Students attending <i>ONLY</i> summer sessions.	For summer sessions, (i.e., four second-half of third term sessions).

The minimum residence time requirement will not in any case be reduced by the acceptance of transfer credit.



*Time Limit*

All requirements for a Master's degree must be satisfied within seven calendar years from the time of matriculation. (Period of service in the armed forces is not included.)

*Graduate Work in Other Institutions*

A maximum of two courses of graduate work may be allowed in transfer from other accredited institutions provided the work be of "B" grade quality or better. The quality points are not transferred.

No transfer credit will be allowed for courses taken more than five years previous to matriculation in the graduate schools of the University of Dayton.

During the initial years of operation of any new program, exceptions to this limitation may be made with the approval of the Dean concerned.

*Registration of Undergraduate Students for Graduate Courses*

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

- a. Graduate courses to count toward the undergraduate degree.
  1. Approval must be obtained from the Graduate Committee of the particular Graduate School offering the course.
  2. The student's total load must not exceed seventeen (17) hours.
- b. Graduate Courses to count toward the graduate degree.
  1. Approval must be obtained from the Graduate Committee of the particular Graduate School offering the course.
  2. The student must be within fifteen (15) semester hours of completing credit hour requirements for graduation in his undergraduate program.
  3. The student's total load must not exceed seventeen (17) hours.
  4. Credit obtained for the graduate courses may not be counted toward both the Bachelor's and the future Master's degrees.
  5. The graduate tuition rates must be paid when registering in graduate courses for graduate credit.

*Language Requirement*

A reading knowledge of a foreign language may be required for a Master's degree at the discretion of the Department. Language courses for the convenience of graduate students can be had by special arrangement on a class or tutorial basis, through the Chairman of the Language Department. No graduate credit is allowed for the fulfillment of these language requirements.

*Grades and Examinations*

To be in good standing a graduate student must have a 3.0 quality point average at all times.

Grades are expressed on the student's permanent record in the following manner:

A—Excellent .....	4 quality points
B—Average .....	3 quality points
C—Poor .....	2 quality points
F—Failed .....	0 quality points
K—Passed	

Credit is given but no corresponding quality points are given. This is used by certain departments when the thesis or special courses are not to affect the 3.0 cumulative quality point average needed to be in good standing.

**P—In Progress**

For the thesis or for courses which have not terminated at the end of a semester. After the courses or thesis are completed the P's are replaced on the permanent record by an A, B, C, F, or K with the corresponding credit and quality point average.

**I—Incomplete**

To be used when a course has terminated but the student has not completed his work. The I has 0 quality points per credit and does affect the cumulative quality point average. It can be changed to a letter grade if the student has completed his work within a period of four months.

*Comprehensive Examination*

A comprehensive examination is required in most programs. The examination may be oral or written, or both. Applications for all comprehensive examinations must be approved by the Chairman of the student's major department at least two weeks prior to the examination. Consult the explanation under each individual program for further details.

*Thesis*

In those departments requiring a thesis or an equivalent project, the work may not be undertaken without the approval of the Departmental Chairman or of an advisor delegated by the Dean; both the form and the content of the thesis must have the approval of three members of the Department, including the faculty

advisor and the Chairman.

Three final copies of an approved thesis in correct form must be submitted by the student, at least two weeks before graduation. Engineering students check Bulletin section from the School of Engineering.

Theses may not be published, in whole or in part, without the approval of the Administration of the University.

#### *Withdrawals from Courses*

Any withdrawal or change of course must be processed by an official Drop/Add Form through the Office for Graduate Studies.

#### *Use of Advanced Undergraduate Courses in the Graduate Program*

1. Some but not all curricula permit the selection of designated upper-division (400) courses to be applied to the graduate program.
2. When upper-division courses are permitted for credit on the graduate level, in order to be accepted toward a degree, the work done shall be of "B" grade or better.
3. The graduate tuition rates must be paid when registering for graduate credit.

## **REGISTRATION**

The responsibility for being properly registered rests with the student. Registration is required each term or session of all students who enter course work for credit; and of all students who wish to audit courses. The written approval of the proper dean or the designated advisor is required for admission to any course. Graduate Students must register by mail at least ten days prior to the registration dates listed in the academic calendar. Any student who has interrupted the normal sequence of his graduate program is required to apply to the designated advisor or departmental chairman for permission to resume graduate study, at least two weeks prior to the date assigned for registration.

## **LIBRARY RESOURCES**

The Albert Emanuel Library houses all general holdings plus the concentration of titles in the field of Electrical Engineering.

Specialized libraries are also open to graduate students as follows:

1. Departmental Libraries
  - a. Biology, Mathematics, Physics, Psychology . . . Sherman Hall Library, third floor.

- b. Chemistry, and Chemical, Mechanical, and Civil Engineering . . . Wohlleben Hall Library, third floor.
  - c. Mariology . . . Marian Library, south wing of the Albert Emanuel Library.
  - d. Education . . . Curriculum Library on the first floor of Chaminade Hall.
2. Other Libraries in the Area:

There are several other libraries in the area available to graduate students. These include the public libraries, the Engineers' Club, Miami Valley Hospital, certain local industries, certain areas at Wright-Patterson Air Force Base, and the libraries of the affiliated institutions.

### **GRADUATE STUDENT ADVISORY COUNCIL**

The Graduate Student Advisory Council is composed of a graduate student representative from each graduate program. This group meets regularly with the Dean for Graduate Studies and Research.

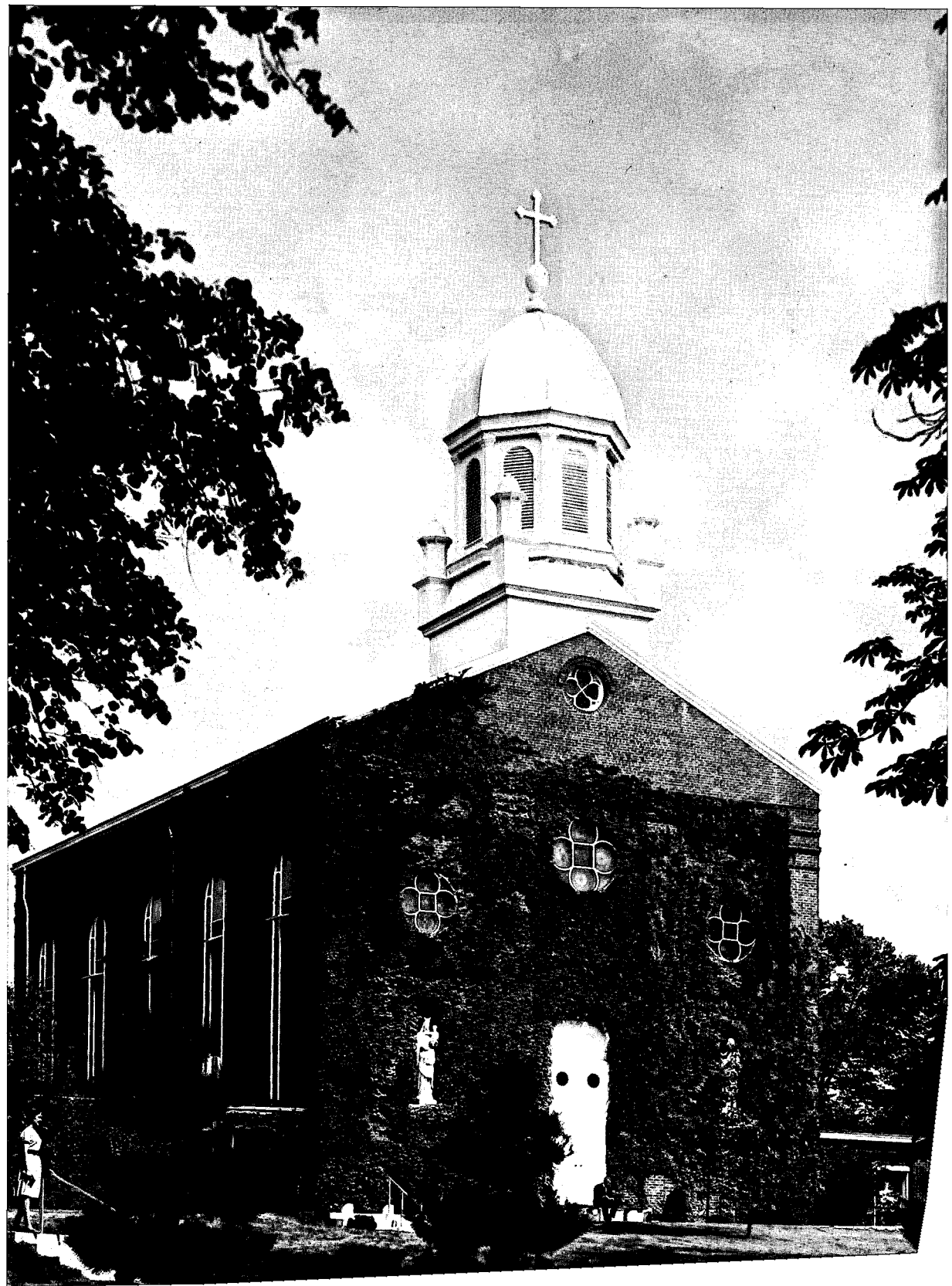
### **SEPARATION FROM THE UNIVERSITY**

Separation from the University may follow upon graduation, withdrawal by the student, or dismissal.

The admission of candidates, their continuance and status, the awarding of academic credits, and the granting of a degree, are all subject to the ordinary regulatory powers of the University. It reserves the right to cancel, at its discretion, any of these privileges for reasons considered sufficient by its own governing body.

The various Deans reserve the right to review at intervals the work of their graduate students, and, in consultation with the Chairman of the Department, to recommend that those who are not doing work of a high caliber be advised to discontinue courses leading to a degree.

The disciplinary authority of the University is vested in the President by right, and in the Deans and other officers on whom jurisdiction may be conferred for specific cases and in restricted areas.



# III Financial Information

## GENERAL REGULATIONS

It is the rule of the University that tuition and fees are to be paid in full at the time of registration.

Where voluntary withdrawal, dismissal, illness, physical disability, or any extraordinary contingencies require a student to leave, he must notify the Dean of the School in which he is enrolled.

## EDUCATION OF VETERANS

All departments of the University have been approved by the Veterans Administration for training under the G.I. Bill. Veterans' affairs are handled by Robert Hildreth, Student Aid office, second floor, Gosiger Health Center. All veterans attending the University must contact his office. Counseling by the Veterans Administration is available in the Guidance Center.

## TUITION AND FEES

### *Tuition for Courses Taken for Undergraduate Credit*

Per registered credit hour for lecture course.....	\$40.00
Per clock hour for laboratory course.....	22.00

### *Tuition for Courses Taken for Graduate Credit*

Per registered credit hour.....	50.00
Special rate for elementary teachers, high school teachers, and administrators.....	40.00

### *Fees*

Foreign Student Application.....	5.00
Matriculation fee, payable once.....	10.00

Basic University Fee, each term.....	5.00
(This fee payable only once during the third term.)	
Graduation fee .....	\$26.00
(Includes binding of three copies of the thesis)	

A transcript of credits may be requested from the Office of the Registrar. The official transcript may be sent to the institution or organization desiring it or to the student himself. There is a fee of fifty cents for a transcript with less than twelve credit hours. The fee is one dollar for a transcript with twelve or more credit hours. For transcripts ordered in lots of two or more, the fee is one dollar for the first copy and fifty cents for each additional copy. The first copy requested after graduation is a free copy.

### CANCELLATION AND REFUNDS

Cancellations will be allowed only after the completion of the proper withdrawal forms. For refund purposes the effective date of cancellation is the date the student notifies the Office for Graduate Studies not the last day the student attended class. This date will appear on the withdrawal form forwarded to the Bursar's Office and will determine the amount of refund due.

Students who discontinue class attendance without officially completing the withdrawal procedures during the cancellation period will be responsible for the full amount of the applicable tuition and fees. Those called to military service before the end of a given term should consult with the Bursar of the University regarding the special regulations that apply in this case.

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

During the first week of classes.....	20%
During the second week of classes .....	40%
During the third week of classes.....	60%
During the fourth week of classes .....	80%
During and after the fifth week of classes.....	100%

During the two-week cancellation period for each session of the split third term the tuition charges will be made according to the following schedule:

During first week of classes.....	35%
During second week of classes.....	70%
During or after third week of classes.....	100%

## HOUSING

Ordinarily, there are no university-owned accommodations available during the first and second terms. Those interested in obtaining information regarding off-campus housing may contact the Housing Office (229-3317), Gosiger Health Center.

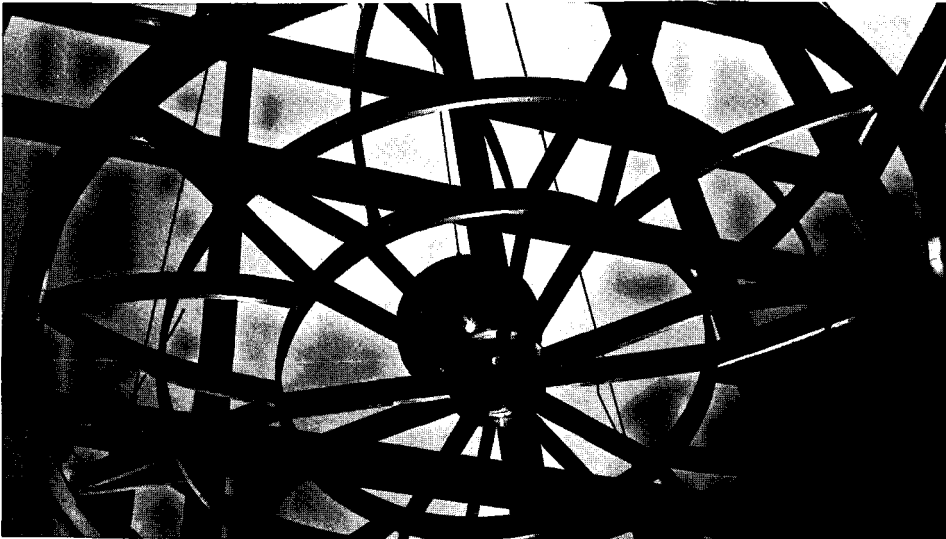
## PARKING

Parking facilities are extremely limited on the main campus. Those that are available are restricted by the following conditions: Graduate Students who wish to park on campus prior to 4:00 p.m. must purchase a student parking permit (\$5.00) from the Traffic Office. Students may park in "A" Lot after 4:00 p.m. with or without a permit. Students who wish to park in student lots other than "A", after 4:00 p.m., must have an evening permit (no charge). Applications may be picked up at the Traffic Office or at the Main Campus gate.

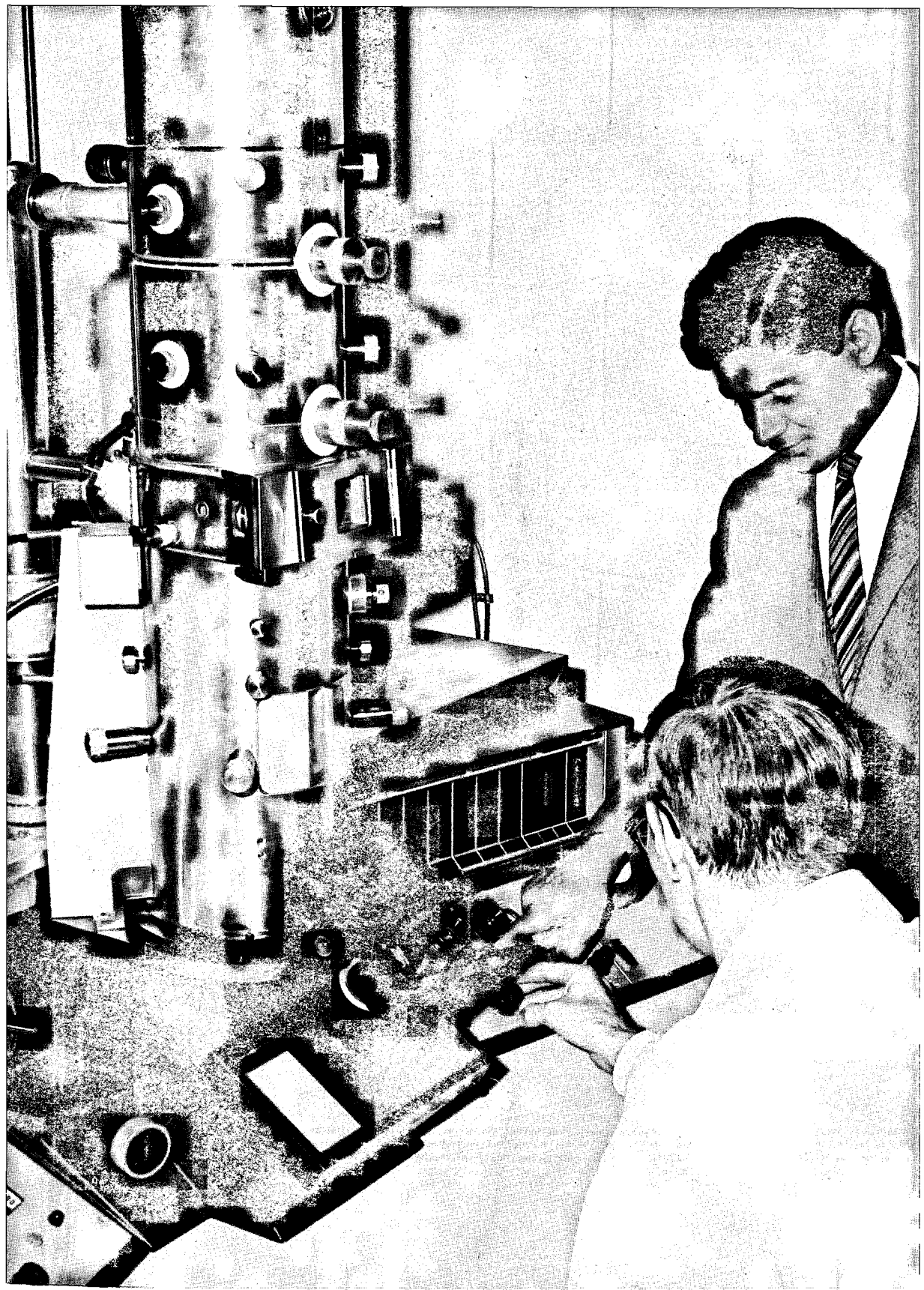
## ASSISTANTSHIPS

A limited number of Graduate Assistantships are available to students who are qualified. These carry a stipend and tuition refund provision which enable the recipients to complete the requirements for the degree in a two-year period.

Detailed information and forms for making application may be secured from the Dean of the School in which study is to be done.







# IV College of Arts and Sciences

The objectives of graduate work in the Arts and Sciences coincide with the general aims and philosophy of education that characterize the University of Dayton. Specific objectives and requirements of the several departments are presented in the following programs:

## **GRADUATE PROGRAMS IN BIOLOGY**

### *Statement of Purpose:*

The general objective of graduate work in the Department of Biology is to give the student a basis for a thorough understanding and appreciation of his chosen discipline. Specifically, the graduate program is intended:

- a. To prepare professional biologists.
- b. To qualify the student for academic, industrial and governmental careers in biology.
- c. To equip teachers for scholarly competence in biology.

### *Specific Requirements of the Department:*

1. Individuals possessing a Bachelor's or Master's degree from an accredited school may be admitted if the Admissions Committee of the Department is satisfied that the applicant is fully qualified to undertake the degree program.
2. All students accepted are considered pre-doctoral students. However, either the student or the Department may terminate the student's program with the completion of the requirements for the M.S. degree.
3. The following undergraduate courses are considered prerequisite:
  - a. Twenty-four to thirty credit hours in the field of Biology, of which eighteen to twenty-four credit hours must correspond to the Department's 300-400 course designation.
  - b. Two semesters each of General Chemistry and Organic Chemistry and one semester of Physical Chemistry or Quantitative Analysis.
  - c. Two semesters of Physics.
  - d. Two semesters of Mathematics including Calculus.

The graduate student may be required to fulfill undergraduate prerequisites before

being admitted to graduate courses for which, in the judgment of the Departmental Committee, he is not qualified.

*Requirements for Graduate Degrees in Biology:*

1. **Residence.** A student must attend the University as a full-time student for at least one full year in the Master's program, at least two full years in the Doctorate program.
2. **Credit Hours.** The Master's degree requires twenty-four semester hours of courses plus three to six thesis hours. There is no set credit hour total for the Ph.D. degree; each student follows the program outlined for him by his committee. At the discretion of the Chairman, credit hours may include graduate and/or undergraduate courses in biology and related areas. If desirable, the student will be encouraged to take some work at neighboring institutions or summer laboratories.
3. **Specialization Area.** While the degree is in biology, some amount of specialization is expected. This is determined by the interests of the student and accomplished by the selection of courses and a thesis topic after conferring with the advisory committee. Course choices may be made in any of the following areas of specialization.

**MICROBIOLOGY**

Bacteriology	Pathogenic Bacteriology
Biochemistry	Parasitology
Bacterial Physiology	Bioinstrumentation
Immunology and Serology	Cytology
Virology	Non-vascular Plants

**BIOFUNCTION**

Bioinstrumentation	Biochemical Genetics
Radiation Biology	Biochemistry
Plant Physiology	Embryology
Endocrinology	Physiology
Immunology	Comparative Animal Physiology
Genetics	

**BIOECOLOGY**

Ecology	Invertebrate Zoology
Population Ecology	Biometrics
Vertebrate Morphology	Vertebrate Paleontology
Lower Plants	Evolutionary Biology
Higher Plants	

Since advanced undergraduate courses may be taken for graduate credit, the student is advised to consult course listings in the Undergraduate Catalog. Normally, only two such courses may be counted toward the graduate requirements.

4. Required Courses. A number of courses are common to all programs. These courses, required of all students, are:

Bio 501 Seminar

Bio 552-553 Biological Instrumentation

Bio 599 M.S. Thesis and/or

Bio 699 Ph.D. Dissertation

5. Degree Examinations. A Preliminary Evaluation will be made to assess the student's background knowledge of biology. As a result of this evaluation specific background courses may be recommended by the student's advisor. In the third semester as a full-time graduate student, a Qualifying Examination (written and oral) will be administered. Depending upon the outcome of this examination and his overall first year performance, the student may be directed to:
  - a. Work directly for a doctorate, if he so chooses.
  - b. Withdraw from the program.
  - c. Complete the requirements for a Master's degree (i.e., course work and thesis). If successful the student may continue studies towards the doctorate with the approval of his advisory committee.

A Candidacy Examination (oral) for the doctorate is given by the student's advisory committee. This examination will be taken no later than the student's sixth semester of full graduate standing (fourth semester for those who enroll with a Master's degree). Successful completion of this examination entitles the student to become a candidate for the Ph.D. degree.

6. Thesis Defense. The thesis defense (M.S. and Ph.D.) constitutes an oral examination on the matter of the thesis. A student must present his dissertation for defense within five years after admission to Ph.D. candidacy, or, for the M.S., five years after admission to full graduate standing.

## GRADUATE PROGRAMS IN CHEMISTRY

### *Statement of Purpose:*

The purpose of the Master's program in Chemistry is to present to the student a rigorous approach to modern theories in Chemistry, and to increase his desire and potential toward fundamental research through a program of literature search and laboratory experimentation.

### *Specific Requirements of the Department:*

a. Undergraduate prerequisites: The undergraduate prerequisites shall be the minimum requirements specified by the American Chemical Society. Those students who have graduated from A.C.S. approved schools will have fulfilled these requirements. Others may have to take certain courses concurrently from the undergraduate program to meet A.C.S. requirements.

b. All candidates for the degree Master of Science in Chemistry are required to submit proof of their ability to do independent work. Normally this proof takes the form of a thesis. Additional coursework may be substituted if the student has previously demonstrated research proficiency commensurate with the Masters Degree as judged by the Departmental Graduate Committee.

c. Twenty-four credit hours of course work and six hours of research are normally required for the Master's degree in Chemistry. The twenty-four course credits must include at least three credits in each of the major fields of organic, physical and inorganic chemistry. The remainder of the student's program is decided upon between the student and his advisor.

d. Electives in other departments may be chosen with the approval of the Departmental Graduate Committee.

e. Written examinations are given to assist the student and advisor in formulating the student's program.

### *Biochemistry Option:*

This program is designed for those students who are planning a career in biochemistry or the medical sciences.

Students who want to specialize in biochemistry should have undergraduate preparation in general, analytical, organic and physical chemistry. The degree will require twenty-four hours of approved course work and 6 hours of thesis research.

## GRADUATE PROGRAM IN CLINICAL CHEMISTRY

### *Statement of Purpose:*

The purpose of the Master's program in Clinical Chemistry is to provide to the student, advanced training in basic chemistry, in analytical procedures, in modern biochemistry and clinical chemical research. It will also prepare the student

for an advanced degree (Ph.D.) program in Clinical Chemistry.

*Specific Requirements of the Department:*

a. Undergraduate prerequisites: Candidates for the degree should have as a minimum the B.S. degree in Medical Technology or its equivalent; a minimum of 20 hrs. of chemistry (Freshman, Quantitative and Organic Chemistry) will be required. Biology majors, pre-meds and pre-dents who have completed the Bachelor's Degree and have completed at least 20 hrs. of chemistry will also be accepted in the program. Chemistry majors with the B.A. or B.S. degree will have had more than the minimum requirements in Chemistry.

b. Undergraduate courses open to graduate students: Credit for certain undergraduate non-Chemistry electives may be allowed at the discretion of the Departmental Graduate Committee.

c. The normal requirements for the Master's degree are 24 credits of course work and 6 credits of thesis. A thesis in clinical chemical research will normally be required. However, this requirement may be waived, at the discretion of the Departmental Graduate Committee. Six hours of advanced course work must be substituted in its place. The thesis will be waived in those instances where the candidate can show previous experience in Clinical Chemistry Research and whenever this exception will not be a prejudice to his program. A suggested outline of the program is as follows:

<i>Chem.</i>		<i>Credits</i>
Chm 533	Intermediate Organic Chemistry	3
Chm 530	Physical Chemistry	3
Chm 415	Analytical Chemistry	3
Chm 531 & 531L	Identification of Organic Compounds	3
Chm 420	Biochemistry	3
Chm 551	Topics in Biochemistry	3
Bio 550	Biometrics	3
	Thesis	6

Other electives are also available from the Graduate Chemistry Curriculum.

Other courses may be chosen from the Graduate Biology Curriculum.

		<i>Credits</i>
Bio 552	Biological Instrumentation	3
Bio 553	Biological Instrumentation	3
Bio 512	Radiation Biology	4

d. Electives in other departments may be chosen with the approval of the Departmental Graduate Committee.

## **GRADUATE PROGRAM IN COMMUNICATION ARTS**

### *Statement of Purpose:*

Appreciation is shown for the significant traditional aspect of the academic discipline involved in Communication Arts which can be directly linked to the inventions and refinements of the Classical Greek Period; subscription is made to the Aristotelian concept of discovering all possible means of persuasion on any given subject and the utilization of these means in the process of the classical categories of Ethical, Pathetic and Logical proofs.

A critical need is present in our time for a continuous analysis of the basic principles and the constant development of the necessary skills to meet the ever-present challenges of the modern interpersonal relations ranging from the local to international levels of communication.

### *Admission Requirements:*

The applicant for graduate study in the Department of Communication Arts must meet the following requirements:

1. A Bachelor's degree from a recognized institution of higher learning. In the case of seniors who have almost completed graduation requirements, the Graduate Committee of Communication Arts may permit the taking of graduate courses which will be applied to the MA degree only after the appropriate Bachelor's degree has been awarded.
2. A 2.8 cumulative point average (or the equivalent). The Graduate Committee within the Department will recognize the potential merits of professional experience and maturity in a specific field as a factor for consideration relative to the student's ability.
3. Demonstrate through the medium of undergraduate studies, or professional accomplishment and growth, coupled with satisfactory undergraduate studies, a competent cultural background.
4. Twenty-four semester hours in an area of Communication Arts or demonstrate equivalent skill in a particular field, coupled with satisfactory undergraduate studies.
5. Demonstrate the possession of a comprehensive background in theory and the necessary skill in oral communication.

6. Applicants for an interdisciplinary program must demonstrate the possession of a substantial background in both the major and minor areas of study.
7. Applicants who do not meet the above requirements and yet wish to pursue the graduate program in Communication Arts may, at the discretion of the Graduate Committee of Communication Arts, be admitted as unclassified students. Such students will be assigned appropriate undergraduate credits which will not count toward the graduate degree.
8. Transfer of graduate credit from accredited institutions of graduate learning will be reviewed by the Graduate Committee and may be accepted up to a maximum of six hours.

*Course Requirements:*

*Plan A (Communication Arts Only)*

1. The student may elect to complete 24 hours of course work and six hours of thesis credit (including an oral defense of the thesis), or
2. 30 hours of course work followed by an oral comprehensive examination.

*Plan B (Communication Arts and Interdisciplinary Study)*

1. The student may elect to complete not less than 18 hours of study in Communication Arts and not more than 12 hours of study in one of the interdisciplinary areas followed by an oral comprehensive examination by a committee composed of Communications Arts faculty members and a faculty representative from the interdisciplinary area involved, or
2. 12 hours of study in Communication Arts, six hours of thesis credit, and 12 hours of study on one of the inter-disciplinary areas followed by oral comprehensive examinations on both the course work and thesis. The oral comprehensive committee for course study will include both Communication Arts faculty and a faculty representative from the interdisciplinary area; the thesis *must* be done in an area of the communication arts and its oral comprehensive examination committee will be composed of Communication Arts faculty only.

Graduate courses leading to the Master of Arts degree in Communication Arts

Com 501 Introduction to Graduate Study in Communication	3 cr. hrs.
Com 506 Ethics of Communication	3 cr. hrs.
Com 511 Persuasion Techniques	3 cr. hrs.



Com 516 Barriers to Effective Communication	3 cr. hrs.
Com 521 The Investigation of Listening Problems	3 cr. hrs.
Com 526 Studies in Communication Skills	3 cr. hrs.
Com 531 Problems—Seminar	3 cr. hrs.
Com 536 Communication Designs	3 cr. hrs.
Com 598-599 Thesis	3 each. cr. hrs.
<b>Option Courses—Equivalent of Thesis Requirement:</b>	
Com 541 Stage Design	3 cr. hrs.
Com 546 Development of Dramatic Form and Criticism	3 cr. hrs.
Com 551 Problems in Dramatic Presentation	3 cr. hrs.
Com 556 Theatre Seminar	3 cr. hrs.
Com 561 Rhetorical Criticism	3 cr. hrs.
Com 566 Advanced Argumentation and Debate	3 cr. hrs.
Com 571 History of Public Address	3 cr. hrs.

### *Communication Arts and Interdisciplinary Study*

Certain offerings from the MBA, English, Psychology and Political Science programs have been designated as appropriate for Communication Arts Interdisciplinary Study. A consultation with the Chairman of the Department concerned is required. Information on applicable courses may be obtained from the Department of Communication Arts.

## **GRADUATE PROGRAM IN ENGLISH**

### *Statement of Purpose:*

The Master's program in English is designed to offer the opportunity for an intensified study of English and American literature, and to develop in the student a competence in independent research and in the exercise of sound literary judgment.

### *Specific Requirements of the Department:*

a. Undergraduate prerequisites: The student seeking admission must have completed studies in English and American literature which will enable him to pursue his graduate studies with distinction. He will ordinarily have completed, with a grade point average of at least 3.00, twenty-four semester credit hours in literature, of which at least eighteen hours were in upper-division courses. Graduate Record Examination scores may be required as part of the applicant's materials.

b. Specific degree requirements: Normally thirty credit hours are required. Every applicant, after twelve hours with a grade of at least 2.75, will be given a diagnostic examination and interview. Exceptionally well qualified students could earn the master's degree in less than thirty hours; students with deficiencies may be required to take up to thirty-six graduate hours.

c. Obligatory courses: English 595, Research and Bibliography, and either English 587, Studies in the History of Criticism, or English 588, Studies in Criticism, are required of all applicants for the degree. The remainder of the student's program should be equally divided between courses from sequence 514 through 542 and sequence 546-582.

d. A thesis upon a topic approved by the Graduate Committee of the Department for which six hours are granted can be accepted if the interview committee recommends this option.

*Course Offerings:*

Courses will be offered during the late afternoons or evenings and on Saturday mornings during the First, Second, and first half of the Third Term and during the evening and in the day in the second half (the summer session) of the Third Term.

## **GRADUATE PROGRAM IN HISTORY**

*Statement of Purpose:*

The Department of History through its graduate program seeks to develop in the student that combination of mature judgment and scholarly competence associated with the ability to make, compare, test, and evaluate historical conclusions and interpretations.

As a secondary purpose, the program is designed to prepare the student for a successful career in teaching, government services, or specific fields of private endeavor.

*Specific Requirements of the Department:*

a. Undergraduate prerequisites: Applicants for the graduate program in History must have completed a total of twenty-four semester credit hours of History, and achieved a grade point average of at least 3.00 in all History courses.

b. One theoretical or methodological course is required of all students in the

Master Degree Program in History. Students may choose between the following two courses:

Hst. 600 Historiography

Hst. 650 The Philosophy of History

c. The candidate must take at least two 600-level courses in addition to Hst. 600 or 650 and in the case of thesis writers, Hst. 699.

d. Up to six credit hours of work may be taken outside the History Department with the approval of the Chairman.

e. Requirements for the Master degree in History:

#### OPTION A

1. Thirty credit hours of acceptable course work and research including three credits for either Hst. 600 or Hst. 650 (see b. above), six credits for the thesis (Hst. 699), and two other 600-level courses (see c. above).
2. An oral comprehensive examination in the field of the thesis. Detailed instructions regarding this examination may be obtained from the Chairman of the Department.
3. Foreign language competence in the thesis area. An examination to show competence may be required at the discretion of the thesis advisor.

#### OPTION B

1. Thirty-three credit hours of acceptable coursework including three credits for either Hst. 600 or Hst. 650 (see b. above), and two other 600-level courses exclusive of Hst. 699 (see c. above).
2. A comprehensive examination. Detailed instructions regarding this examination may be obtained from the Chairman of the Department.
3. This program is recommended for students who do not plan to enter a doctoral program.

#### *Course Offerings:*

Courses will be offered in the late afternoon and evening hours for the convenience of teachers and other employed persons except during the Third Term, Second Session, when courses will be offered primarily in the morning hours.

## GRADUATE PROGRAM IN MATHEMATICS

### *Statement of Purpose:*

The Department proposes to offer graduate studies in Mathematics in order to give an opportunity for properly prepared persons to acquire skills in those branches of Mathematics normally studied after the Baccalaureate degree. The curriculum is intended to serve as a firm basis for doctoral studies and research.

### *Specific Requirements of the Department:*

- a. Undergraduate prerequisites:
  - Mth 361 Introduction to Abstract Algebra (or equivalent)
  - Mth 421-2 Advanced Calculus (or equivalent)
- b. Requirements for the Degree:
  1. Thirty hours of 500 level courses: These may include a maximum of 6 hours of approved courses outside the department; a maximum of 6 hours for a thesis in special cases.
  2. The student must successfully pass a written examination covering the content of Mth 521, 522, 525, 561, 565, and 571, as well as an oral examination, within three months of the expected date of graduation.

## GRADUATE PROGRAM IN PHILOSOPHY

### *Statement of Purpose:*

The purpose of the graduate program in Philosophy is to provide an atmosphere for independent study and research, in which the student can gain a more comprehensive knowledge and deepen his understanding of the major philosophical positions, develop his powers of critical analysis and his ability to apply philosophical principles to the solution of present-day problems. Our program has been designed to enable our graduates to continue their doctoral studies in other universities.

Students working toward the Master of Arts degree in Philosophy will be subject to the general requirements of the College of Arts and Sciences program and to the specific requirements given below.

### *Specific Requirements of the Department:*

- a. Undergraduate Prerequisites: For a Master's degree in Philosophy, the student must have had at least twenty-four credit hours in undergraduate philosophy.
- b. Requirements in Terms of Credit Hours for an M.A. in Philosophy: The

student must take a minimum of thirty hours in graduate work, six of which are given for a thesis.

c. **Comprehensive Examination:** Each student must pass the three parts of the "Master's Reading Exam" in the history of philosophy covering the three major historical areas of Western philosophy: ancient, medieval and modern. Each part of this examination is given orally. Only one retake of each part is permitted. The student will be tested on his familiarity and understanding of the selected primary sources stated in the lists of readings specifically prepared for these tests. The department feels that a good and solid background of the historical development of philosophical thought is essential to the program. These examinations have been devised to insure that every student has this background.

d. **Thesis Requirement:** A written thesis will be required of all students in this program.

1. An outline of a thesis project prepared according to departmental instructions will be submitted in triplicate no later than two months before the end of the term immediately prior to the tentative graduation date. The student will not be granted his M.A. candidacy prior to the approval by the Graduate Committee of his thesis project.
2. Three copies of the thesis must be submitted for study the first Monday of either November or March.
3. The student must give evidence of having complied with the corrections indicated by the official readers of his thesis.
4. Three final copies of the corrected thesis must be submitted no later than the first Monday of December or April.
5. An oral defense of the thesis will be held *only* after the fulfillment of all the requirements listed above.

e. **Language Requirement:** All graduate students of Philosophy are strongly urged to learn at least one or two foreign languages as a means to improve their professional skills. However, there is no mandatory requirement of any language for their Master program at this University. Nevertheless, any student who should decide to take the language examination could do so and, if approved, will have this examination in his official records.

f. **Application for Candidacy:** Every student must formally apply for candidacy for the M.A. in Philosophy only after he has:

1. Passed the three qualifying examinations.
2. Completed 18 hours of graduate work.
3. Obtained official approval of his thesis project.

*Teaching Internship for Graduate Assistants in Philosophy:*

As a part of their contractual obligations, graduate assistants are required to participate in the department's "Teaching Internship Program in Philosophy" (Phl 598). This involves participation in seminars on the teaching of philosophy on the undergraduate level and in the directed teaching of a "Basic Problems in Philosophy" undergraduate course. This program is open only to graduate philosophy assistants and is offered each term for 1 academic credit upon satisfactory completion of the internship in a given term. Satisfactory completion of this internship will be shown on the transcript and the grade "K" (credit) will be recorded. The grade "K" does not affect the Q.P.A. Receipt of academic credits for this Teaching Internship does not reduce the 24 credit hours of courses required of a graduate student in the Department of Philosophy.

*Courses of Instruction:*

A distinctive feature of the graduate program in Philosophy is the emphasis on the continuity of philosophic inquiry from the ancient and medieval era to the modern period. Each graduate student will arrange his program upon consultation with the Director of Graduate Studies in Philosophy.

- Phl 503 Philosophy of Man
- Phl 510 Philosophy of Science
- Phl 540 Aristotle's *De Anima* and St. Thomas' Commentary
- Phl 541 Texts of Plato
- Phl 542 Texts of Aristotle
- Phl 543 Texts of Presocratic Philosophers
- Phl 545 Modern French Philosophy
- Phl 550 Philosophy of History
- Phl 553 Kantianism I
- Phl 554 Kantianism II
- Phl 555 Modern German Philosophy
- Phl 556 Philosophy of Hegel
- Phl 560 Modern British Philosophy
- Phl 565 American Pragmatism
- Phl 570 Existentialist Philosophy
- Phl 571 Perception and Knowledge
- Phl 575 Contemporary Philosophies of Evolution
- Phl 576 Contemporary Problems in the Philosophy of God
- Phl 580 Contemporary Naturalism and Realism
- Phl 585 Phenomenology
- Phl 590 Directed Studies

- Phl 591 Seminar
- Phl 592 Analytic Philosophy
- Phl 594 Symbolic Logic
- Phl 598 Teaching Internship Program in Philosophy

## GRADUATE PROGRAM IN PHYSICS

### *Statement of Purpose:*

Basically the Master's program in the Department of Physics serves the stated purpose of the University by giving the student a thorough understanding and appreciation of his chosen discipline. Advanced study in physics may be used in several immediate ways:

- a. To prepare for an advanced degree (Ph.D.) program;
- b. To qualify the student for research and development careers in industry and government;
- c. To enrich the backgrounds of teachers of physics on the secondary school level.

### *Specific Requirements of the Department:*

a. Undergraduate requirements: An applicant will be admitted to advanced study in physics if the graduate admission committee of the Department determines he is qualified to take the degree program. In general, a properly prepared student should have the following background:

1. Physics courses which are approximately the equivalent of University of Dayton courses.

- Phy 303 Intermediate Mechanics
- Phy 408 Advanced Electricity & Magnetism
- Phy 301 Thermodynamics
- Phy 390 Introduction to Quantum Mechanics
- Phy 420 Solid State or
- Phy 421 Nuclear Physics

2. Mathematics through Differential Equations and preferably Advanced Calculus.

The applicant will be required to make up any deficiencies which the Department deems necessary to bring him to the level of the graduate course.

b. Specific requirements for the degree: The formal requirements for the degree are thirty credit hours of course work properly distributed plus examinations

and possibly a thesis as indicated in the following:

1. The "core sequence" required of all degree students.
 

Phy 511	Classical Mechanics	three credit hours
Phy 515	Statistical Mechanics	three credit hours
Phy 523	Electromagnetic Theory I	three credit hours
Phy 525	Quantum Mechanics I	three credit hours

2. Other recommended Graduate courses in physics.
 

Phy 512	Classical Theory of Fields	three credit hours
Phy 520	Advanced Solid State Physics	three credit hours
Phy 521	Advanced Nuclear Physics	three credit hours
Phy 524	Electromagnetic Theory II	three credit hours
Phy 526	Quantum Mechanics II	three credit hours
Phy 531	Advanced Graduate Laboratory	three credit hours

3. Courses in related disciplines.

These may be chosen in related fields, mathematics, chemistry, etc. up to a maximum of six credit hours with the approval of the Chairman of the Department.

4. Advanced undergraduate courses.

A maximum of six credit hours of graduate credit may be granted for advanced undergraduate courses which are approved by the graduate student's Faculty Advisor.

NOTE: Courses for which undergraduate credit has been allowed may not be repeated for graduate credit.

5. Thesis credit.

A Master's degree thesis is recommended for those students who have no comparable experience. An oral examination before a committee designated by the Chairman of the Department must be passed before credit can be given. A maximum of six credit hours can be given for thesis work.

6. Diagnostic examinations.

A series of six examinations covering basic physics subjects on the Intermediate Level are provided for candidates for a Master's degree. These exams assist the student and the department to properly place him in appropriate courses.

7. Language requirement.

No foreign language requirement is necessary for the Master of Science



in Physics; however, students are expected to be sufficiently familiar with computer programming to solve basic problems in Physics using the computer.

## **GRADUATE PROGRAMS IN POLITICAL SCIENCE**

### *Statement of Purpose:*

The Department of Political Science offers two graduate programs; each one is designed to accomplish a particular objective.

1. The Master of Arts in Political Science is an academic degree which is designed to prepare the student for further graduate work at the Ph.D. level, for teaching or research.
2. The Master of Public Administration is a professional degree which is designed to prepare students for further graduate work or administrative work in a public or private organization.

### *Requirements for Admission:*

1. M.A. in Political Science
  - a. Baccalaureate degree
  - b. Cumulative average of 2.5 in a 4.0 grading system
  - c. Fifteen hours of social sciences with a cumulative average of 2.75
  - d. Students coming from colleges and universities operating on a Pass-Fail grading system are required to submit GRE scores taken in the field of political science. Other students are encouraged to present GRE scores for additional evidence of their competence to do graduate work.
2. Master of Public Administration
  - a. Baccalaureate degree
  - b. Cumulative average of 2.5 in a 4.0 grading system
  - c. Students coming from colleges and universities operating on a Pass-Fail grading system are required to submit GRE scores taken in the field of political science. Other students are encouraged to present GRE scores for additional evidence of their competence to do graduate work.

*Degree Requirements for the M.A. in Political Science:*

1. Options are available to students in pursuing this degree and is to be selected after consultation with the student's advisor and in accordance with his long-range academic objective.
  - a. Option 1 - Thirty hours consisting of 24 hours of course work, six hours for thesis work, and a comprehensive examination covering the student's course work and the methodology and content of the thesis.
  - b. Option 2 - Thirty hours of course work and a comprehensive examination covering the student's course work.

Students must maintain a B average in all his courses. A reading list covering some major works in the discipline of political science will also be covered in the comprehensive examination.

## 2. Course Requirements:

## a. Required Courses:

1. Pol 501 - Scope and Methods of Political Science
2. Pol 514 or 569 - Political Theory

The latter course may be taken if the student has already the equivalent of Pol 514 as an undergraduate or at another graduate school.

## b. Elective Courses: A minimum of one course from each of the following areas excluding the required courses.

## 1. American Politics and Institutions:

- Pol 508 Seminar: American Foreign Policy
- Pol 509 Seminar: National Security Policy
- Pol 510 Public Administration
- Pol 521 Intergovernmental Relations
- Pol 545 Seminar: Urban Politics
- Pol 557 Seminar: State Governments and Politics
- Pol 574 Seminar: American Politics
- Pol 575 Science and Public Policy
- Pol 577 Municipal Governments

## 2. Political Theory and Public Law:

- Pol 560 Seminar: American Pol. Thought
- Pol 567 Studies in Political Science
- Pol 569 Seminar: Political Theory
- Pol 571 Seminar: Constitutional Law
- Pol 572 Administrative Law
- Pol 573 Seminar: Civil Liberties

3. International Relations:

- Pol 506 Political Geography
- Pol 530 Seminar: International Law
- Pol 589 Seminar: International Relations

4. Comparative Politics:

- Pol 520 Seminar: Politics of Developing Nations
- Pol 522-528 Seminar: Comparative Politics
- Pol 582 Comparative Public Administration
- Pol 585 Seminar: Soviet Foreign Policy

The remainder of the student's course work must be chosen from the Graduate course offerings of the Department of Political Science in consultation with the student's advisor or the Department Chairman.

- c. Cognate Courses: Students may take a maximum of six hours of course work in other social science fields with the approval of his advisor or the Department Chairman.

*Degree Requirements for the Master of Public Administration:*

1. Options are available to students in pursuing this degree and is to be selected after consultation with the Director of the M.P.A. Program and in accordance with his long-range professional objective.
  - a. Option 1 - Thirty hours consisting of 24 hours of course work, six hours of government internship, and a comprehensive examination covering the student's course work and internship experience. The internship requirement may be waived in part or entirely depending upon the length and nature of the student's administrative experience. The internship requirement, when waived, must be replaced by equivalent credits in course work.
  - b. Option 2 - Thirty hours consisting of 27 hours of course work, three hours for research paper taken in conjunction with Pol 578, and a comprehensive examination covering the student's course work and the methodology and content of the research paper.

Students must maintain a B average in all his courses. A reading list covering some major works in public administration will also be covered in the comprehensive examination.

2. Course Requirements:

- a. Required Courses:
  1. Pol 510 Public Administration
  2. Pol 581 Organization Theory

- b. Elective Courses: The student may elect the remainder of his course work from the following graduate courses in the Political Science Department in consultation with his advisor or the Director of the M.P.A. Program.

Pol 508 Seminar: American Foreign Policy

Pol 514 History of Political Theory

Pol 521 Intergovernmental Relations

Pol 535 Fiscal Administration

Pol 540 Problems in Public Administration

Pol 545 Seminar: Urban Politics

Pol 552 Government Planning

Pol 557 Seminar: State Governments and Politics

Pol 560 Seminar: American Political Thought

Pol 571 Seminar: Constitutional Law

Pol 572 Administrative Law

Pol 573 Seminar: Civil Liberties

Pol 574 Seminar: American Politics

Pol 575 Science and Public Policy

Pol 576 Public Personnel Administration

Pol 577 Municipal Governments

Pol 578 Studies in Public Administration

Pol 582 Comparative Public Administration

- c. Cognate Courses: A student may, with the consent of his advisor or the Director of the M.P.A. Program, elect a maximum of two courses offered in the Schools of Business Administration, Education, or Engineering, provided they relate to his professional or career interests.

## GRADUATE PROGRAMS IN PSYCHOLOGY

### *Statement of Purpose:*

The Department of Psychology offers four graduate programs.

The Clinical M.A. program is designed to provide the student with a coherent theoretical frame of reference (in line with contemporary person-centered, existentialist, and phenomenological trends) which will enable him to observe keenly and think creatively in his specific field of scientific and professional endeavors; adequate measurement tools for meaningful and relevant research; and the groundwork of a sound professional orientation to the practice of clinical psychology. The immediate objective is to prepare the student for further graduate work at the Ph.D. level.

The Master of Arts program in Experimental/Cognitive Psychology prepares

the student for duties as a research psychologist in government, industry, and the university. The program objective is to develop a firm understanding of human cognitive processes from an experimental perspective. The program requires competence in research methodology, quantification and theory. The laboratory and course work is preparatory to advanced study at the Ph.D. level.

The Master of Arts degree in General Psychology is designed to allow the student to pursue an individualized course of study. The student, upon entering the program, will submit a sequence of courses to the advisor which, upon approval, will be considered as the student's course of study. The course sequence will reflect both the student's individual interests as well as the resources available within the Department of Psychology and the university community. Programs including courses from outside the Department of Psychology are permitted. It is intended that the course sequence will allow the student to pursue further work at the Ph.D. level.

The Master of Science in Information Science program provides the training needed to attack problems men face in organizing and controlling mass amounts of data generated and used by individuals and institutions. The program provides an integrated outlook for the application of computer, psychological and engineering principals to the receipt, classification, communication, cataloging, storing, retrieval, presentry and use of data regardless of its subject matter. The program will provide cross-discipline training in the underlying concepts of information and its use as it relates to various fields, particularly to behavioral sciences, information processing, management, and communication technologies. Human parameters of the information process are emphasized.

Individuals completing the program are expected to be sufficiently trained to cope with problems emerging in the development and implementation of information handling systems in general and computer based systems in particular. Examples of such systems are automated library environment, military command and control, community data systems, medical diagnostic, and computerized educational systems.

### *Student Guidance*

The student enrolled in the graduate program of the department is provided with the *Student's Guide to Graduate Study in the Department of Psychology*. The Guide provides specific elaboration of the procedures to be followed by the student in completing his graduate studies.

### *Student Status*

Each student *admitted* to the Graduate Program is placed in either of the following

categories as defined.

- a. *Regular Standing*  
Student meeting all the entrance requirements of the department.
- b. *Conditional standing*
  1. Students in this status are required to complete admission requirements as determined by the department.
  2. Students are considered as *probationary* pending the results of nine to fifteen hours of graduate work.
- c. *Unclassified*  
Students enrolled in graduate courses of the department who may not be necessarily working for a degree.

### *Candidacy*

A graduate student becomes eligible for candidacy when in the judgment of his advisor he has adequately demonstrated ability to satisfy the requirements stipulated in the program for which he was accepted. On the student's part, application for candidacy signifies the intention to complete the degree requirements at the University of Dayton.

### *Time Limit*

The program must be completed within seven years after matriculation. (Period of service in the Armed Forces not included.)

### *Minimum Entrance Requirements for all Psychology Programs*

Undergraduate prerequisites for admission as a regular student:

1. Three credit hours of College Algebra
2. 3.0 point average in Psychology
3. As a minimum, 3 credit hours in Experimental Psychology and 3 hours in Statistics, plus 6 hours in upper level Psychology

### Course Requirements for Degree in Respective Programs

#### A. Master of Arts in Psychology (Clinical)

1. Formal Requirements
  - a. Minimum 41 credit hours of course work including thesis.
  - b. Minimum B average in course work.

- c. Passing of a comprehensive examination.

Details on the examination are included in the *Student's Guide to Graduate Study*.

- d. Thesis and oral examination of Thesis.

## 2. Course Requirements

### *Theoretical frame of reference*

- Psy 536 History of Psychology as a Human Science I (3)
- Psy 537 History of Psychology as a Human Science II (3)
- Psy 567 Theories of Personality (3)
- Psy 568 Theories of Psychotherapy (3)

### *Quantitative-Methods*

- Psy 501 Advanced Statistics (3)
- Psy 593 Mathematical Psychology I (3)
- Psy 594 Mathematical Psychology II (3)

### *Professional Orientation*

- Psy 552 Clinical Psychology (3)
- Psy 570 The Practice of Professional Psychology (3)
- Psy 571 Individual Psychotherapy: Theory and Practice (3)
- Psy 516 Projective Techniques (3) (OR)
  - Psy 515 Assessment of Intelligence (3)
- Psy 517 Small Group Function (3) (OR)
  - Psy 519 Practicum in Projective Techniques (3)
- Psy 566 Clerkship (3)
- Psy 599 Thesis (3)

- 3. Extra-course requirement: Attendance to a regularly scheduled seminar on selected issues in clinical psychology, and to occasional specialized workshops
- 4. Thesis: The thesis is viewed as a creative endeavor. Exact measurement is emphasized, but allowance is made for other projects of high competence and relevance.

## B. Master of Arts in Psychology (Experimental/Cognitive)

### 1. Formal Requirements

- a. 33 credit hours of course work including thesis.
- b. Minimum B average in course work.

c. Passing of a comprehensive examination.

Details on the examination are included in the *Student's Guide to Graduate Study*.

d. Thesis and oral examination of Thesis.

## 2. Course Requirements

Psy 501 Advanced Statistics (3)

Psy 522 Advanced Cognitive Processes (3)

Psy 532 Perception (3)

Psy 593 Mathematical Psychology I (3)

Psy 594 Mathematical Psychology II (3)

Psy 596 Experimental Research (6)

Psy Electives (9) (Selected with permission of Advisor)

Psy 599 Thesis (3)

3. Extra-course requirement: Attendance to a regularly scheduled seminar on selected issues in Experimental Psychology.

## C. Master of Arts in Psychology (General)

### 1. Formal Requirements

a. 36 credit hours of course work.

b. Minimum B average.

c. Passing of a comprehensive exam.

Details on the examination are included in the *Student's Guide to Graduate Study*.

### 2. Course Requirements

Quantitative Methods (9)

Psy 501 Advanced Statistics (3)

Psy 593 Mathematical Psychology I (3)

Psy 594 Mathematical Psychology II (3)

Area of Concentration (24)

A selected concentration of courses approved by the advisor. May include courses taken outside the department.

Psy 599 Thesis (3)

3. Extra-course requirement: Attendance to a regularly scheduled seminar on selected issues in Psychology.



**D. Master of Science in Information Science****Specific Requirements of the Program****a. Undergraduate prerequisites:**

1. Familiarity with Calculus
2. Familiarity with Statistics and Probability Theory
3. 3.0 point average in major (behavioral, physical science, or engineering)
4. Knowledge of basic computer programming

**b. Specific course requirements for the degree:**

1. Students are required to complete 36 credit hours in the following areas:
  - 9 credit hours in Behavioral Theory
  - 9 credit hours in Computer Science
  - 9 credit hours in Engineering
  - 9 credit hours in Basic Science
2. All students are required to register for the graduate seminar (ISc 590)
3. Minimum B average in course work
4. Passing of a comprehensive examination
5. Thesis and oral examination of thesis

***Courses of Instruction:***

The following courses meet the requirements in the respective areas outlined. Depending on the undergraduate background of the student, the student may, upon approval of his advisor, substitute different concentration of courses, hours, and field requirements to insure a balanced program of professional training required of an Information Scientist.

**a. Behavioral Theory Segment*****9 credit hours***

- ISc 525 Foundations of Behavioral Theory (3)
- ISc 553 Information Presentation (3)
- ISs 565 Sociology of Information Systems (3)
- ISc 570 Human Communication (3)
- ISc 571 Man-Machine Communication (3)
- ISc 576 Computational Linguistics
- ISc 580 Human Information Processing (3)
- Psy 508 Advanced Experimental Psychology (3)
- Psy 530 Learning
- Psy 531 Learning Theory
- Psy 532 Theories of Perception
- Psy 533 Decision Processes (3)
- Psy 541 Computer Applications to Behavioral Science (3)

- b. Computer Science Segment** *9 credit hours*
- ISc 510 Computers and Research Design (3)
  - ISc 510L Computers and Research Design Laboratory (1)
  - ISc 576 Computational Linguistics (3)
  - Cps 399 Special Problems in Computer Science (1-3)
  - Cps 481 Mathematical Logic (3)
  - Cps 499 Special Topics (3)
  - Ele 501 Analog and Digital Computers (3)
- c. Basic Science (Methods) Segment** *9 credit hours*
- ISc 501 Introduction to Information Science (3)
  - ISc 503 Introduction to Cybernetics (3)
  - ISc 510 Computers and Research Design (3)
  - ISc 510L Computers and Research Design Laboratory (1)
  - ISc 515 Mathematics and Information Science (3)
  - ISc 516 Advanced Statistical Application to Information Science (3)
  - ISc 520 Communication Theory (3)
  - ISc 550 Information System Technology (3)
  - ISc 560 Organization and Retrieval of Information (3)
  - ISc 570 Human Communications (3)
  - ISc 575 Artificial Intelligence (3)
  - ISc 576 Computational Linguistics (3)
  - Ine 430 Engineering System Design (I) (3) \*
  - Ine 521-2 Operations Research, I and II (3-3)
  - Ine 544 Systems Analysis, Design and Evaluation (3)
  - Cps 367 Statistics (3)
  - Psy 501 Advanced Statistics (3)
- d. Engineering Segment** *9 credit hours*
- ISc 550 Information System Technology (3)
  - ISc 553 Information Presentation (3)
  - ISc 571 Man-Machine Communication (3)
  - ISc 575 Artificial Intelligence (3)
  - Ine 421 Reliability Theory (3)
  - Ine 422 Reliability Application (3)
  - Ine 430 Engineering Systems Design (I) (3)
  - Ine 502 Simulation Techniques in Operations Research (3)
  - Ine 509 The Engineering Management (3)
  - Ine 521-2 Operations Research, I & II (3-3)
  - Ine 525 Reliability (3)
  - Ine 544 Systems Analysis, Design & Evaluation (3)

Ele 515/Egr. 525 Automatic Control Theory (3)  
Egr 525 Automatic Control Theory (3)

## GRADUATE PROGRAMS IN THEOLOGICAL STUDIES

### *Statement of Purpose:*

The Department of Theological Studies offers two graduate programs.

The M.A. program in Theological Studies is conceived as a broad comprehensive approach to the study of Religion and Theology. Its major concern is to develop in the degree candidate a methodology whereby he may approach the field with five major concerns: a solid grasp of Sacred Scripture, the historical development of western theological thought, the comparative study of world religious phenomena, an ecumenical awareness, the establishment of an interdisciplinary mentality. The unique facilities afforded by the Marian Library allow the offering of special electives in Mariology. The program is conceived both as a preparation for specialization on the doctoral level and as a terminal program for those with other interests and needs.

The M.A. program in Pastoral Catechetics is a professional program designed to offer students an opportunity to specialize in catechetics while at the same time offering the student a strong concentration in theology. The program is intended to prepare students to serve as teachers of catechetics and religious education, parish coordinators of catechetical programs, and administrators and teachers in adult education programs. It is also designed to be sufficiently flexible to meet the needs of individual student.

### *Specific Requirements of the Department:*

a. Undergraduate prerequisites: An applicant is admitted to graduate study if the admitting committee of the Department is satisfied that the applicant is fully qualified to undertake graduate study. A minimum of 24 credit hours in philosophy and theology is recommended. Graduate Record Examination scores are required as a part of the applicant's materials. After admission each student must take a diagnostic examination in the areas of biblical, historical, and systematic theology. These examinations will assist the student and his advisory committee to formulate his program of studies. Any deficiencies revealed by the examinations must be made up during the first two semesters of residency.

b. Specific course requirements for the degree: The candidate must take 36 hours of course work or 30 hours of course work and 6 hours of thesis credit.

The M.A. program in Theological Studies may be pursued in either of the following ways:

1. Specialization program (6-2-2-2): A minimum of six courses must be taken in one area (Biblical Studies, either Old or New Testament, Historical Theology, or Systematic Theology). A minimum of two courses must be taken in each of the other two areas. The remaining two courses may be taken with approval in any area or interdisciplinary subject.

2. Comprehensive program (3-3-3-3): A minimum of three courses must be taken in each of the areas. The remaining three courses may be taken with approval in any area or interdisciplinary subject.

The M.A. program in Pastoral Catechetics is patterned after the comprehensive program in Theological Studies (three courses in each area of the Theological Studies program). Three courses must be taken in the Catechetics area and these will be supplemented by workshops and/or seminars each semester on a particular catechetical problem. For those who already have a strong theological background upon entrance to the program provision will be made for them to concentrate even further in the catechetical and interdisciplinary areas.

c. In order to permit flexibility to meet the needs and interests of individual students variations in the programming may be submitted for approval to the director of the graduate program and the student's advisory committee.

d. With permission undergraduate courses on the 400 level in Theological Studies and in Judaics may be taken for graduate credit to a maximum of six credit hours. Courses for which undergraduate credit has been received may not be repeated for graduate credit.

e. Language requirement: For both programs a working knowledge of a modern language is recommended. For specialization in the biblical or historical areas a working knowledge of the language employed in the area, e.g., Hebrew, Greek, or Latin, may be required.

f. Comprehensive examination: At the completion of the program of studies a written and oral examination must be taken. If the written examination reflects sufficient competency upon the part of the student, the graduate committee may waive the oral examination.

g. Thesis: Students desiring to do so may with approval write a thesis for six credit hours of work. They would then be required to do thirty credit hours of course work. An oral defense of the thesis will be required.

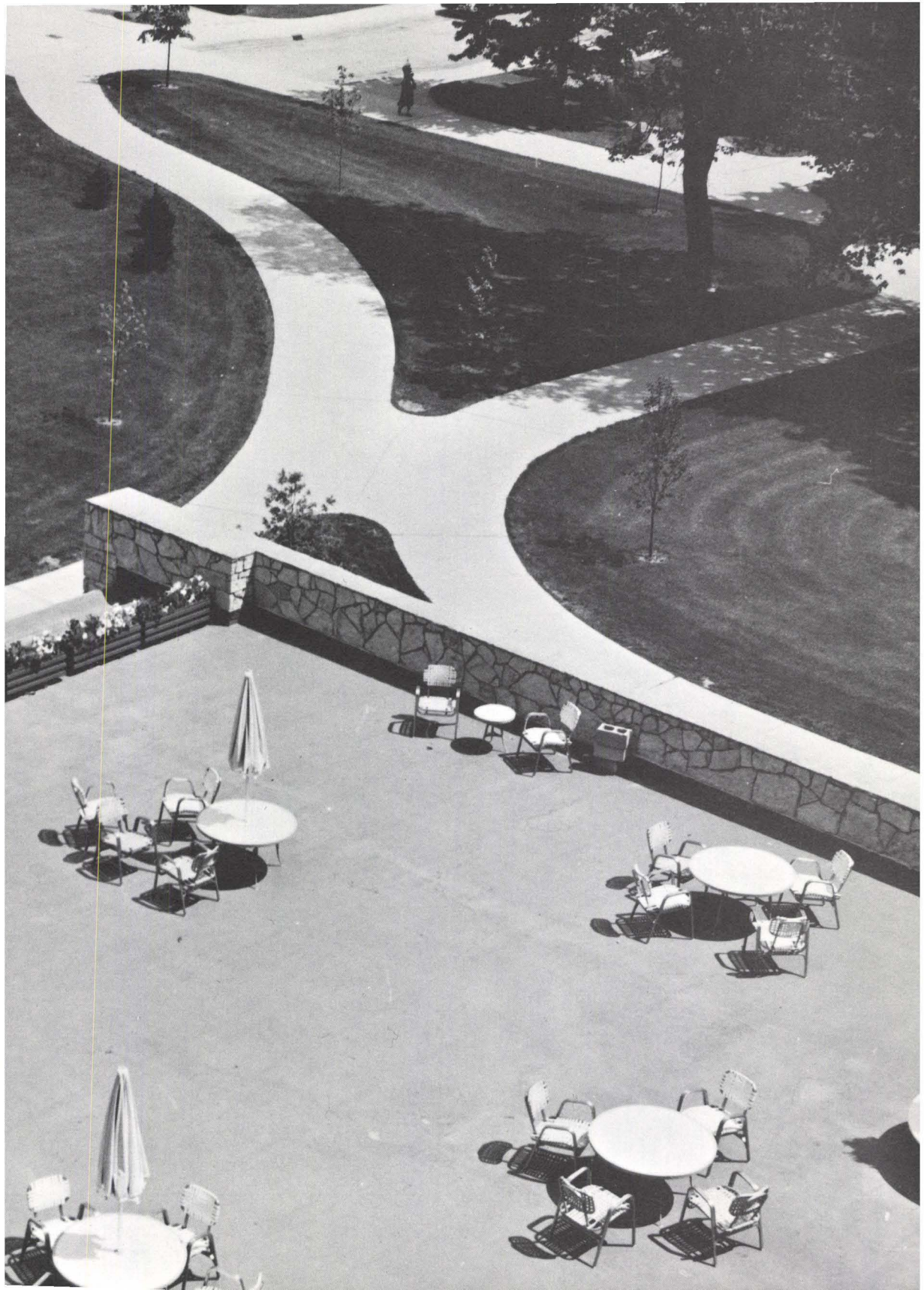
*Program for M.A. in Theological Studies and Pastoral Catechetics:*

The programs leading to each degree may be pursued in Summer Sessions or full-time, i.e., throughout the year. They must be completed within seven calendar years from the time of matriculation. Another program in Theological Studies is offered

conjointly by the University of Dayton and St. Leonard College. Details of this program along with the descriptions of the courses offered at St. Leonard can be found in the catalog of St. Leonard College, Centerville, Ohio.

The University is an active member of the Consortium for Higher Education Religious Studies (CHERS) which provides the possibility of dialogue with students in the other eleven member institutions. It makes possible the interchange of faculties, cross-registration, sharing of library resources, and innovative programming. The following are member schools: Antioch College, Central State University, Hamma School of Theology, Hebrew Union College, Payne Theological Seminary, St. Leonard College, Union Theological Seminary, University of Dayton, Western College for Women, Wilberforce University, Wittenberg University and Wright State University.

The Department of Theological Studies and the University of Dayton is a member of the Consortium of the Hebrew Union College Biblical and Archeological School of Jerusalem. This consortium of more than fifty colleges, universities and seminaries makes available to the faculty and students the resources of the Biblical and Archeological School of Jerusalem for further study and also for Travel and/or Maintenance Fellowships.





# V

## School of Business Administration

### AIMS AND OBJECTIVES

#### *Graduate Work in Business at the University of Dayton*

In the fall term of 1963, the Master of Business Administration program at the University of Dayton was launched. The decision to embark upon graduate education in business resulted from several years of careful study and planning. It was determined that such an undertaking afforded the University an opportunity to meet a growing need in an area in which it was in a position to offer a program consistent with the University's objectives of purpose and quality.

#### *Philosophy of the Master of Business Administration Program*

The M.B.A. program is designed to provide advanced work on a professional level for those whose occupational and personal objectives can be thus served. The University recognizes that a society characterized by heavy industrialization and organized activity requires an increasing input of skilled managers and administrators. It also recognizes that the increased complexities of enterprise and organization places demands upon managers and administrators that require more exacting mastery of the business disciplines.

The manager today must view his function as a professional activity. One aspect of professional competence is the mastery of a body of knowledge. Another is the development of proficiency in applying such knowledge in the decision-making situation. The manager's knowledge must encompass certain basic categories: The social, economic and political environment of business enterprise; the basic business functions such as marketing, finance, operations, and accounting; the management process; and the methodologies for research and problem-solving.

The emphasis of the M.B.A. program is on management practice and decision-making. Although some degree of specialization is afforded, most of the student's work is in courses designed to provide a solid grounding in all the basic business functions, the management process, and the economic and social environment. In



the final analysis, most truly managerial decisions require this broad-based educational background.

In summary, then, the objective of the program is to enable the student to achieve the following:

1. An understanding of the factors and forces in the social, economic and political environment that bear directly and indirectly on managerial decision-making.
2. A knowledge of the principles, methods, and applications of the basic business functions of marketing, finance, accounting and operations.
3. An understanding of managerial processes, administrative practices and organizational relationships.
4. Methodologies for problem analysis and decision-making.





## ADMISSION

The program is designed for holders of a bachelor's degree from an accredited college in: (1) business administration or (2) a field other than business administration.

Those in the first group usually can meet the requirements for the M.B.A. degree by completing thirty credits of graduate work.

Those in the second group may find it necessary to remove certain undergraduate deficiencies by taking basic courses in accounting, economics, management, statistics, and marketing before starting the program.

Applicants for admission to the M.B.A. program should demonstrate a readiness for graduate study, personal integrity, and aptitude for successful business performance. The admissions committee carefully evaluates the following:

1. Undergraduate and other collegiate record as indicated by official transcripts of all universities and colleges previously attended by the applicants.
2. Results of the Admission Test for Graduate Study in Business (ATGSB).
3. Personal interview may be suggested where questions arise regarding either of the above requirements.



The admissions committee is not only interested in the overall undergraduate grade average but the trend of these grades.

All applicants are required to take the Admission Test for Graduate Study in Business (ATGSB). This should be done prior to the beginning of course work in the program. To register for the examination, request an application form from the School of Business Administration and forward the completed form to the Educational Testing Service, Princeton, New Jersey, thirty days before the examination is to be held.

Two copies of the application for admission to the M.B.A. program are required.

Applicants who are not graduates of the University of Dayton must submit official transcripts of all previous college studies. These transcripts should be sent directly by the degree granting institution and received prior to the published deadlines for each term. All applications and transcripts should be sent to The Office for Graduate Studies, University of Dayton, Dayton, Ohio 45409.

#### *Admission with Advanced Standing*

A maximum of six hours of appropriate graduate courses earned at another approved graduate school of business may be applied toward the M.B.A. degree at the University of Dayton. No graduate credit earned at either the University of Dayton or another school may be applied to the M.B.A. degree if such course work was completed more than five years prior to the date of graduation.

#### *Prerequisite Courses*

Certain undergraduate courses in business and economics are required before a student is permitted to begin courses at the graduate level. These are in the areas of Economics, Accounting, Principles of Marketing, Principles of Management, and Statistics. If a student is deficient in one or more of these courses, he may remove such deficiency by successful completion of the appropriate course or courses as follows:

- Eco 202 Principles of Economics (MBA section)
- Acc 203 Survey of Accounting (MBA section)
- Mkt 305 Principles of Marketing (MBA section)
- Bus 215 Principles of Management (MBA section)
- Bus 313 Statistics (MBA section)

Each of the above courses is especially designed for students in the M.B.A. program who lack such courses in their undergraduate work. If the student or a prospective student contemplates taking prerequisites at a school other than the University of Dayton, he should consult with the Director in advance to assure that such courses are acceptable as prerequisites.

### **REQUIREMENTS**

Thirty hours of graduate level course work are required for the M.B.A. degree.

Twenty-four of the thirty hours are prescribed as follows:

MBA 570 (Business and Society) and MBA 590 (Business Policies and Administrative Management) *ARE REQUIRED*. MBA 570 may be taken at any time, provided no prerequisites remain to be taken. MBA 590 may be taken *only* after twenty-one hours of graduate courses have been completed.

Six of seven courses designated CORE COURSES must be taken.

The seven core courses are:

- MBA 501 Managerial Accounting
- MBA 510 Business Investigation and Analysis  
(MBA 512 may be taken as a core course in lieu of MBA 510.  
See paragraph below.)
- MBA 520 Financial Policies of Enterprise
- MBA 530 Marketing Management
- MBA 540 Managerial Economics
- MBA 550 Government and Business
- MBA 560 Operations Management

Those students with an adequate background in mathematics may substitute MBA 512 (Quantitative Methods in Business Decisions) for MBA 510. MBA 512 treats quantitative methodologies in business research with greater intensity and requires, in addition to the Statistics pre-requisite, adequate mathematics preparation through differential and integral calculus, with differential equations desirable.

The six remaining hours may be elected from among the remaining M.B.A. courses listed in the catalogue. With the approval of the Director, certain designated advanced undergraduate courses offered by the School of Business Administration may also be taken as electives. Likewise with the approval of the Director, graduate level courses offered by other schools and departments of the University may be taken as electives. It is emphasized that prior approval of the Director is required before the student may enroll in the latter two categories of courses for graduate credit.

All course work must be completed within five calendar years.

### *Comprehensive Examination*

Successful completion of a comprehensive examination is required for graduation. The examination is given once during each of the three regular terms and may be taken in the student's last term of course work, or after he has completed his course work. The subject areas covered are Economics, Accounting, Finance, Marketing, Management, and Business and Society. In each area, the scope of the examination generally corresponds with the content of the required and core courses.

To be eligible to take the Comprehensive Examination, the student must have at least a 3.00 grade average for all graduate courses completed up to the term in which the examination is given. Unless special permission has been granted, the student must have completed twenty-seven (27) graduate hours of work by the end of the term preceding the term in which he is taking the examination.

### *Academic Standards*

Academic standing is determined on a point system in which corresponding letter and quality points are as follows:

A	4.00
B	3.00
C	2.00
F	0.00

A 3.00 or B average is required for graduation. As indicated earlier, a 3.00 average for course work completed is required for eligibility to take the comprehensive examination. To maintain good academic standing, the student must not have received more than six hours of C. He must achieve a 3.00 cumulative average for the first 15 credit hours in order to be permitted to continue in the program. A student whose average is not above 3.00 after nine hours of graduate credit is strongly urged *and may be required* to limit his load to below the maximum permitted according to his work status as indicated below.

### *Course Load*

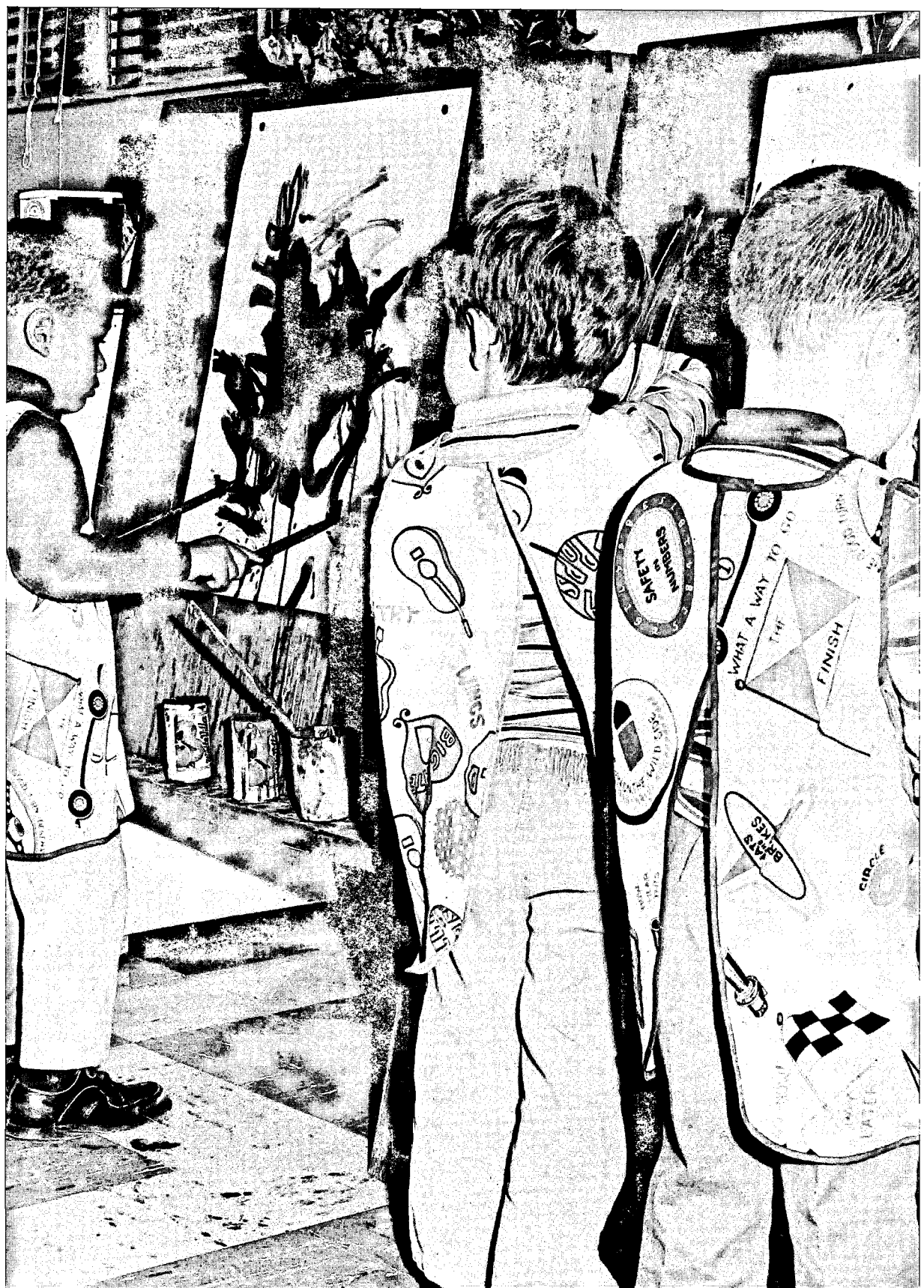
Graduate work may be pursued on either a part-time or full-time basis. If the student is employed in a full-time position, he is permitted to carry a maximum of six hours. If the student is employed in a part-time position, he may carry a maximum load of nine hours.

### *Schedule of Courses*

Most courses are scheduled for late afternoon, evening and Saturday morning class periods. The courses are scheduled in such a manner as to permit a student to complete his entire program by attending week night classes exclusively or Saturday morning classes exclusively. Courses are scheduled for all three terms. With the exception of the split Third Term, all required and core courses are normally offered each term. While certain required and core courses may not be offered in the Third Term, most of them are and a maximum load for either part-time or full-time students is available for either or both of the two half-term periods.

## **PROGRAM PLANNING CONFERENCE**

Upon acceptance into the program, each student is required to have a conference with the Director of the program or a member of the graduate faculty to plan his program of studies. The student should call the Office of the MBA Program to schedule the conference.



SAFETY NUMBERS

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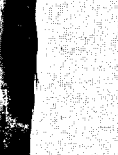


CIRCLE

STAR

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# VI School of Education

## **AIMS AND OBJECTIVES**

The general objectives of the School of Education coincide with the purposes of the University. Accepting the Christian world-view as its distinctive orientation and seeking to foster principles and values consonant with Catholicism and the living traditions of the Society of Mary, the School assists in carrying out the four essential tasks of the University: teaching, research, serving as critic of society, and rendering public service.

The particular objective of the School of Education is to develop those special capabilities of the student which enable him to become an effective practitioner in the field of professional education.

The programs leading to the Master of Science in Education degree are designed primarily to meet the following purposes:

1. To develop Master Teachers on the elementary and secondary school levels by providing advanced work for those who have completed a recognized baccalaureate teacher education program.
2. To enable teachers with at least three years' successful teaching experience to qualify for certification as principals, supervisors, executive heads, or local superintendents.
3. To prepare qualified school counselors, school psychologists, or counselors and psychologists for social agencies.
4. To develop personnel for student services in higher education.
5. To prepare educational research specialists.
6. To enable students with nonprofessional baccalaureate degrees and above-average academic records to gain teacher certification on the secondary level.



## THE MASTER'S PROGRAM IN EDUCATION

### *Title and Meaning of the Degree:*

The title of the Master's degree to which all the indicated programs lead is the Master of Science in Education.

The awarding of this degree means that the candidate has completed a program of graduate work designed to give him the following characteristics:

- a. Broader knowledge of an advanced nature of the tested psychological and philosophical theories of education.
- b. Essential understandings and skills necessary for intelligent consumption of educational research.
- c. More extensive knowledge and skill involved in teaching, or in school counseling, or in school administration.
- d. Ability to contribute toward the improvement of school conditions and/or professional practice through consumer research.

### *Authorization:*

The University of Dayton's offerings in graduate work leading to the Master of Science in Education degree have the official approval of the State of Ohio, Department of Education, of the North Central Association of Colleges and Secondary Schools, and of the National Council for the Accreditation of Teacher Education.

The programs in School Counseling, in School Psychology, in School Administration, and in Educational Research lead to Provisional Certification by the State of Ohio.

The Master Teacher program may lead to Eight Year Professional or to Permanent Certification depending on the years of successful teaching performed under the previous provisional certificate held.

### *Admission Requirements:*

a. General Requirements: The School of Education accepts those students into its graduate program who can present undergraduate records which show them capable of meeting the standards of graduate work and of becoming leaders in their respective fields of professional education.

In order to qualify for admission to the graduate programs, applicants (1) must hold a teacher's certificate on a bachelor's degree from an accredited institution (at least State Accreditation), unless specific exceptions are granted by the

Dean; and (2) must have attained an undergraduate quality-point average of at least 2.50 out of a possible 4.00. An exception to the latter requirement may be made if the Department in which the applicant seeks enrollment recommends it and if the recommendation is endorsed by the School's Graduate Review Board. If the exception is granted, the applicant will be placed on conditional status, pending the successful completion of nine to twelve graduate credit hours.

An applicant who is not a graduate of the University of Dayton must submit complete official transcripts of all of his previous college studies. These transcripts should be sent directly to the Dean, School of Education, from the degree-granting institution at least twenty days before the opening of the term or summer session in which the student expects to enroll.

Admission to graduate study on regular, special, or conditional status does not imply admission to candidacy for a degree.

b. **School Psychologist:** Besides meeting the above requirements, an applicant for the School Psychologist Program must receive a favorable recommendation from the School Counseling staff. In deciding whether or not to make such a recommendation to the Admissions Committee, the staff will take into account the applicant's physical and mental health, his personality adjustment as determined by appropriate tests, and his general character as determined by reference appraisals solicited from former professors and employers.

c. **Teacher Certification:** This program is restricted to students who (1) hold a non-professional bachelor's degree; (2) have earned the degree within a period of ten years prior to application to the program; (3) have an undergraduate cumulative point average of 3.0 or higher (on a 4.0 scale); (4) desire certification to teach in secondary school; (5) have a major teaching field which can be serviced by graduate courses offered at the University of Dayton. (Students who desire high school certification but cannot meet these requirements may take Program E-9 on the undergraduate level. Cf. Undergraduate Catalog.)

#### *Admission to Candidacy for Degree:*

A student becomes a candidate for the Master of Science in Education degree if his cumulative point average for graduate work, the Preliminary Plan for his Research Project or the approved plan for his internship experiences, and his reference appraisals are judged to be acceptable by the Graduate Committee of the School of Education.

The most important consideration in the admission of a student to candidacy is the qualitative aspect of his graduate work to date. He must give evidence of

being able to meet all the graduation requirements. Applicants who are deemed unqualified at this point will be advised to discontinue their program.

Students should apply for admission to candidacy after the completion of fifteen (15) semester credit hours of graduate work, including at least two courses in the area of concentration and EdF 503 Research Methodology. Application is made by filing with the Dean the official candidacy form. Applicants should be sure that all the required credentials are in order and that their Preliminary Plan for the Research Project or the approved plan for their internship experiences is ready for evaluation.

Applicants with a concentration in Administration must present evidence of at least three years of successful teaching and a letter of recommendation to the program from an administrator in position to judge their potential for educational leadership.

Students following Plan C in the School Counseling Program should apply for candidacy upon completion of twenty-four (24) semester credit hours. Approval of the plan for the Research Paper is required.

*Requirements for the Degree:*

a. Cumulative Point Average: Students must achieve an average of at least 3.00 (“B” average) in all work undertaken in order to qualify for graduation.

b. Research Project or Internship Report: At least ten days before graduation the student must submit three acceptable copies of his Research Project and two copies of an abstract of the Project; OR one acceptable copy of a formal report on his internship experiences; OR, in the case of Plan C, one copy of his Research Paper.

c. Seminar and Department Conference: During the final term preceding his graduation the student must participate in the Graduate Seminar (EdF 592) and in a formal “Departmental Conference” as arranged by his Department Chairman.

*Advisement*

The student, while pursuing his graduate program, has access to three official advisors:

a. The Dean of the School of Education acts as general advisor to all graduate students regardless of the program they are following. In this capacity he will counsel students with a view toward orienting them in the purpose and requirements of graduate work and will assist them in planning their programs and schedules.



b. The Chairman of the Department acts as special advisor to students enrolled in programs under his jurisdiction. He counsels them with regard to their professional objectives, their selection of courses, and the options that are available in their programs. In the case of specialized programs within the Department he may delegate these functions to the program directors. The student is urged to confer with his chairman and/or Director in the very first term of his enrollment.

c. The Project or Internship Advisor, chosen by mutual agreement between the student, the department chairman, and the prospective advisor, guides the student to the successful completion of the Research Project or the approved internship experiences.

**PROGRAMS OF STUDY**

**PROGRAM I: MASTER HIGH SCHOOL TEACHER**

<i>Core Courses</i>	<i>Nine credit hours</i>
EdF 501 Advanced Psychology of Learning	three credit hours
EdF 502 Comparative Philosophies of Education	three credit hours
EdF 503 Research Methodology	three credit hours

*Area of Concentration* *Twelve credit hours*

Content courses in a selected teaching field

*Electives* *Six credit hours*

Further courses in the selected teaching field or in allied field; or (with the approval of the advisor) courses in general or professional education.

*Research Project (EdF 591)* *Three credit hours*

*Graduate Seminar (EdF 592)*

NOTE: A special program, including EdF 588 and EdF 589, can be arranged for students desiring a concentration in the Humanities. Students who are interested should confer with the Chairman of the Department of Secondary Education.

**PROGRAM II: MASTER ELEMENTARY TEACHER**

<i>Core Courses</i>	<i>Nine credit hours</i>
EdF 501 Advanced Psychology of Learning	three credit hours
EdF 502 Comparative Philosophies of Education	three credit hours
EdF 503 Research Methodology	three credit hours

*Possible Concentrations* *Eighteen credit hours*

**1. GENERAL ELEMENTARY EDUCATION**

- EdE 500 Mathematics in the Elementary School
- EdA 511 Elementary School Curriculum
- EdE 564 Advanced Science in the Elementary School
- EdE 568 Diagnosis and Correction of Reading Difficulties
- EdE 560 Social Studies Through Unit Teaching
- EdE 566 Innovations and Trends in Language Arts

**2. SCIENCE AND MATHEMATICS** *Eighteen credit hours*

- EdE 500 Mathematics in the Elementary School
- EdE 559 Research and Materials in Mathematics Instruction
- EdE 564 Advanced Science in the Elementary School

- EdE 565W Practicum in Science Instruction  
 EdE 561 Analysis of Instruction  
 EdE 562 New Media and Methods in Elementary Education  
 — — Elective

**3. READING SPECIALIST** *Eighteen credit hours*

- EdA 511 Elementary School Curriculum  
 EdE 566 Innovations and Trends in Language Arts  
 EdE 567 Survey of Research in Reading  
 EdE 568 Diagnosis and Correction of Reading Difficulties  
 EdE 570 Supervision and Curriculum in Reading  
 — — Elective

**4. IMPROVEMENT OF INSTRUCTION** *Eighteen credit hours*

- EdE 500 Mathematics in the Elementary School  
 EdE 560 Social Studies Through Unit Teaching  
 EdE 561 Analysis of Instruction  
 EdE 562 New Media and Methods in Elementary Education  
 EdE 563 Supervision of Student Teaching  
 EdE 568 Diagnosis and Correction of Reading Difficulties

NOTE: Other possible concentrations to fit the needs of students may be worked out in conference with the Dean or the Chairman of the Department.

*Research Project* (EdF 591) *Three credit hours*

*Graduate Seminar* (EdF 592)

**PROGRAM III: SCHOOL COUNSELOR**

Three options are available to students following this program:

- Plan A: Requires 30 credit hours, a Research Project, and participation in the Departmental Conference.  
 Plan B: Requires 30 credit hours, completion of a set of internship experiences, and participation in the Departmental Conference.  
 Plan C: Requires 36 credit hours, a Research Paper, and participation in the Departmental Conference.

<i>Core Courses</i>	<i>Nine credit hours</i>
EdF 502 Comparative Philosophies of Education	three credit hours
EdF 503 Research Methodology and Statistics	three credit hours
EdF 504 Advanced Child and Adolescent Psychology	three credit hours

<i>Concentration</i>	<i>Eighteen credit hours</i>
EdC 531 Dynamics of Personality	three credit hours
EdC 522 Principles and Techniques of Guidance, <i>or</i>	three credit hours
EdC 580 Guidance in the Elementary School	three credit hours
EdC 583 Group Process	three credit hours
EdC 524 Educational and Occupational Information	two credit hours
EdC 533 Psychometrics	two credit hours
EdC 543 Principles and Techniques of Counseling, <i>or</i>	three credit hours
EdC 581 Counseling in the Elementary School	three credit hours
EdC 545 Practicum in Counseling Techniques	three credit hours
<i>Research Project</i> (EdF 591) (Plan A) <i>or</i>	<i>three credit hours</i>
<i>Internship in Guidance and Counseling</i> (EdF 599) (Plan B) <i>or</i>	<i>three credit hours</i>
<i>Electives</i> (Plan C)	
<i>Graduate Seminar</i> (EdF 592)	
NOTE: Students who desire to qualify for a SUPERVISOR'S CERTIFICATE IN SCHOOL COUNSELING should add to the above program the following courses:	
EdA 509 School Supervision	three credit hours
EdA 511 Elementary School Curriculum	two credit hours
EdA 512 Secondary School Curriculum	two credit hours
EdA 515 School Law, <i>or</i>	two credit hours
EdA 521 School Public Relations	two credit hours
EdF 518 School and Social Order	three credit hours
EdC 530 Psychology of Individual Differences, <i>or</i>	two credit hours
EdF 593 Interpretation of Statistics	two credit hours

#### **PROGRAM IV: STUDENT SERVICE PERSONNEL IN HIGHER EDUCATION**

<i>Core Courses</i>	<i>Nine credit hours</i>
EdF 502 Comparative Philosophies of Education	three credit hours
EdF 503 Research Methodology	three credit hours
EdF 504 Advanced Child and Adolescent Psychology	three credit hours
<i>Concentration</i>	<i>Nineteen credit hours</i>
EdC 533 Psychometrics	two credit hours
EdC 543 Principles and Techniques of Counseling	three credit hours

EdC 545	Practicum II: Counseling Techniques	three credit hours
EdC 583	Group Process	three credit hours
EdF 550	History of Higher Education in the United States	three credit hours
EdC 551	Education Personnel Services in Higher Education	two credit hours
EdC 552	Seminar: College Personnel Service Problems	three credit hours
<i>Electives</i>		<i>Five credit hours</i>
<i>Internship in College Personnel Services (EdC 553)</i>		<i>Three credit hours</i>
<i>Graduate Seminar (EdF 592)</i>		

### PROGRAM V: SCHOOL PSYCHOLOGIST

<i>Core Courses</i>		<i>Nine credit hours</i>
EdF 502	Comparative Philosophies of Education	three credit hours
EdF 504	Advanced Child and Adolescent Psychology	three credit hours
EdF 590	Educational Research Design	three credit hours
<i>Concentration</i>		<i>Twenty-seven credit hours</i>
EdC 531	Dynamics of Personality	three credit hours
EdC 532	Learning Disabilities	three credit hours
EdC 533	Psychometrics	two credit hours
EdC 543	Principles and Techniques of Counseling	three credit hours
EdC 545	Practicum II: Counseling Techniques	three credit hours
EdC 572	The School Psychologist: Role and Function	two credit hours
EdF 593	Interpretation of Statistics, <i>or</i>	three credit hours
Psy 501	Advanced Statistics	three credit hours
EdC 576	Child & Adolescent Personality Evaluation I	four credit hours
EdC 577	Child & Adolescent Personality Evaluation II	four credit hours
<i>Internship (EdC 594-595)</i>		<i>Twelve credit hours</i>
<i>Research Project (EdF 591)</i>		<i>Three credit hours</i>
<i>Graduate Seminar (EdF 592)</i>		

Upon successful completion of the above program the student will be awarded the Master's degree.

Students from Ohio who desire certification may then register for EdC 594-595 Internship for School Psychologists.

Students from outside Ohio are responsible for initiating and completing the internship and certification requirements of their respective states.



**PROGRAM VI: SCHOOL ADMINISTRATOR**

Two options are available to students following this program:

**Plan A:** Requires 30 credit hours, a Research Project, and participation in the Departmental Conference.

**Plan B:** Requires 30 credit hours, completion of a set of approved internship experiences, and participation in the Departmental Conference.

<i>Core Courses</i>	<i>Nine credit hours</i>
EdF 502 Comparative Philosophies of Education	three credit hours
EdF 503 Research Methodology and Statistics	three credit hours
EdF 504 Advanced Child and Adolescent Psychology, <i>or</i>	three credit hours
EdF 501 Advanced Psychology of Learning	three credit hours

<i>Concentration</i>	<i>Thirteen credit hours</i>
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Students interested in *Elementary School Administration* should take the following courses:

EdA 506 School Administration	three credit hours
EdA 509 School Supervision	three credit hours
EdA 511 Elementary School Curriculum	two credit hours
EdA 513 Elementary School Evaluation	two credit hours
EdC 522 Principles and Techniques of Guidance	three credit hours

Students interested in *Secondary School Administration* should take the following courses:

EdA 506 School Administration	three credit hours
EdA 509 School Supervision	three credit hours
EdA 512 Secondary School Curriculum	two credit hours
EdA 514 Secondary School Evaluation	two credit hours
EdC 522 Principles and Techniques of Guidance	three credit hours

<i>Electives</i>	<i>Five credit hours</i>
EdA 515 School Law	two credit hours
EdA 516 School Plant	two credit hours
EdA 517 School Finance	two credit hours
EdF 518 School and the Social Order	three credit hours
EdA 521 School Public Relations	two credit hours
EdC 522 Principles and Techniques of Guidance	three credit hours
EdC 530 Psychology of Individual Differences	two credit hours

EdC 533	Psychometrics	two credit hours
EdC 539	Administration of a School Guidance Program	two credit hours
EdC 543	Principles and Techniques of Counseling	three credit hours
EdC 583	Group Process	three credit hours
<i>Research Project (EdF 591) (Plan A) or</i>		<i>Three credit hours</i>
<i>Internship Experiences in School Administration</i> (EdA 507) (Plan B)		<i>Three credit hours</i>

*Graduate Seminar (EdF 592)*

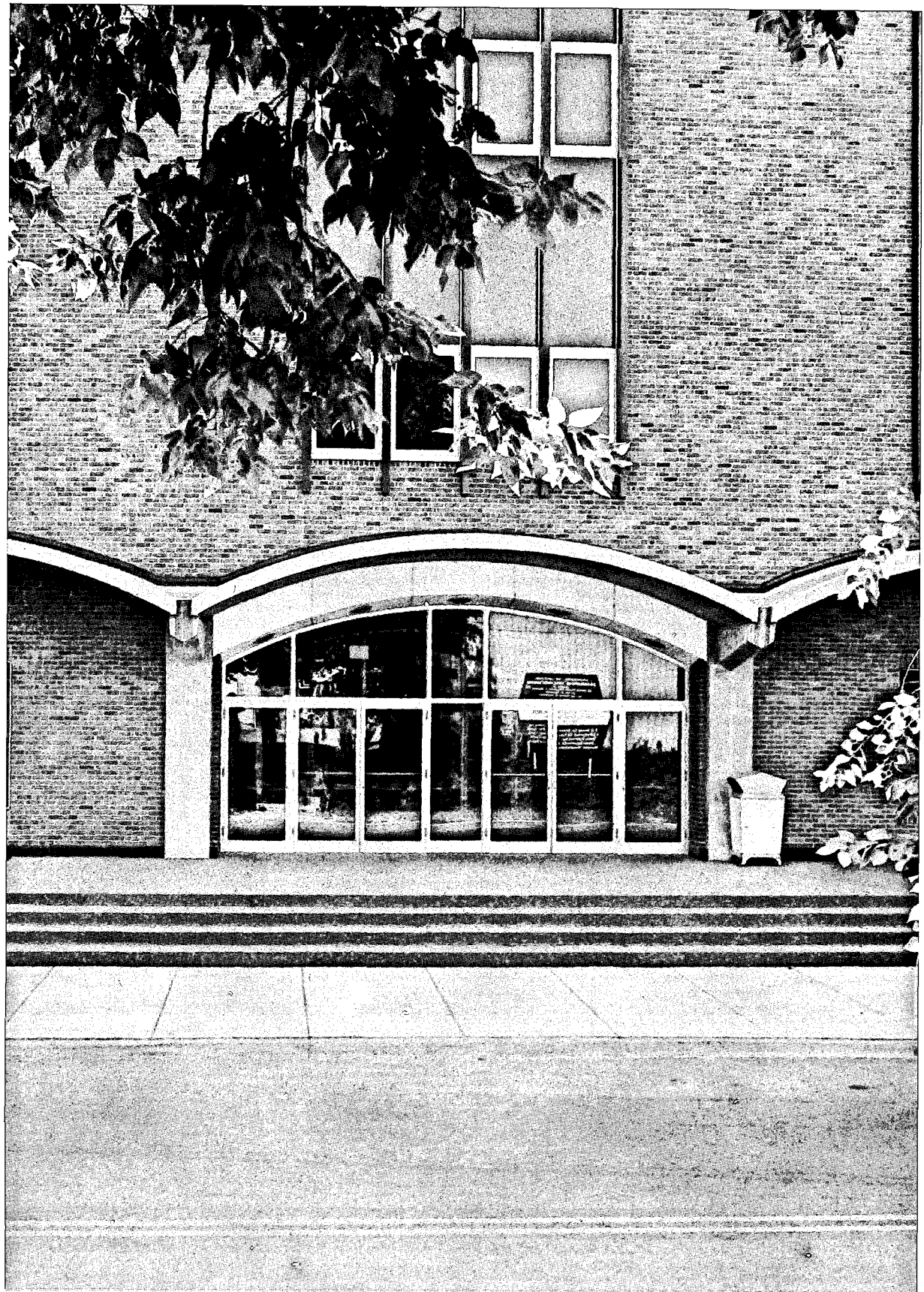
NOTE: Programs can be arranged for students who desire to work for higher administrative and supervisory certificates.

### PROGRAM VII: EDUCATIONAL RESEARCH SPECIALIST

<i>Core Courses</i>		<i>Six credit hours</i>
EdF 501	Advanced Psychology of Learning	three credit hours
EdF 502	Comparative Philosophies of Education	three credit hours
<i>Concentration</i>		<i>Thirteen credit hours</i>
EdA 514	School Evaluation	two credit hours
EdC 533	Psychometrics	two credit hours
EdF 593	Interpretation of Statistics	three credit hours
— —	Data Processing and Computer Techniques	three credit hours
EdF 590	Educational Research Design	three credit hours
<i>Internship in Educational Research (EdF 596-597)</i>		<i>Twelve credit hours</i>

### PROGRAM VIII: TEACHER CERTIFICATION

<i>Core Courses</i>		<i>Nine credit hours</i>
EdF 501	Advanced Psychology of Learning	three credit hours
EdF 502	Comparative Philosophies of Education	three credit hours
EdF 518	School and the Social Order	three credit hours
<i>Concentration</i>		<i>Nineteen credit hours</i>
EdS 351	The Secondary School: Self and Society	two credit hours
— —	Special Methods in Principal Teaching Field	two credit hours
— —	Content Courses in Principal Teaching Field	fifteen credit hours
<i>Internship in Teaching (EdS 598)</i>		<i>Eight credit hours</i>



# VII School of Engineering

## **FOREWORD**

The specific purpose of the graduate program in the School of Engineering is to provide the best possible education at the graduate level. This purpose is achieved through the development of the special capacities and capabilities of the student, thereby enabling him to become a thoroughly competent professional in his chosen field.

The graduate engineering programs are designed to meet the professional needs of the engineer and they also represent a preparatory step toward the Ph.D. degree.

The School of Engineering currently offers graduate programs leading to the following Master's degrees:

- Master of Science in Engineering
- Master of Science in Chemical Engineering
- Master of Science in Civil Engineering
- Master of Science in Electrical Engineering
- Master of Science in Engineering Management
- Master of Mechanical Engineering

## **ADMISSIONS**

Refer to Page 11 for status classification for students accepted for graduate study. Graduate Record Examination results should be included in the supporting data for admission, if available.

## **GENERAL DEGREE REQUIREMENTS**

The requirements for the Master's degree are the following:

1. Meet the requirements for a bachelor's degree.
2. Earn a minimum cumulative grade-point average of 3.00 and successfully complete all courses in an approved program of studies. 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.
3. Submit an acceptable thesis or project report where specified. The grade for the thesis or project report becomes part of the total cumulative average. Joint authorship is not permissible. The thesis or project report should be prepared in accordance with the general format, outlined in the Guide for Preparation of Thesis or Project Report, copies of which are available in the departmental offices and in the Engineering Administration Office. If a proprietary aspect is involved, due to completion of the investigational work at the student's place of employment, the confidential nature of the information will be respected and arrangements will be made to delay public disclosure, subject to written permission from the organization involved. Students who have completed registration in all courses, but who have not completed the thesis or project report, must request approval for continuance in the graduate program by means of a Graduate Student Program Approval form each term until graduation. A regular grade will be assigned upon satisfactory completion of the thesis or project report and will be included in the final cumulative grade point average. Prior to completion, cumulative averages will be calculated only on the basis of course performance, and a grade of "P" will be given for the thesis or project.
4. Pass satisfactorily an oral thesis or project report examination. The examination will be conducted by a department advisory committee under the direction of the advisor as chairman. The approved thesis or project report topic must be selected in the major engineering area. The procedure for the examination is outlined in the Guide for Preparation of Thesis or Project Report.

In fulfilling the requirements for the degree programs, certain specified conditions prevail and should be noted carefully.

### **1. Transfer Credits**

All Engineering Master's Programs with the exception of the Engineering

Management Program, will permit transfer credit for two courses, completed at recognized institutions, providing a grade of "B" (3.00) or better has been achieved. The Engineering Management Program permits the transfer of three courses. All transfer credits must be approved by the advisor.

## 2. Course Load

A part-time student may not register for more than six credit hours per term unless permission is gained from the Director of Engineering Graduate Programs.

## 3. Use of Advanced Undergraduate Courses

Certain undergraduate level courses may be used, if approved by student's advisor, see page 11.

## THE GRADUATE PROGRAM

After admission, each student will be assigned to the appropriate department representing the student's major interest. Assignment of a permanent advisor will be made. He will guide the student in the development of a program of studies deemed best for his particular interest and objectives. Amendments to the program may be made with the approval of the advisor. A change in advisor must be filed in writing with the Director.

## FINANCIAL AID

Assistantships and industrial fellowships are available at the University of Dayton for the encouragement of graduate work and the promotion of research. These are administered by the academic departments. Detailed information relative to application may be secured from the Director of Engineering Graduate Programs.

## THE MASTER OF SCIENCE IN ENGINEERING PROGRAM

The Program of Study leading to the degree of Master of Science in Engineering must include a minimum of 30 credit hours of the following:

1. 12 credit hours in major area;
2. 12 credit hours of electives;
3. 6 credit hours of research on an approved project.

## **MAJOR IN MATERIALS SCIENCE IN ENGINEERING**

### **Courses:**

#### **1. Major Field**

12 credit hours to be selected from the following courses:

MEE 501	MEE 511
MEE 502	MEE 515
MEE 503	MEE 551
MEE 504	MEE 597
MEE 505	ELE 524
MEE 506	ELE 525

#### **2. Electives**

12 credit hours to be selected from current course offerings which best suit the student's requirements.

#### **3. Research Project**

**six credit hours**

With the approval of the faculty advisor and chairman, the student who can provide evidence of previous research of acceptable quality may substitute 6 credit hours of additional course work for the research project.

### *Examinations:*

A final examination at the completion of the project is required.

## **THE MASTER OF SCIENCE IN ENGINEERING MANAGEMENT PROGRAM**

The Program of Study leading to the degree of Master of Science in Engineering Management is inter-disciplinary and is offered by the School of Engineering with the cooperative participation of the School of Business Administration and the College of Arts and Sciences. It must include a minimum of 36 credit hours consisting of the following:

1. 18 credit hours in Industrial Engineering;
2. 9 credit hours in Business Administration;
3. 9 credit hours in electives.

### *Courses:*

#### **1. Industrial Engineering**

18 credit hours to be selected from the graduate level Industrial Engineering courses. The student will be required to choose twelve credit hours

from either Option A, Systems Engineering or Option B, Operations Research.

Option A—12 credit hours to be selected from the following courses:

INE 501	INE 517
INE 502	INE 518
INE 503	INE 524
INE 504	INE 541
INE 506	INE 542
INE 507	INE 543
INE 508	INE 590
INE 516	INE 598
	*INE 599

Option B—12 credit hours to be selected from the following courses:

INE 501	INE 524
INE 502	INE 525
INE 503	INE 528
INE 504	INE 530
INE 508	INE 531
INE 515	INE 544
INE 516	INE 590
INE 518	INE 598
INE 521	*INE 599
INE 522	

## 2. Business Administration

Six credit hours, two courses, to be selected from the following list:

MBA 520	MBA 550
MBA 530	MBA 560
MBA 540	

Three credit hours, one course, to be selected from the following list:

MBA 581
MBA 582
MBA 583

## 3. Electives

Nine credit hours of electives from graduate courses approved by the advisor and selected from Business Administration, Engineering, Science and Mathematics.

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\*If a student so elects, a thesis may be substituted for six credit hours of course work.



**EXAMINATIONS:**

A final examination at the completion of the thesis is required.

**THE MASTER OF SCIENCE IN CHEMICAL ENGINEERING PROGRAM**

The Program of Study must include a minimum of 30 credit hours consisting of the following:

1. 3-6 credit hours in Basic Sciences;
2. 15 credit hours in Chemical Engineering;
3. 3-6 credit hours of electives;
4. 6 credit hours on an approved thesis project.

*Courses:*

1. Basic Sciences  
3-6 credit hours to be selected from the basic sciences taught by the Mathematics and Science Departments.
2. Chemical Engineering  
15 credit hours to be selected from the graduate level Chemical Engineering courses. CME 507, CME 521, and CME 581 must be included in the 15 credit hour requirement.
3. Electives  
3-6 credit hours of electives as approved by the advisor and department chairman.
4. Thesis  
CME 599 6 credit hours on an approved thesis project.

**EXAMINATIONS:**

A final examination at the completion of the thesis is required.

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**THE MASTER OF SCIENCE IN CIVIL ENGINEERING PROGRAM**

The Program of Study must include a minimum of 30 credit hours consisting of the following:

1. 3-6 credit hours in Basic Sciences;

2. 18-21 credit hours in Civil Engineering, Engineering Mechanics or thesis related subjects;
3. 6 credit hours on an approved thesis project.

*Courses:*

1. **Basic Sciences**  
3-6 credit hours are to be selected from the general basic science group taught by the Mathematics and Science Departments.
2. **Civil Engineering, Engineering Science, or Thesis Supporting Courses**  
18-21 hours to be selected from the following courses:  
Civil Engineering graduate level courses.  
Engineering Mechanics  
Engineering Mechanics courses as approved by the student's advisor.  
Thesis Supporting Courses  
Thesis Supporting Courses approved by the student's advisor.
3. **Thesis**  
Cie 599 6 credit hours on an approved thesis project.

*Examinations:*

A final examination at the completion of the thesis is required.

**THE MASTER OF SCIENCE IN ELECTRICAL ENGINEERING PROGRAM**

The program of study must include a minimum of 30 credits hours consisting of the following:

1. 6 credit hours in Basic and Engineering Sciences;
2. 12 credit hours in Electrical Engineering;
3. 6 credit hours in Thesis Supporting Courses approved by the student's advisor;
4. 6 credit hours on an approved thesis project.

*Courses:*

1. Basic and Engineering Sciences

6 credit hours are to be selected from either the general basic science group taught by the Mathematics and Science Departments, or from appropriate courses listed in the Master of Science in Engineering Program. It is permissible to combine three credit hours from each program. Selected courses must meet with the approval of advisor.

2. Electrical Engineering

12 credit hours to be selected from the graduate level Electrical Engineering courses.

3. Thesis Supporting Courses

6 credit hours in Thesis Supporting Courses approved by the student's advisor.

4. Thesis

Ele 599 6 credit hours on an approved Thesis Project.

*Examinations:*

A final examination at the completion of the thesis is required.

**THE MASTER OF MECHANICAL ENGINEERING PROGRAM**

The Program of Study leading to the degree of Master of Mechanical Engineering with major areas of study in Thermal Engineering, Fluid Mechanics and Mechanical Design must include a minimum of 30 credit hours consisting of the following:

1. 12-15 credit hours in Mechanical Engineering;
2. 6 credit hours in Mechanical Engineering Project;
3. 9-12 credit hours of electives.

*Courses:*

1. Mechanical Engineering

12-15 credit hours to be selected from the following courses:

*Material Science* — MEE 501, MEE 502, MEE 503, MEE 504, MEE 505, MEE 506.

*Thermal Engineering* — MEE 511, MEE 512, MEE 513, MEE 514, MEE 515, MEE 516, MEE 517, MEE 518.

*Fluid Mechanics* — MEE 521, MEE 522, MEE 523, MEE 524, MEE 525.

*Mechanical Design* — MEE 531, MEE 532, MEE 533, MEE 534, MEE 535, MEE 536, MEE 537, MEE 538, MEE 539.

2. Mechanical Engineering Project

Mee 550 Mechanical Engineering Project one to six credit hours

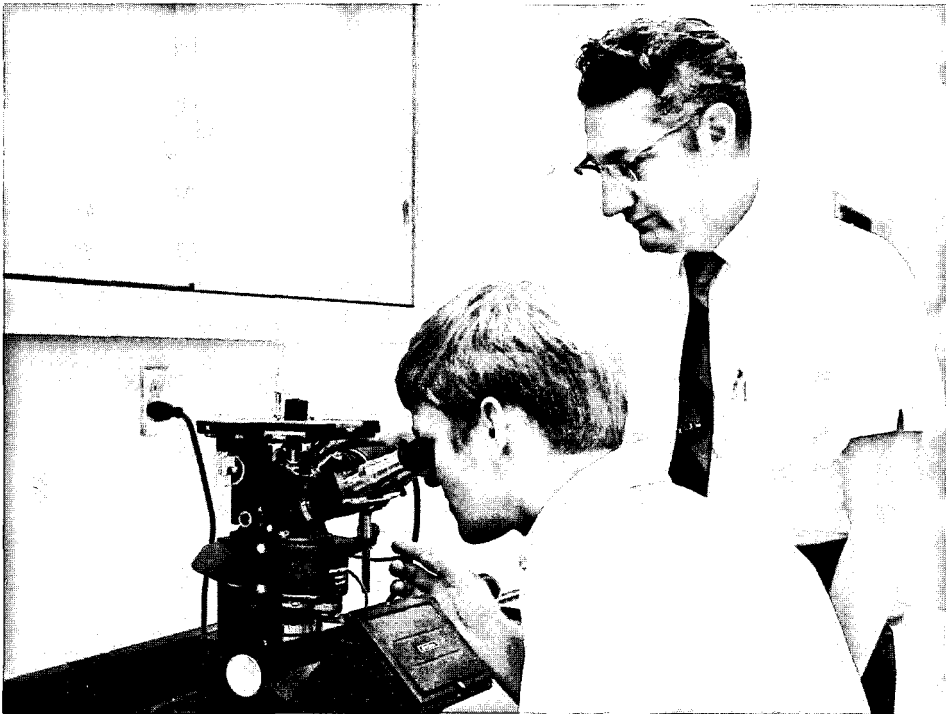
With the approval of the Chairman, the project may be replaced by 6 credit hours of course work when the student can provide evidence of previous engineering research of acceptable quality.

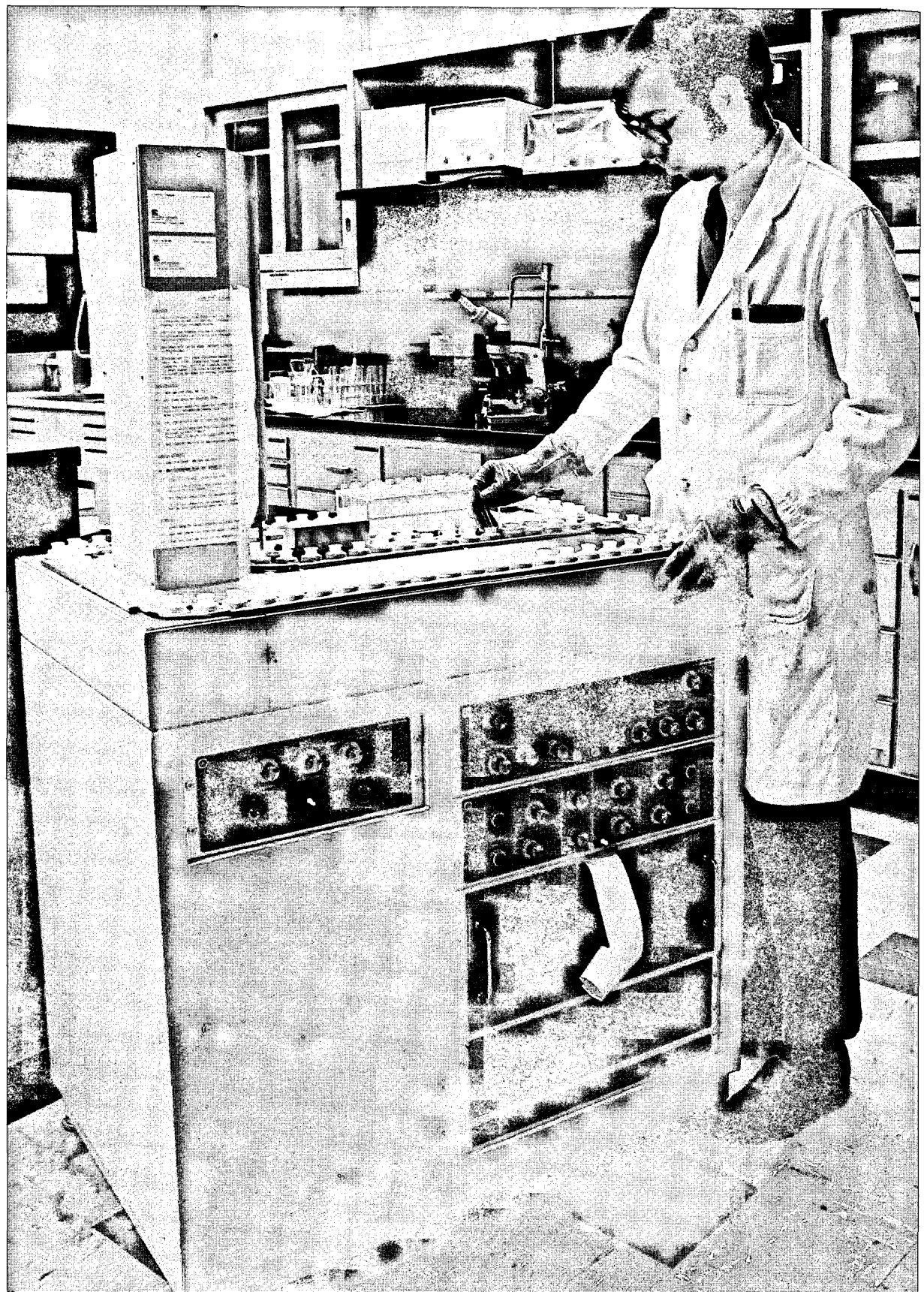
3. Electives

Electives from other Engineering Departments and from Science may be taken with the approval of the Faculty Advisor and the Department Chairman.

*Examinations:*

A final examination at the completion of the project is required.





## VII Department of Instruction

### **Biology (BIO)**

Dr. George B. Noland, *Chairman*

Any 300-400 upper level undergraduate course in biology may be taken for graduate credit under the usual conditions.

**BIO 501. SEMINAR** **ZERO-ONE CREDIT HOUR**

The development, presentation, and discussion of papers dealing with Biological problems. Open only to advanced undergraduate and graduate Biology Majors.

**BIO 502. VERTEBRATE ZOOLOGY** **FOUR CREDIT HOURS**

An advanced course dealing with the morphology, physiology, ecology and distribution of representative vertebrate groups. Three hours lecture and one three-hour lab per week.

**BIO 509. ECOLOGY** **THREE CREDIT HOURS**

The course deals with the mutual relations between organisms and their environment. Some aspects of biological productivity of lakes will be included. Three hours lecture.

**BIO 512. RADIATION BIOLOGY** **FOUR CREDIT HOURS**

A course in the theory and principles of ionizing radiation. Application of radioactive tracers to biological problems will be considered. Two hours lecture and two two-hour labs per week.

**BIO 514. BIOCHEMISTRY** **FOUR CREDIT HOURS**

Lectures, selected readings and laboratory assignments dealing with carbohydrates, lipids, amino acids, proteins, enzymes, nucleic acids and the metabolism of those compounds. Three hours lecture and one three-hour lab per week.

**BIO 515. BACTERIAL PHYSIOLOGY** **THREE CREDIT HOURS**

A study of the metabolic and biosynthetic activities of bacteria, accompanied by a laboratory period designed to familiarize the student with some of the basic biochemical techniques used in the study of bacterial physiology. Three hours lecture.

**BIO 517. ENDOCRINOLOGY** **FOUR CREDIT HOURS**

A functional analysis of the mechanisms and activity of the endocrine system. Emphasis will be placed on hormonal regulation of metabolism and growth. Three hours lecture and one three-hour lab per week.

- BIO 518. CYTOLOGY** **FOUR CREDIT HOURS**  
 A study of cell structure at the organelle and the molecular levels. Where possible, fine structure will be related to cell function. Two hours lecture and two three-hour labs per week.
- BIO 519. VIROLOGY** **THREE CREDIT HOURS**  
 Lectures, selected readings and laboratory assignments dealing with the biology of plant, animal and microbial viruses. Tissue culture techniques will be considered. Two hours lecture and one three-hour lab per week.
- BIO 521. BIOCHEMICAL GENETICS** **THREE CREDIT HOURS**  
 An analysis of the nature of the gene and gene action. Particular attention will be given to genetic control of protein synthesis and to recent advances in biochemical and physiological genetics. Two hours lecture and one three-hour lab per week.
- BIO 522. IMMUNOLOGY AND ADVANCED PATHOGENIC BACTERIOLOGY** **THREE CREDIT HOURS**  
 Discussion of epidemiology, host-parasite relationships, and antigenicity with emphasis on the chemical aspect of immune response.
- BIO 523. ADVANCED MICROBIOLOGY** **THREE CREDIT HOURS**  
 Lectures and readings dealing with current concepts in basic and applied microbiology.
- BIO 530. COMPARATIVE ANIMAL PHYSIOLOGY** **FOUR CREDIT HOURS**  
 Organized on a function-system basis, the course deals with environment-organism interaction and with integrative systems of the principal phyla of animals. Three hours lecture and one three-hour lab per week.
- BIO 531. EXPERIMENTAL EMBRYOLOGY** **FOUR CREDIT HOURS**  
 Morphological and physiological aspects of development will be considered along with an introduction to teratology. Three hours lecture and one three-hour lab per week.
- BIO 532. VERTEBRATE MORPHOLOGY** **FOUR CREDIT HOURS**  
 The general biology of vertebrates with emphasis on their structural, functional and behavioral adaptations, comparative anatomy and evolutionary history. Three hours lecture and one three-hour lab per week.
- BIO 534. VERTEBRATE PALEONTOLOGY** **FOUR CREDIT HOURS**  
 The origin, evolution, dispersal and geologic history of the major groups of the Chordates with emphasis on the morphology and paleoecology of the higher classes. Three hours lecture and one three-hour lab per week, plus one field trip. Laboratory sessions to take place at the Dayton Museum of Natural History.
- BIO 537. BIOSYSTEMATICS** **THREE CREDIT HOURS**  
 A study of the principles of classification, stressing the evidence used in phylogenic and evolutionary schema.
- BIO 538. ECOLOGY II** **FOUR CREDIT HOURS**  
 A study of the coactions of animals and plants within their environment. Particular emphasis will be given to trophic structure and bioenergetics. Three hours lecture and one three-hour lab per week.
- BIO 540. PHYSIOLOGY OF HIGHER PLANTS** **FOUR CREDIT HOURS**  
 Principles covering photosynthesis, respiration, mineral nutrition, solute transport and growth in higher plants. Three hours lecture and one three-hour lab per week.

**BIO 550. BIOMETRICS** **THREE CREDIT HOURS**  
 The design and analysis of experiments in quantitative biology. Rectilinear and curvilinear regression, correlation, and the distribution function of various statistics will be considered.

**BIO 552-553. BIOLOGICAL INSTRUMENTATION** **THREE CREDIT HOURS EACH TERM**  
 A course designed to introduce the student to the theory and use of techniques and instruments of modern biology. Required of all graduate students. One hour lecture and two three-hour labs per week.

**BIO 554. ELECTRON MICROSCOPY** **FOUR CREDIT HOURS**  
 Principles and application of electron microscope in the study of biological materials. Emphasis will be placed on fixation, dehydration, embedding, and sectioning of animal and plant tissues. Two hours lecture and two three-hour labs per week.

**BIO 596. CURRENT BIOLOGICAL PROBLEMS** **THREE CREDIT HOURS**  
 The consideration of recent developments in biological thought and procedure. By permission of Chairman only.

**BIO 599. THESIS** **THREE-SIX CREDIT HOURS**

**BIO 699. PH.D. DISSERTATION** **ONE-SIX CREDIT HOURS**

**Business Administration (MBA)**

*William J. Hoben, Dean*

**MBA 501. MANAGERIAL ACCOUNTING** **THREE CREDIT HOURS**  
 Practical emphasis on the accountant's role in business measurement techniques, communication, prediction, and decision-making based upon the use of relevant accounting information.

**MBA 503. INFORMATION SYSTEMS** **THREE CREDIT HOURS**  
 Latest concepts, methods, and advanced developments in information systems emphasizing the implementation of office automation; the business survey, selection of methods, designing the system, and preparing the report; the problems of communication with technical staff specialists. Prerequisite: MBA 501.

**MBA 504. TAX FACTORS IN BUSINESS DECISIONS** **THREE CREDIT HOURS**  
 An organized review of the provisions of the Federal Income Tax Code and tax laws on business decisions, including selection of the legal form of the business entity, corporate reorganization, acquisitions, and mergers, employee compensation and benefits, alternative methods of capital gains and ordinary income, and interactions of income, estate and gift taxes. Prerequisite: MBA 501.

**MBA 510. BUSINESS INVESTIGATION AND ANALYSIS** **THREE CREDIT HOURS**  
 Business research methodology; problem definition and research design; application of statistical decision methods; introduction to mathematical analysis of business problems. Prerequisite: Bus 313.

**MBA 512. QUANTITATIVE METHODS FOR BUSINESS DECISIONS** **THREE CREDIT HOURS**  
 Application of mathematical and statistical methods to business decision-making in the fields of marketing, production, finance and related areas; basic nature and method of operations research; the use of such techniques as linear programming, queuing problems, Monte Carlo method and Bayesian statistics. Prerequisites: Bus 313 and mathematics through differential and integral calculus; differential equations desirable.



**MBA 520. FINANCIAL POLICIES OF ENTERPRISES** **THREE CREDIT HOURS**  
A study of finance with emphasis upon the financial policies and problems of business, especially within the corporation. Consideration is given to institutions and other investors in supplying funds for enterprise. Prerequisite: MBA 501.

**MBA 521. PROBLEMS OF FINANCE** **THREE CREDIT HOURS**  
The application of principles of finance to the financial management of corporate enterprise with special attention to the financing of expansion. Reading assignments, cases, individual reports and discussion of current financial problems. Prerequisite: MBA 520.

**MBA 530. MARKETING MANAGEMENT** **THREE CREDIT HOURS**  
Major areas of marketing are examined from the viewpoint of the marketing executive. Presents and develops concepts for analytical purposes, but is primarily oriented to decision-making.

**MBA 531. SEMINAR IN CONSUMER BEHAVIOR** **THREE CREDIT HOURS**  
Identification and analysis of the consumer market through use of concepts from the behavioral sciences emphasizing the family life cycle, social class and family life styles.

**MBA 532. PHYSICAL DISTRIBUTION MANAGEMENT** **THREE CREDIT HOURS**  
The logistics of business as a basis for marketing action. Integrates plant location, warehousing and transportation into modern marketing strategy.

**MBA 540. MANAGERIAL ECONOMICS** **THREE CREDIT HOURS**  
Examination of the scope and method of managerial methods; introductory cases in managerial economics; demand analysis, forecasting demand, cases in demand; short-run cost analysis; long-run costs and production functions, cases in cost analysis; pricing, selected topics in pricing, cases in pricing decisions; capital budgeting, risk and uncertainty, cases in capital budgeting and uncertainty. Prerequisites: Bus. 313 and MBA 510 (or MBA 512).

**MBA 541. LABOR RELATIONS AND LABOR ECONOMICS** **THREE CREDIT HOURS**  
A study of labor relations and labor economics; collective bargaining, wage determination, structure and operation of labor markets, direction of the labor movement, theories of industrial peace and conflict; current problems and trends in labor relations.

**MBA 550. GOVERNMENT AND BUSINESS** **THREE CREDIT HOURS**  
Analysis of the economic aspects and consequences of government regulations over social and business activities; a study of government and business relations.

**MBA 560. OPERATIONS MANAGEMENT** **THREE CREDIT HOURS**  
An analysis of the principles of organization and management; the theory of organization and the principles of planning, directing and controlling product development, plant layout and location, equipment, inventory and production standards.

**\*MBA 570. BUSINESS AND SOCIETY** **THREE CREDIT HOURS**  
Business is presented as a private and quasi-public institution between community and society with definite functions of its own as well as those which foster the dignity of man and the interests of the common good.

\*Required of all students.

**MBA 581. ADMINISTRATIVE MANAGEMENT PRACTICES** **THREE CREDIT HOURS**

An in-depth analysis of concepts, principles, and theories of the management process with emphasis upon application in administrative decisions and practice. The relating of administrative management practices to the systems concept and environmental factors. Prerequisite: A Principles of Management course.

**MBA 582. HUMAN RELATIONS IN INDUSTRY** **THREE CREDIT HOURS**

The application of psychology to the problems of human behavior and human relations; the problems of motivation, morale, conflict, discipline, leadership, emotions and decision-making are considered and analyzed in lectures, cases and discussions.

**MBA 583. ADVANCED MANAGEMENT SEMINAR** **THREE CREDIT HOURS**

An analysis in depth of several strategically important areas of management in which theory, research, and practice have progressed significantly in recent years; the applicability, potential and actual, of the newer concepts. Areas considered are: long range planning, management organization development, systems management, executive decision-making, organizational behavior, control techniques, and other selected topics.

**MBA 584. MULTI-NATIONAL BUSINESS POLICY** **THREE CREDIT HOURS**

Examines changes in the structure, organization, and policies of Multi-National business firms and international trade in general. Analyzes their implications relative to the composition of exports, international marketing processes, terms of trade, and determinants of payments and exchange-rate movements.

**\*MBA 590. BUSINESS POLICIES AND ADMINISTRATIVE MANAGEMENT****THREE CREDIT HOURS**

The correlation of theory and practice in the development of business policies. Emphasis will be on the problems of executive management, decision-making and administrative action.

\*Required of all students.

**MBA 595. INDIVIDUAL RESEARCH****ONE TO SIX CREDIT HOURS**

Individual research and study in subject areas encompassed by the MBA curriculum under the guidance and direction of faculty. No regular class schedule, but meetings arranged for presentation and discussion of individual research projects.

**Chemistry (CHM)****Dr. John J. Lucier, S.M., *Chairman*****CHM 540. INTRODUCTION TO QUANTUM MECHANICS** **THREE CREDIT HOURS**

An introduction to the concepts of quantum mechanics with applications to chemical systems.

**CHM 541. TOPICS IN PHYSICAL CHEMISTRY** **THREE CREDIT HOURS**

Modern aspects of Physical Chemistry. Subject matter may include the solid state, electrochemistry, or mathematical methods of Physical Chemistry.

**CHM 542. STATISTICAL THERMODYNAMICS** **THREE CREDIT HOURS**

A treatment of ensembles and their partition functions with applications to solid, liquid and vapor states. Bose-Einstein and Fermi-Dirac statistics will be developed.

**CHM 543. THERMODYNAMICS AND KINETICS** **THREE CREDIT HOURS**  
First, second, and third laws will be covered to develop free-energy functions for use in chemical equilibrium. Phenomenological and mathematical characterization of kinetic systems.

**CHM 544. COORDINATION CHEMISTRY** **THREE CREDIT HOURS**  
A course dealing in recent developments in the Chemistry of coordination compounds. Special emphasis will be placed on ligand field theory, substitution processes, and ligand stabilization of metal ions.

**CHM 545. INORGANIC REACTIONS AND STRUCTURE** **THREE CREDIT HOURS**  
A survey of modern inorganic chemistry including non-aqueous solvents, trends in the periodic table, acid base theory, and reaction mechanisms.

**CHM 546. SPECIAL TOPICS IN MODERN ANALYTICAL CHEMISTRY** **THREE CREDIT HOURS**  
Modern analytical methods. Subject matter may include NMR, EPR, electroanalytical methods, GLC, mass spectroscopy, neutron activation analysis, IR, visible and UV methods.

**CHM 547. BONDING IN INORGANIC COMPOUNDS** **THREE CREDIT HOURS**  
Topics will include atomic theory; bonding theories, especially molecular orbital theory; the ionic model; band theory of metals; and the structure of solids. Prerequisite: Quantum Chemistry.

**CHM 548. ADVANCED ORGANIC CHEMISTRY I** **THREE CREDIT HOURS**  
A course dealing with nucleophilic substitution, B elimination, and condensation reactions, free radicals, carbanions, acidities, and linear free energy relationships.

**CHM 549. ADVANCED ORGANIC CHEMISTRY II** **THREE CREDIT HOURS**  
Topics discussed include the Chemistry of multiple bond systems, resonance aromaticity, electrocyclic additions, carbenes, oxidation reduction, electrophilic substitution and addition reactions.

**CHM 550. SPECIAL TOPICS IN ORGANIC CHEMISTRY** **THREE CREDIT HOURS**  
Modern physical organic chemistry, spectroscopy, photochemistry, molecular rearrangements, stereochemistry and natural products.

**CHM 551. GENERAL BIOCHEMISTRY I** **THREE CREDIT HOURS**  
Subject matter will include the chemistry of proteins and carbohydrates, enzymes, bioenergetics, glycolysis and the tricarboxylic acid cycle. Prerequisites: Chm 314, or 316 and 302 or equivalent.

**CHM 552. GENERAL BIOCHEMISTRY II** **THREE CREDIT HOURS**  
Topics will include electron transport and oxidative phosphorylation, lipid metabolism, nitrogen metabolism, nucleic acid and protein synthesis, biochemical genetics, regulation, hormones and nutrition. Prerequisites: Chm 551.

**CHM 553. TOPICS IN BIOCHEMISTRY** **THREE CREDIT HOURS**  
Topics of current interest in biochemistry will be discussed. Prerequisite: Chm 551, 552 or permission of instructor.

**CHM 554. DIRECTED READINGS** **ONE TO THREE CREDIT HOURS**

**CHM 560-561. RESEARCH** **THREE CREDIT HOURS EACH TERM**

THE FOLLOWING COURSES ARE OFFERED BY THE DEPARTMENT OF CHEMISTRY IN COOPERATION WITH OTHER DEPARTMENTS AND SCHOOLS OF THE UNIVERSITY. THESE COURSE OFFERINGS ARE NOT APPLICABLE TO THE MASTER'S DEGREE IN CHEMISTRY.

**CHM 501. PRINCIPLES OF CHEMISTRY I** **THREE CREDIT HOURS**

The subjects treated in this course are: atomic structure, chemical bonding, chemical equilibrium, inorganic nomenclature, theory of solutions, acid-base concepts, periodic properties of the elements, radiochemistry and nuclear reactions. Prerequisite: One year of College Chemistry.

**CHM 502. PRINCIPLES OF CHEMISTRY II** **THREE CREDIT HOURS**

The subjects treated in this course are: thermodynamics, chemical kinetics, redox reactions, organic chemistry (nomenclature, functional groups, preparation and properties of organic compounds). Prerequisite: Chm 501.

**CHM 525-526. PRINCIPLES OF ORGANIC CHEMISTRY** **THREE CREDIT HOURS EACH TERM**

An introduction to the fundamentals of Organic Chemistry. Prerequisite: Chm 124.

**CHM 525L-526L. PRINCIPLES OF ORGANIC CHEMISTRY** **ONE CREDIT HOUR**

Laboratory course to accompany Chm 525-526. One three-hour lab per week.

**CHM 527-528. THEORETICAL PRINCIPLES OF CHEMISTRY**

**THREE CREDIT HOURS EACH TERM**

Prerequisite: Chm 215 or equivalent. Corequisite: Mth 218.

**CHM 527L-528L. THEORETICAL PRINCIPLES OF CHEMISTRY** **ONE CREDIT HOUR**

Laboratory course to accompany Chm 527-528. One three-hour lab per week.

**CHM 529. INORGANIC CHEMISTRY** **THREE CREDIT HOURS**

The nature of the chemical bond, periodicity, electron distribution in atoms, coordination compounds, the nucleus and its reactions. Prerequisite: Chm 303-304.

**CHM 530. PHYSICAL CHEMISTRY** **THREE CREDIT HOURS**

A concise treatment of Theoretical Chemistry. Prerequisite: Chm 124.

**CHM 531. IDENTIFICATION OF ORGANIC COMPOUNDS** **ONE CREDIT HOUR**

An analytical course, applying functional groups, physical properties and instrumental methods to the identification of organic compounds. Prerequisite: Chm 315-316.

**CHM 531L. IDENTIFICATION OF ORGANIC COMPOUNDS** **TWO CREDIT HOURS**

Laboratory course to accompany Chm 531. Two three-hour labs per week.

**CHM 532. SPECIAL TOPICS IN THEORETICAL CHEMISTRY** **THREE CREDIT HOURS**

A treatment of special topics surveyed in Chm 527-528. Prerequisite: Chm 304.

**CHM 533. INTERMEDIATE ORGANIC CHEMISTRY** **THREE CREDIT HOURS**

Modern theory of Organic Chemistry and reaction mechanisms. Prerequisite: Chm 215 or equivalent.

**Communication Arts (COM)**

George C. Biersack, *Chairman*

**COM 501. INTRODUCTION TO GRADUATE STUDY IN COMMUNICATION**

**THREE CREDIT HOURS**

A survey of professional literature in the field of communication; an introduction to scholarly writing of graduate papers. Individual and group projects. Each student will be required to demonstrate oral proficiency of a research project to a reviewing panel of staff members.

**COM 506. ETHICS OF COMMUNICATION**

**THREE CREDIT HOURS**

An investigation into the general ethical principles of persuasion and into the special ethics of platform communication, business communications, conference responsibilities, broadcast-journalism reporting, classroom communication, theatric message and forensic behavior. Students will be given an opportunity to investigate in depth one or more of the specific areas of ethical communication.

**COM 511. PERSUASION TECHNIQUES**

**THREE CREDIT HOURS**

A review of the development of the Classical Tradition of Persuasion from 600 B.C. to the present. The principles of Classical Rhetoric based upon the theories of Aristotle, Cicero, and Quintilian are examined in order to determine their effect upon modern theories and techniques in oral communication. A comprehensive analysis of the modern approach to persuasion will be supplemented by research projects in the area of business and industry.

**COM 516. BARRIERS TO EFFECTIVE COMMUNICATION**

**THREE CREDIT HOURS**

Examination of those circumstances that prevent effective communication in all areas of personal and group relationships. Consideration will be given to misunderstanding arising from the problems of language, semantics, and the lack of factual knowledge. These elements and their misuse will be studied in such situations as private conversations, business, industrial management, interdepartmental communications, and politics.

**COM 521. THE INVESTIGATION OF LISTENING PROBLEMS**

**THREE CREDIT HOURS**

Studies dealing with the importance and complexities of listening. A comprehensive study of the place of listening in our society and its direct relationship to the various forms of communication. Investigation will be made into an analysis of the many related skills involved in effective listening and to the reasons for poor listening habits. Research will be pursued to demonstrate how listening can be improved along with specific procedures for refining the skills necessary for good reception.

**COM 526. STUDIES IN COMMUNICATION SKILLS**

**THREE CREDIT HOURS**

This course, for senior majors in Communication Arts and Graduate students, is designed to develop and implement the basic skills in oral communication. It stresses comprehensive study of the nature and types of speech situations in the business and professional areas such as the interview, group discussions, the technique of mediation, goodwill and the after-dinner situations. Particular stress will be placed upon the composition and development of lecture length speeches.

**COM 531. PROBLEMS SEMINAR****THREE CREDIT HOURS**

This seminar is designed to offer the student an opportunity to gain practical experience that will supplement his theoretical background. Arrangements will be made for an internship position in a particular business or industry or a specialized area in Communication Arts such as Dramatics, Public Address, Forensics, Radio, and/or Television. The student will submit progress reports as assigned in the seminar sessions. The director of the seminar will collaborate with the director of the internship program within the specialized area.

**COM 536. COMMUNICATION DESIGNS****THREE CREDIT HOURS**

Investigation of contemporary communication design methods in organizational structures, with emphasis on scholastic and experimental approaches. Individual and group projects.

**COM 541. STAGE DESIGN****THREE CREDIT HOURS**

A study of modern theories of scene design; style, balance composition and unity of the stage setting coordinated with lighting theories and techniques.

**COM 546. DEVELOPMENT OF DRAMATIC FORM AND CRITICISM****THREE CREDIT HOURS**

An analytic study of plays and criticism from the major periods of Western drama for the purpose of distinguishing the kinds of drama and the critical standards and evolution of drama in performance.

**COM 551. PROBLEMS IN DRAMATIC PRESENTATION****THREE CREDIT HOURS**

A study of the interpretative problems concerned in the script and the psychological and technical means of projecting dramatic values to the audience.

**COM 556. THEATRE SEMINAR****THREE CREDIT HOURS**

Application of principles of theatre to be selected in the student's field of interest and applied to specific projects.

**COM 561. RHETORICAL CRITICISM****THREE CREDIT HOURS**

Comprehensive study of Classical and Contemporary Rhetorical theory and criticism; study of the contributions of the classicists and modern scholars of Rhetoric.

**COM 566. ADVANCED ARGUMENTATION AND DEBATE****THREE CREDIT HOURS**

Advanced principles of argumentation and debate, including analysis, evidence, and proof. Consideration of the Brief and its construction.

**COM 571. HISTORY OF PUBLIC ADDRESS****THREE CREDIT HOURS**

This course will be basically a survey of great orators and speakers from the period of the Golden Age of Greece through the Roman, Patristic, Medieval, Reformation, and Contemporary Periods in French and British Public Address. It will culminate in a study of American Public Address from early colonial times until the present. An analysis of a highly selective list of great orations and speeches will reinforce the historical and biographical materials.

**COM 598. THESIS****THREE CREDIT HOURS****COM 599. THESIS****THREE CREDIT HOURS**

Proposal submitted by the Candidate for the M.A. Degree must be approved by the director and his graduate committee.

**EQUIVALENT OF THESIS REQUIREMENT****SIX CREDIT HOURS**

The student may select from the following courses his option program: Stage Design (3), Development of Dramatic Form and Criticism (3), Problems in Dramatic Presentation (3), Theatre Seminar (3), Rhetorical Criticism (3), Advanced Argumentation and Debate (3), History of Public Address (3).

**Economics (ECO)****Dr. George E. Matlin, *Chairman***

Prerequisite for enrolling in any of the following courses for credits toward the M.S. in Education degree is Eco 201-202 Principles of Economics or the equivalent.

**Eco 501. ADVANCED PRINCIPLES OF ECONOMICS** **THREE CREDIT HOURS**

A review and analysis of the fundamental principles underlying the economic system.

**Eco 503. HISTORY OF ECONOMIC DOCTRINE** **THREE CREDIT HOURS**

Development of economic concepts and theories from the Mercantilists to the present period.

**Eco 505. CONSUMER ECONOMICS** **THREE CREDIT HOURS**

A study of the economic forces which influence the consumer in his choice and use of goods and services; and of the public and private agencies which afford protection, information, and assistance to the consumer.

**Eco 507. CURRENT ECONOMIC PROBLEMS** **THREE CREDIT HOURS**

An analysis and discussion at an advanced level of current economic issues and problems.

**Eco 520. ECONOMICS OF GOVERNMENT** **THREE CREDIT HOURS**

A survey of government and business relationships in the American economy and the impact of government on private enterprise.

**Eco 525. GRADUATE SEMINAR IN ECONOMICS** **THREE CREDIT HOURS**

Special studies and discussions of economic problems and trends.

**Education****Dr. Joseph J. Panzer, S.M., *Dean***

**EdE 500. MATHEMATICS IN THE ELEMENTARY SCHOOL** **THREE CREDIT HOURS**

A graduate course (or workshop) designed for teachers and school supervisors of the Modern Arithmetic Program. Demonstration of how the logical patterns of mathematical thought which are inherent in arithmetic can be readily acquired by pupils.

**EdF 501. ADVANCED PSYCHOLOGY OF LEARNING** **THREE CREDIT HOURS**

A conscious effort to relate learning theories and current issues in the psychology of learning to major aspects of growth and development.

**EdF 502. COMPARATIVE PHILOSOPHIES OF EDUCATION** **THREE CREDIT HOURS**

The historical development of educational philosophies; evaluation of major current philosophies; significant problems of the present day in educational philosophy. Prerequisite: EdF 419 Philosophy of Education, or equivalent where the student has already achieved a norm for evaluating the theories of modern education.

**EdF 503. RESEARCH METHODOLOGY AND STATISTICS** **THREE CREDIT HOURS**

Designed to develop an understanding of the nature of research: methods, research techniques, sources, evaluation of research studies, basic statistics. Prepares the student for writing the Research Project using the historical, descriptive, experimental, or philosophical approach.

**EdF 504. ADVANCED CHILD AND ADOLESCENT PSYCHOLOGY** **THREE CREDIT HOURS**  
Deals with the principal areas of growth and development through adolescence with special emphasis on mental development.

**EDA 506. SCHOOL ADMINISTRATION** **THREE CREDIT HOURS**  
General principles governing the administrative functions of planning, organizing, and controlling are presented and applications are made in the administration of both elementary schools and secondary schools.

**EDA 507. INTERNSHIP EXPERIENCES IN SCHOOL ADMINISTRATION** **THREE CREDIT HOURS**  
The internship is intended to give school administration majors opportunities to associate with people in various administrative positions in both public and parochial school systems for the purpose of becoming aware of on-the-job problems, duties, responsibilities, and challenges. Students are urged to have a variety of experiences and must submit written evaluations for each experience. Prerequisite: The advisor's approval of a planned series of internship experiences in various areas of educational administration. The student will develop his planned series of experiences with the assistance of an advisor.

**EDA 509. SCHOOL SUPERVISION** **THREE CREDIT HOURS**  
A course in planning, organizing, and administering instructional supervision in public and private (parochial) school systems. Field observation required.

**EDA 510W. CURRICULUM OF THE CATHOLIC ELEMENTARY SCHOOL** **TWO CREDIT HOURS**  
A curriculum development workshop designed for implementation in the Catholic elementary schools. It includes consideration of the necessity of a complete system of Catholic education and the principles which dictate this necessity.

**EDA 511. ELEMENTARY SCHOOL CURRICULUM** **TWO CREDIT HOURS**  
A fundamental course in curriculum development designed to prepare the student for effective participation in cooperative efforts to improve the curriculum. Attention is directed to curriculum issues and to desirable instructional practices in the major areas of curriculum.

**EDA 512. SECONDARY SCHOOL CURRICULUM** **TWO CREDIT HOURS**  
A fundamental course in curriculum development designed to prepare the student for effective participation in cooperative efforts to improve the curriculum. Attention is directed to curriculum issues and to desirable instructional practices in the major curriculum areas.

**EDA 513. ELEMENTARY SCHOOL EVALUATION** **TWO CREDIT HOURS**  
Centers attention on systematic, total school self-evaluation as the basis for school improvement programs.

**EDA 514. SECONDARY SCHOOL EVALUATION** **TWO CREDIT HOURS**  
Centers attention on systematic, total school self-evaluation as the basis for school improvement programs.

**EDA 515. SCHOOL LAW** **TWO CREDIT HOURS**  
Problems in school administration which may give rise to court action.



- EDA 516. SCHOOL PLANT** **TWO CREDIT HOURS**  
 The course will cover types of school facilities, considerations in working with architects, remodeling and new construction, site selection, government financing, space utilization, and other aspects dealing with the overall educational plant.
- EDA 517. SCHOOL FINANCE** **TWO CREDIT HOURS**  
 A course for school administrators covering principles of school finance, technical problems of budgeting, source of income, purchasing, accounting, and debt service.
- EDF 518. SCHOOL AND THE SOCIAL ORDER** **THREE CREDIT HOURS**  
 The relationship of the school to the total cultural pattern and the development of interaction between school and community are appraised and concrete suggestions are presented. The nature of the individual child and his relations with society and culture; the special culture of the school and its accompanying social world; school, teacher, and community relations.
- EDA 521. SCHOOL PUBLIC RELATIONS** **TWO CREDIT HOURS**  
 Covers philosophy and techniques of school-community relations for educational leaders. Attention given to parent contacts, citizens' participation, press, radio, television, printed material and other media.
- EDC 522. PRINCIPLES AND TECHNIQUES OF GUIDANCE** **THREE CREDIT HOURS**  
 An introduction to the scope, aims, and techniques of guidance; an introductory treatment of the basic guidance services and how the counselor and the teacher can make efficient use of them.
- EDC 524. EDUCATIONAL AND OCCUPATIONAL INFORMATION** **TWO CREDIT HOURS**  
 Selection, utilization, and evaluation of educational and occupational information materials; familiarization with standard labor market data, current requirements for admission into college curricula, and available sources of placement; a usable knowledge of printed and personal reference sources in these fields.
- EDC 525. USE OF COMMUNITY RESOURCES IN GUIDANCE** **TWO CREDIT HOURS**  
 Familiarization with availability of services in appraisal, guidance; local information and placement (methods of procedure and cooperation with medical, pastoral, social welfare, mental, educational, industrial, labor, commercial, governmental and recreational agencies).
- EdS 527W. BUSINESS SYSTEMS AND DATA PROCESSING** **THREE CREDIT HOURS**  
 A graduate workshop in business automation, related procedures, and equipment; designed to develop a program of approach the secondary schools can use in educating students in office automation and business data processing. Explanation of the Business Office Education Program of the Department of Education, State of Ohio, is included. This workshop fulfills a requirement for BOE certification. Prerequisite: High School Certification in Business Education.
- EDC 530. PSYCHOLOGY OF INDIVIDUAL DIFFERENCES** **TWO CREDIT HOURS**  
 Nature, extent, and significance of variability; heredity and cultural influences; theories of intelligence; trait organization; group differences.
- EDC 531. DYNAMICS OF PERSONALITY** **THREE CREDIT HOURS**  
 Required of all graduate students who are enrolled in the School Counseling, School Psychology, and Pupil Personnel programs. Personality theory and abnormal psychology are discussed with emphasis on dynamics of personal behavior.

**EDC 532. LEARNING DISABILITIES** **THREE CREDIT HOURS**  
 Etiological, diagnostic, theoretical, remedial factors and practical application to learning disabilities are described.

**EDC 533. PSYCHOMETRICS** **TWO CREDIT HOURS**  
 Lectures and demonstrations in the principles and application of psychological measurement, with particular emphasis on standardized group tests of intelligence and scholastic achievement, interest tests, personality tests, and other areas pertinent to the graduate function. Practicum in test selection, use, and interpretation.

**EDC 535. PRACTICUM I: TEST INTERPRETATIONS AND CASE STUDIES** **TWO CREDIT HOURS**  
 Supervised experiences in typical school guidance policies and practices. Such experience will include: vocational guidance, educational guidance and curriculum structures, cumulative folder, test and profile interpretations. Prerequisites: EdC 522, 533. (533 may be taken concurrently).

**EDC 539. ADMINISTRATION OF A SCHOOL GUIDANCE PROGRAM** **TWO CREDIT HOURS**  
 Planning, developing and administering school testing and guidance services and group guidance in the homeroom. This course covers also such matters as in-service training of guidance personnel, facilities, supplies, assembling and disseminating educational and occupational information, and liaison with both teachers and school administrators.

**EDC 543. PRINCIPLES AND TECHNIQUES OF COUNSELING** **THREE CREDIT HOURS**  
 Basic theories, principles and techniques of counseling. A consideration of directive, non-directive and eclectic techniques as a function of the intelligence and grade-level of the child; ethical considerations.

**EDC 545. PRACTICUM II: COUNSELING TECHNIQUES** **THREE CREDIT HOURS**  
 Supervised experience in counseling, using role-playing and actual counseling cases. Both group and individualized instruction and supervision. Prerequisites: EdC 524, 533, 543.

**EDF 550. HISTORY OF HIGHER EDUCATION IN THE UNITED STATES** **THREE CREDIT HOURS**  
 A study of the growth and development of American colleges and universities: multiplication and variety; methods of instruction; aims; administration; innovations and conflicts; values of students, faculty and administrators; public opinion.

**EDC 551. PERSONNEL SERVICES IN HIGHER EDUCATION** **TWO CREDIT HOURS**  
 A study of personnel services in higher education: development and principles, theory and practice of administration, trends and research.

**EDC 552. SEMINAR: COLLEGE PERSONNEL SERVICE PROBLEMS** **THREE CREDIT HOURS**  
 This course and the internship in College Personnel Service are integrated over three trimesters. Problems encountered during the internship and present-day problems of campus life are treated.

**EDC 533. INTERNSHIP IN COLLEGE PERSONNEL SERVICES** **THREE CREDIT HOURS**  
 A three-trimester experience in three college personnel services under the instruction and supervision of staff members of the same services working closely with the coordinator of College Personnel Work.

**EDE 559. RESEARCH AND MATERIALS IN MATHEMATICS INSTRUCTION** **THREE CREDIT HOURS**  
 A study of research and trends in contemporary mathematics. Particular attention to new materials and to action research.

**EDE 560. SOCIAL STUDIES THROUGH UNIT TEACHING** **THREE CREDIT HOURS**  
 Designed to help organize the teaching of social science in units. Emphasis on local relevance, concept formation, group dynamics, and individualizing of learning. Actual application in the classroom.

**EDE 561. ANALYSIS OF INSTRUCTION** **THREE CREDIT HOURS**  
 To enable the teacher to increase his awareness of the effect that his teaching behavior has upon pupils; to increase his proficiency in distinguishing between his expectations and the resulting pupil behavior; to become expert in recognizing and overcoming the natural defensive reaction when outcomes in pupil behavior differ from teacher expectations.

**EDE 562. NEW MEDIA AND METHODS IN ELEMENTARY EDUCATION** **THREE CREDIT HOURS**  
 A study of new problems, trends, innovations in the elementary school. Actual use and evaluation in the classroom.

**EDE 563. SUPERVISION OF STUDENT TEACHING** **THREE CREDIT HOURS**  
 Demonstration of procedures and use of instruments to determine the student teacher's readiness and to guide his progress. Prerequisites: EdE 561, 562.

**EDE 564. ADVANCED SCIENCE IN ELEMENTARY SCHOOL** **THREE CREDIT HOURS**  
 This course or workshop is designed to train elementary school teachers to integrate science with all phases of the curriculum—by research projects in the basic areas of astronomy, biology, chemistry, geology, physics, and air-age education. Teachers also have the opportunity to study and evaluate the visual aids now available in the field of science. Prerequisite: EdE 460 Science in the Elementary School or another college course in physical science.

**EDE 565W. PRACTICUM IN SCIENCE INSTRUCTION** **THREE CREDIT HOURS**  
 A two week workshop at the Glen Helen Outdoor Education Center in Yellow Springs, Ohio. Application of inquiry and discovery approach to the study of biotic communities, geologic formations, and balance of nature. (There is an additional fee for board and room.)

**EDE 566. INNOVATIONS AND TRENDS IN LANGUAGE ARTS** **FOUR CREDIT HOURS**  
 A survey of research and trends in Language Arts instruction, particularly in areas of grammar, spelling, and writing.

**EDE 567. SURVEY OF RESEARCH IN READING INSTRUCTION** **THREE CREDIT HOURS**  
 A basic course for experienced teachers concerned with the psychology of learning Reading and with current problems and trends. The first course in a program designed to prepare specialists in Reading.

**EDE 568. DIAGNOSIS AND CORRECTION OF READING DIFFICULTIES** **FOUR CREDIT HOURS**  
 A study of common causes for Reading disabilities and of types of observation and measurements to be used in identifying disabilities. Practicum in use of machines and materials with individuals and groups.

**EDE 570. SUPERVISION AND CURRICULUM IN READING** **THREE CREDIT HOURS**  
 A study of selected curricula and the processes of planning a sound curriculum in Reading at different levels. It outlines the role of the Reading supervisor, providing guidelines for effective implementation of Reading programs. Prerequisite: EdE 568.

**EdA 571W. EVALUATION OF CATHOLIC ELEMENTARY SCHOOLS TWO CREDIT HOURS**

This workshop is designed to enable Catholic school administrators to engage in depth studies relative to the evaluative criteria. The participants will engage likewise in discovering ways and means of implementing the criteria in their own schools or school systems.

**EdC 572. THE SCHOOL PSYCHOLOGIST: ROLE AND FUNCTION TWO CREDIT HOURS**

Selected topics of current significance in the profession of school psychology, with special emphasis on ethics, interpersonal relationships in the school and community, research methodology and current practices in the field.

**EdC 576. CHILD AND ADOLESCENT PERSONALITY EVALUATION I FOUR CREDIT HOURS**

History and objectives of intelligence testing. Methods utilized in the construction of intelligence tests. Intensive experience in administering the Wechsler, Binet, and Illinois Test of Psycholinguistic Abilities.

**EdC 577. CHILD AND ADOLESCENT PERSONALITY EVALUATION II FOUR CREDIT HOURS**

History and rationale of projective tests. Instruction in the administration and use of the Rorschach, Bender Gestalt, TAT, and such other projectives commonly used by the school psychologist. Laboratory experience is provided.

**EdC 580. GUIDANCE IN THE ELEMENTARY SCHOOL THREE CREDIT HOURS**

A study of the most important concepts and techniques of guidance, with emphasis on the functions and responsibilities of the elementary teacher and counselor.

**EdC 581. COUNSELING IN THE ELEMENTARY SCHOOL THREE CREDIT HOURS**

An introduction to the principles and techniques of counseling elementary school children.

**EdC 583. GROUP PROCESS THREE CREDIT HOURS**

This course has two purposes: (1) to enable the counselor to work effectively with groups; and (2) to achieve the formation of deeper counselor self-understanding by actually participating in the group process. (One quarter of class time is devoted to lectures and three quarters to participation.)

**EdC 584. CHILD STUDY PROJECT I THREE CREDIT HOURS**

The primary aim of this program in the first year is to encourage participants to sharpen their awareness of factors that shape the child's motivations and affect his behavior and learning in the classroom.

**EdC 585W. CHILD STUDY LEADERSHIP I TWO CREDIT HOURS**

This workshop is designed to train school personnel for leadership roles in the Child Study Project. It provides training to persons who plan to be group leaders in the Child and Youth Study Project. Besides exploring the processes inherent in the Child Study Project, participants work on skills that will enable them to be more effective group discussion leaders.

**EdC 586. CHILD STUDY PROJECT II THREE CREDIT HOURS**

The second year of the Child and Youth Study Project is designed to continue and extend the understanding of the children and youth with whom we work. During the first year, the approach toward better understanding of children and youth was made through a study of the youth from an external frame of reference. The second year seeks to deepen understanding and increase sensitivity through a study of the subject from an internal frame of reference.

- EdC 587W. CHILD STUDY LEADERSHIP II** **TWO CREDIT HOURS**  
 An advanced Child Study workshop that focuses on (1) group leadership skills, and (2) the processes inherent in child study Project II. Those school personnel who complete this workshop should be able to lead productive second year Child Study Project Groups. Prerequisite: EdC 584 or EdC 585W.
- EdS 588. SEMINAR AND PRACTICUM IN PERSONAL KNOWLEDGE** **THREE CREDIT HOURS**  
 This experience focuses upon the understanding and development of subjectivities through personal encounter and reading. Students are encouraged to explore personal meanings which are not discursive, not nomothetic, and not repeatable. Required of all students pursuing the master high school teacher concentration in the humanities.
- EdS 589. SEMINAR AND PRACTICUM IN THE STUDY OF LEARNING ENVIRONMENTS** **THREE CREDIT HOURS**  
 Study and participation in writing behavioral objectives, in becoming aware of verbal and non-verbal behavior, in micro-teaching, and in becoming aware of the impact of teacher expectations. Required of all students pursuing the master high school teacher concentration in the humanities.
- EdF 590. EDUCATIONAL RESEARCH DESIGN** **THREE CREDIT HOURS**  
 This course has two major emphases: Part I is devoted to basic processes of scientific inquiry into educational problems; Part II is devoted to selected techniques which stress in greater detail specific methodological problems.
- EdF 591. RESEARCH PROJECT** **THREE CREDIT HOURS**  
 Prerequisite for registration: Completion of EdF 503 Research Methodology, and approval of Preliminary Plan.
- EdF 592. GRADUATE SEMINAR** **(NON-CREDIT)**  
 Required of all degree-seeking students in the last term of their enrollment. Designed as a culminating experience, with emphasis on integration of the total graduate program.
- EdF 593. INTERPRETATION OF STATISTICS** **THREE CREDIT HOURS**  
 The emphasis of this course is placed upon descriptive and inferential statistics. Descriptive statistics are used to describe observations of groups of individuals. Inferential statistics are used to make inferences about the total parameters in terms of observed samples and to draw valid inferences and interpretations.
- EdC 594-595. INTERNSHIP FOR SCHOOL PSYCHOLOGISTS** **TWELVE CREDIT HOURS**  
 A job-related program for nine months under the immediate supervision of a trained school psychologist. The internist will be given a stipend, made available from the State of Ohio Foundation funds.
- EdF 596-697. INTERNSHIP IN EDUCATION RESEARCH** **TWELVE CREDIT HOURS**  
 Investigation of the literature of education research; experiences in developing research design; applications of data processing; conduct of major research activity. The South-western Ohio Educational Research Council and area schools are used as a locus of operations.
- EdS 598. INTERNSHIP IN TEACHING** **EIGHT CREDIT HOURS**  
 A full semester of directed teaching experiences under the supervision of a faculty advisor and of selected master teachers in local area schools. Weekly seminars on campus.

**EdC 599. INTERNSHIP EXPERIENCES IN GUIDANCE AND COUNSELING****THREE CREDIT HOURS**

These Internship Experiences are designed to provide students with the opportunity to work on professional problems in guidance and counseling under the direction of the staff of the School of Education. Prerequisite: Permission, Chairman of Department of Counselor Education.

**Chemical Engineering (CME)****Dr. Michael A. Bobal, *Chairman*****CME 507. ADVANCED THERMODYNAMICS****THREE CREDIT HOURS**

Applications of the laws of thermodynamics—Phase equilibria in ideal and nonideal systems—Chemical Equilibrium.

**CME 508. ADVANCED TOPICS IN CHEMICAL ENGINEERING****THREE CREDIT HOURS**

Study and discussion of current problems in Chemical Engineering Research. Prerequisites: Cme 521, Cme 581, Cme 582.

**CME 521. ADVANCED TRANSPORT PHENOMENA****THREE CREDIT HOURS**

Applications of the principles of momentum and heat transfer to steady state and transient problems. Potential flow, boundary layer theory. Prerequisite: Cme 581.

**CME 522. SEPARATION PROCESSES****THREE CREDIT HOURS**

A study of mass transfer in Binary and Multicomponent systems. Absorption. Distillation. Extraction.

**CME 541. PROCESS DYNAMICS****THREE CREDIT HOURS**

Application of dynamic analysis techniques to the study of non-steady state chemical processes.

**CME 542. CHEMICAL ENGINEERING KINETICS****THREE CREDIT HOURS**

Theory of absolute reaction rates, mass and heat transfer in catalytic beds.

**CME 581. ADVANCED CHEMICAL ENGINEERING CALCULATIONS I****THREE CREDIT HOURS**

Applications of ordinary and partial differential equations to engineering problems. Classical methods of solution.

**CME 582. ADVANCED CHEMICAL ENGINEERING CALCULATIONS II****THREE CREDIT HOURS**

Analysis and design of processes and the solution of the resulting differential equations by computer techniques.

**CME 598. SPECIAL PROBLEMS IN CHEMICAL ENGINEERING****TWO TO SIX CREDIT HOURS**

Particular assignments to be arranged and approved by the Chairman of the department.

**CME 599. GRADUATE ENGINEERING THESIS****THREE TO SIX CREDIT HOURS**

Students engaged in thesis research must enroll for this course for a total of six credit hours.

**Civil Engineering (CIE)****Seymour J. Ryckman, *Chairman*****\*CIE 500. ADVANCED STRUCTURAL ANALYSIS****THREE CREDIT HOURS**

Methods of moment-areas, matrix analysis, moment distribution and virtual work. Includes consideration of such problems as frames of variable cross section, plates and shells, space frames and plastic design. Prerequisite: Cie 407, Egm 304.

\*open for enrollment of undergraduate student.

- \*CIE 502. PRESTRESSED CONCRETE** **THREE CREDIT HOURS**  
Discussion of the properties of concrete and prestressing steel. Theory and design of prestressed concrete beams, slabs, circular tanks and rigid frames. Prerequisite: Cie 407.
- \*CIE 520. ADVANCED SOIL MECHANICS** **THREE CREDIT HOURS**  
Treatment of the theories of conventional soil mechanics. Detailed study and analysis of the static and dynamic properties of soils, with applications to foundation behavior. Prerequisite: Cie 312.
- \*CIE 524. FOUNDATION DESIGN** **THREE CREDIT HOURS**  
Analysis of earth pressure, stability of natural slopes and bearing capacity of soil; design of spread foundations, pile foundations, beams on elastic foundations, anchored bulkheads, caissons, and cofferdams. Prerequisite: Cie 312.
- \*CIE 540. HIGHWAY GEOMETRIC DESIGN** **THREE CREDIT HOURS**  
Design controls and criteria, vehicle capacity, sight distance, intersection and interchange design. Prerequisite: Cie 405.
- \*CIE 544. TRAFFIC ENGINEERING** **THREE CREDIT HOURS**  
Characteristics of traffic, including the road user, the vehicle, origin, and destination surveys; traffic regulation, control devices and aids, design, administration and planning. Prerequisite: Cie 405.
- CIE 558. TRAFFIC ENGINEERING RESEARCH** **THREE CREDIT HOURS**  
Problems in control or capacity restraints based on studies of local situations.
- \*CIE 560. ADVANCED SANITARY ENGINEERING** **THREE CREDIT HOURS**  
Stream pollution control and design of water and waste treatment plants and sewers. Prerequisites: Cie 433, Cie 434.
- \*CIE 562. INDUSTRIAL WASTE TREATMENT** **THREE CREDIT HOURS**  
Nature and quality of specific industrial wastes and water supplies, treatment and disposal of industrial wastes. Prerequisites: Cie 433, Cie 434.
- \*CIE 580. HYDROLOGY AND SEEPAGE** **THREE CREDIT HOURS**  
The deposition, movement and infiltration of water as related to the hydrologic cycle and groundwater hydraulics; a study of the theory of flow in porous media with application to dams, excavations, and other foundation problems. Prerequisites: Cie 307, Cie 312.
- \*CIE 582. ADVANCED HYDRAULICS** **THREE CREDIT HOURS**  
Problems and study involving open channel flow, draw down curves, hydraulics of dams, spillway, models, and water distribution systems. Prerequisite: Cie 307.
- CIE 598. SPECIAL PROBLEMS IN CIVIL ENGINEERING** **TWO TO SIX CREDIT HOURS**  
Subject material in Civil Engineering and assignments to be arranged and approved by the Department Chairman and the Director of Engineering Graduate Programs.
- CIE 599. THESIS** **THREE TO SIX CREDIT HOURS**  
Thesis topic to be arranged by student with approval of Thesis Advisor. Student must enroll for this course with total credit of 6 credit hours.

**\*Open for enrollment of undergraduate students.**

**Electrical Engineering (ELE)**Dr. Bernhard M. Schmidt, *Chairman***ELE 502. NETWORK SYNTHESIS****THREE CREDIT HOURS**

Synthesis of linear passive networks using classical pole-zero techniques; conditions for physical realizability; approximating network functions and design to meet specific requirements; analysis and synthesis of linear active networks. Prerequisites: Ele 332, Ele 413. (Open for enrollment of undergraduate students.)

**ELE 505. QUANTUM ELECTRONICS: PRINCIPLES****THREE CREDIT HOURS**

Principles of quantum theory; classical and quantum statistics; many-particle systems; electromagnetic interactions with materials. Prerequisite: Ele 440 or equivalent. (Open for enrollment of undergraduate students.)

**ELE 506. SOLID STATE DEVICES****THREE CREDIT HOURS**

Introduction to the theory of solid state electron devices. Bulk devices, junction devices, devices involving electric, magnetic, optical, and acoustical interactions. (Open for enrollment of undergraduate students.)

**ELE 507. ELECTROMAGNETIC FIELDS I****THREE CREDIT HOURS**

Fundamental concepts; introduction to waves; theorems of electromagnetics; plane wave function; cylindrical wave functions. Prerequisite: Ele 334.

**ELE 508. ELECTROMAGNETIC FIELDS II****THREE CREDIT HOURS**

Spherical wave functions; perturbational and variational techniques; microwave networks. Prerequisite: Ele 507.

**ELE 509. ANALYSIS OF LINEAR SYSTEMS****THREE CREDIT HOURS**

Modern methods of analysis of transient phenomena in electrical, mechanical, and thermal linear systems involving lumped and distributed parameters. (Consent of instructor.)

**ELE 513. COMMUNICATION THEORY****THREE CREDIT HOURS**

The application of Fourier series and integrals to the analysis of communication problems; theory of random signals, autocorrelation, power density spectra, and optimum filters. Prerequisite: Ele 413.

**ELE 514. ANALYSIS OF NON-LINEAR SYSTEMS****THREE CREDIT HOURS**

An advanced study of methods of analysis of non-linear systems with applications in the fields of electric circuit theory and control systems. Prerequisite: Ele 509.

**ELE 515. AUTOMATIC CONTROL THEORY****THREE CREDIT HOURS**

Representation and analysis of feedback control systems; Nyquist plots; Bode diagrams; the root-locus method and signal-flow diagrams; introductory treatment of sampled data systems. (Consent of instructor.)

**ELE 517. RANDOM PROCESSES IN SYSTEM THEORY I****THREE CREDIT HOURS**

A coherent, semiformal introduction to the theory of probability and random processes as applied to system theory. Topics to be treated are the axioms of probability; the concept of random variable, distributions, density; function of random variables; stochastic processes; stationary processes; linear mean square estimation; Markov processes. Prerequisite: Ele 331 or consent of instructor.



**ELE 518. ESTIMATION THEORY AND ITS APPLICATIONS** **THREE CREDIT HOURS**  
 A unified approach to the theory of estimation as applied to engineering problems of communication and control. Review of probability and linear dynamical systems, analysis of discrete and continuous linear stochastic systems; frequency and time domain solution of the linear estimation problem; applications to current engineering problems of communication and control. Prerequisite: Ele 517.

**ELE 521. CONDUCTORS AND DIELECTRICS** **THREE CREDIT HOURS**  
 Ionic and metallic conduction; thermoelectric phenomena; conductors for various engineering application; physics of "non-conductors"; ferro-electricity; electrets; piezoelectricity; optical properties; specialty materials. Prerequisite: Ele 525 or consent of instructor. Corequisite: Ele 505.

**ELE 522. MAGNETIC MEASUREMENTS** **THREE CREDIT HOURS**  
 Magnetic material properties; quantities and units. Field generation; measurement of field strength, static magnetization and induction; permeability, induction and iron losses, etc. at power frequencies; resonance phenomena; special measurements; magnetostriction, magnetocaloric and magneto-optic effects. Prerequisite: Ele 525 or consent of instructor.

**ELE 523. PERMANENT MAGNETS** **THREE CREDIT HOURS**  
 Definition and basic types; engineering uses of permanent magnets; physics of permanent magnets' fine particle theory. Measurement of permanent properties; design with permanent magnets; present research activities. This course is designed to prepare students for research work on permanent magnets. Corequisite: Ele 525 or consent of instructor.

**ELE 524. MAGNETIC MATERIALS AND SUPERCONDUCTORS I** **THREE CREDIT HOURS**  
 Description of bulk magnetic properties. The magnetic circuit. Atomic magnetism. Types of magnetic order and spin structures. Intrinsic magnetization. Molecular field theory. Magnetic domains. Relations between technical magnetization and domain structure. Prerequisite: Ele 334 or consent of instructor.

**ELE 525. MAGNETIC MATERIALS AND SUPERCONDUCTORS II** **THREE CREDIT HOURS**  
 Magnetic anisotropies. Magnetostriction and stress effects. Eddy currents. Magnetic losses. Magnetic resonance phenomena. Thin films, fine particles. Engineering applications of magnetic materials. Superconductivity; phenomenology, basic theoretical concepts, materials. Applications of superconductors: magnets, magneto-mechanical devices, amplifiers and switching elements, storage devices, bolometers, heat flow valves. Prerequisite: Ele 524.

**ELE 527. RANDOM PROCESSES IN SYSTEM THEORY II** **THREE CREDIT HOURS**  
 A continuation of Ele 517, Random Processes in System Theory I, with emphasis on Markov Processes and Random Dynamical Systems. Prerequisite: Ele 517.

**ELE 531. DIGITAL SYSTEMS THEORY I** **THREE CREDIT HOURS**  
 Switching Circuit Theory: Number systems, truth functions, Boolean algebra, switching devices, codes, relay circuits, threshold logic, and an introduction to sequential circuits. Prerequisite: Ele 313 or consent of instructor. (Open for enrollment of undergraduate students.)

**ELE 532. DIGITAL SYSTEMS THEORY II** **THREE CREDIT HOURS**  
 Sequential Circuit Theory: Clocked sequential circuits, incompletely specified sequential circuits, pulse-mode circuits, fundamental mode circuits, linear sequential circuits.  
 Prerequisite: Ele 531.

**ELE 533. DIGITAL SYSTEMS THEORY III** **THREE CREDIT HOURS**  
 Digital Computer Design: Digital arithmetic, switching matrices, digital computer elements, arithmetic and control units, the logic design of a simple digital computer.  
 Prerequisite: Ele 532.

**ELE 534. DIGITAL SYSTEMS THEORY IV** **THREE CREDIT HOURS**  
 Advanced Sequential Machine Theory: Finite — state machines, regular expressions, lossless machines, bilateral analysis and synthesis procedures, sequential iterative systems. Prerequisite: Ele 532.

**ELE 535. CODING THEORY** **THREE CREDIT HOURS**  
 The theory of error-correcting, error-detecting codes as applied to the design of reliable digital data systems. Prerequisite: Ele 532.

**ELE 598. SPECIAL PROBLEMS IN ELECTRICAL ENGINEERING** **TWO-SIX CREDIT HOURS**  
 Particular assignments to be arranged and approved by the chairman of the department.

**ELE 599. THESIS** **THREE TO SIX CREDIT HOURS**  
 Students engaged in thesis research must enroll for this course for a total of six credit hours.

### **Engineering Mechanics (EGM)**

**EGM 501. EXPERIMENTAL STRESS ANALYSIS** **THREE CREDIT HOURS**  
 A study of the experimental analysis of stress as an aid to design for strength and economy with emphasis on electrical strain gauges. Also covered are photoelasticity, brittle coatings, photoelastic coatings, analogies, structural similitude. Two hours lecture and one three-hour lab per week. Prerequisite: Egm 304.

**EGM 519. ANALYTIC DYNAMICS** **THREE CREDIT HOURS**  
 Kinematics, relative motion, constraints and generalized coordinates, Hamilton's principle, Lagrange's equations, variational principles. Applications to particle dynamics and rigid body motion. Prerequisites: Egm 301, Mth 219, or equivalent.

**EGM 530. APPLIED ELASTICITY** **THREE CREDIT HOURS**  
 Equations of equilibrium and continuity; solution of two-dimensional problems in rectangular and curvilinear coordinates by means of stress functions; St. Venant's principle; energy methods; stress concentrations; introduction to three-dimensional and thermal stress problems; application of finite difference equations. Prerequisite: Egm 304.

**EGM 539. THEORY OF PLASTICITY** **THREE CREDIT HOURS**  
 Fundamentals of elasticity and plasticity, yield criteria, plastic stress-strain relations, theories of work hardening. Extremum principles. Application to problems of bending, torsion, plane stress and plane strain. Slip line and limit analysis. Prerequisite: Mee 533.

**EGM 598. SPECIAL PROBLEMS IN ENGINEERING SCIENCE** **TWO TO SIX CREDIT HOURS**  
 Particular assignments to be arranged and approved by the Chairman, Graduate Study Committee, School of Engineering.

**Industrial Engineering (INE)**Robert I. Mitchell, *Chairman*

- INE 501. ANALYSIS OF ENGINEERING DATA** **THREE CREDIT HOURS**  
 A study of statistical techniques especially applicable to industrial experimentation and research. Principles of analysis of variance and design of experiments and multiple correlation. Emphasis upon the theory underlying various techniques.
- INE 502. SIMULATION TECHNIQUES IN OPERATIONS RESEARCH** **THREE CREDIT HOURS**  
 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.
- INE 503. MATHEMATICAL PROGRAMMING OF INDUSTRIAL PROBLEMS** **THREE CREDIT HOURS**  
 Development of analytical techniques for the solution of engineering and economic problems. Construction of mathematical models, with emphasis on linear models and linear programming.
- INE 504. INDUSTRIAL DYNAMICS** **THREE CREDIT HOURS**  
 Experimental and quantitative approaches are used for designing corporate structures and policies compatible with organization growth and stability objectives. Information feed-back systems, decision making policy, computer simulation and experimental model approaches to the design of large systems are among the topics studied.
- INE 506. ADVANCED WORK STUDY** **THREE CREDIT HOURS**  
 Introduction to the latest developments in assembly methods, including selection of cycle time, assembly line balancing, sequencing of mixed models, and automatic assembly methods. Technical, economic and human aspects of both processing and assembly work.
- INE 507. ADVANCED WORK MEASUREMENT** **THREE CREDIT HOURS**  
 An advanced study of work standards, how they are developed, evaluated and used. Predetermined time systems, time study techniques and Work Measurement Sampling are studies with particular emphasis on the statistical aspects of work measurement.
- INE 508. ADVANCED QUALITY CONTROL** **THREE CREDIT HOURS**  
 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.
- INE 515. QUEUING THEORY AND APPLICATION** **THREE CREDIT HOURS**  
 Emphasizes application of theory to Industrial Engineering. Topics include machine interference, mathematical queuing models, a study of case histories (with solutions) including marketing models, servicing problems, Markovian models. Includes Monte Carlo techniques and computer simulation models.
- INE 516. INVENTORY THEORY AND APPLICATION** **THREE CREDIT HOURS**  
 Theory and application of inventory control with respect to costs of ordering and manufacturing, holding and storage, shortage penalty costs, revenues, and discount rates. Topics include: forecasting, material control, input capacity and scheduling, stochastic inventory models, dynamic inventory models including real time computerized inventory control models.

**INE 517. RANDOM PROCESSES IN SYSTEM THEORY I** **THREE CREDIT HOURS**

A coherent, semiformal introduction to the theory of probability and random processes as applied to system theory. Topics to be treated are the axioms of probability; the concept of random variable, distributions, density; function of random variable; expectation and Lebesgue Integration; sequences of random variables; stochastic processes; linear mean square estimation; Markov processes: Prerequisite: Ele 322 and working knowledge of LaPlace transforms or consent of instructor.

**INE 518. ESTIMATION THEORY AND ITS APPLICATIONS** **THREE CREDIT HOURS**

A unified approach to the theory of estimation as applied to engineering problems of communication and control. Review of probability and linear dynamical systems, analysis of discrete and continuous linear stochastic systems; frequency and time domain solution of the linear estimation problem; applications to current engineering problems of communication and control. Prerequisite: Ine 517.

**INE 521-522. OPERATIONS RESEARCH** **SIX CREDIT HOURS**

Study of methods of operations research, including formulating problems, weighing the objectives, construction of models, deriving solutions, testing the models and implementing results. Emphasis upon applications of operations research to industrial problems. Prerequisites: Ine 501, Ine 503, or equivalent.

**INE 524. DISCRETE TIME SERIES** **THREE CREDIT HOURS**

Emphasis is placed on Industrial applications of open loop statistical forecasts. Techniques of describing a time series by very general classes of functions are studied. These include but are not limited to trigonometric functions that make it possible to describe any cyclical process accurately and easily.

**INE 525. SYSTEM RELIABILITY AND MAINTAINABILITY** **THREE CREDIT HOURS**

Application 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. Prerequisite: Ine 521, or equivalent.

**INE 527. RANDOM PROCESSES IN SYSTEM THEORY II** **THREE CREDIT HOURS**

A continuation of Ine 517, Random Processes in System Theory I, with emphasis on Markov Processes and Random Dynamical Systems. Prerequisite: Ine 517, or Ele 517.

**INE 528. DESIGN AND ANALYSIS OF EXPERIMENTS** **THREE CREDIT HOURS**

Covers advanced topics in statistical experiments with emphasis on the design aspects. Topics include confounding, fractional replication, factorial and nested designs. Prerequisite: Ine 501, or equivalent.

**INE 530. ADVANCED TOPICS IN LINEAR PROGRAMMING** **THREE CREDIT HOURS**

Main emphasis on computational techniques and applications of linear programming to industrial problems, primal-dual algorithm, decomposition principle, assignment, transportation and transshipment problems, network flow algorithm and integer programming. Prerequisite: Ine 503.

**INE 531. NON-LINEAR AND DYNAMIC PROGRAMMING** **THREE CREDIT HOURS**

Development of the theory and computational techniques of non-linear and dynamic programming. Includes applications of optimization methods, non-linear programming problems, stochastic programming, gradient methods, dynamic programming, Kuhn-Tucker theory and quadratic programming. Prerequisites: Ine 503, Ine 521.

**INE 541. PRODUCTION ENGINEERING** **THREE CREDIT HOURS**  
The design of systems of men and machines for the production process; forecasting, scheduling, production and inventory control, staffing, plant layout, and equipment replacement. Prerequisites: Ine 502, 521, or equivalent.

**INE 542. ANALYSIS AND DESIGN OF CONTROL SYSTEMS** **THREE CREDIT HOURS**  
Use of mathematical models, data-gatherings and statistics in defining the design problem. Systems logic, queuing theory, game theory, linear programming, simulation and human engineering applied to the design of large-scale work systems. Prerequisites: Ine 502, 521, or equivalent.

**INE 543. ADVANCED PRODUCTION CONTROL** **THREE CREDIT HOURS**  
Analysis of modern, quantitative techniques of production planning and control. Design of production control systems using methods of mathematical programming, probabilistic and deterministic models. Prerequisites: Ine 521, 522, or equivalent.

**INE 544. ADVANCED TOPICS IN RELIABILITY AND MAINTAINABILITY** **THREE CREDIT HOURS**  
The exact content of this course will vary from year to year. The major emphasis will be to study the latest research in the field and evaluate the impact these developments will have on future practices in reliability and maintainability. Prerequisites: Ine 508, 525, or equivalent.

**INE 590. SEMINAR IN ENGINEERING MANAGEMENT** **THREE CREDIT HOURS**  
An analysis in depth of strategically important areas of engineering management which are being influenced by technological innovations. Will include guest lectures on selected topics, team studies, and the correlation of administrative practice with theory.

**INE 598. SPECIAL PROBLEMS IN INDUSTRIAL ENGINEERING** **TWO TO SIX CREDIT HOURS**  
Particular assignments to be arranged and approved by the chairman of the student's advisory committee.

**INE 599. MS THESIS IN INDUSTRIAL ENGINEERING** **THREE TO NINE CREDIT HOURS**  
Students engaged in Master's thesis research must register for this course and continue registering each semester until the thesis is completed for a total credit of not more than nine hours (usually six hours).

## **Mechanical Engineering (MEE)**

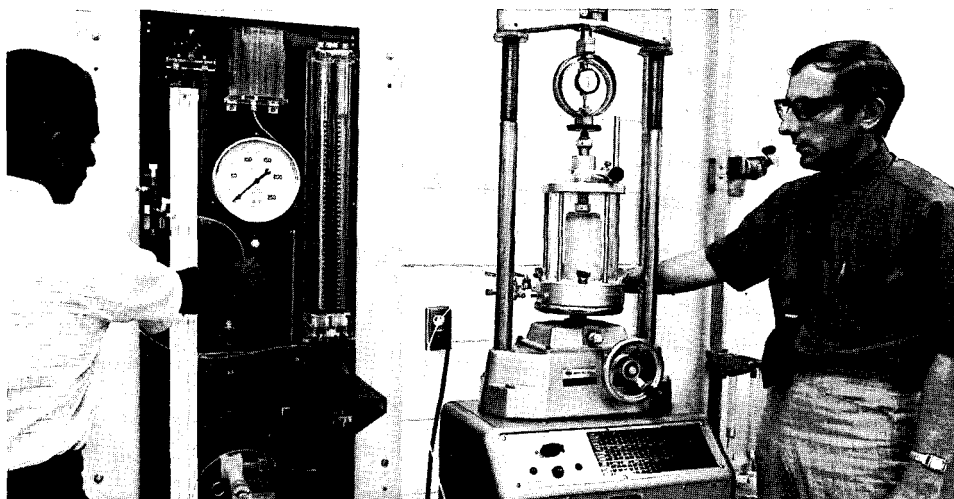
Dr. Howard E. Smith, *Chairman*

Students who have completed work equivalent in nature to the stated prerequisite courses may be enrolled in these courses with the consent of the instructor.

**MEE 501. PRINCIPLES OF MATERIALS I** **THREE CREDIT HOURS**  
The electronic, atomic, submicroscopic, microscopic and macroscopic structures of crystalline solids are presented. Specific topics include bonding, electron theory of metals, crystals, dislocations, phase diagrams, phase transformations, and diffusion. Prerequisite: Mth 219.

- MEE 502. PRINCIPLES OF MATERIALS II** **THREE CREDIT HOURS**  
 A theoretical approach to the mechanical behavior of crystalline solids is presented, emphasizing the relationship of mechanical properties to the structure of materials. Topics include elasticity, plasticity, strengthening mechanisms, creep, fracture, fatigue, and the mechanical testing of these properties. Prerequisite: Mee 501.
- MEE 503. X-RAY DIFFRACTION ANALYSIS** **THREE CREDIT HOURS**  
 The fundamentals of X-ray diffraction and its application to the study of materials. The generation and detection of X-rays, elements of crystallography and the diffraction of X-rays by crystals. The laboratory includes both single and polycrystalline X-ray diffraction procedures. Two hours lecture and one three-hour lab per week. Prerequisite: Mee 501.
- MEE 504. ELECTRON PROBE MICROANALYSIS** **THREE CREDIT HOURS**  
 An introduction to electron and X-ray optics and specimen interactions. The design and applications of the scanning electron microscope and the electron probe micro-analyzer. Laboratory includes the actual operation of the scanning electron microscope and the electron probe microanalyzer, data retrieval and interpretation, and techniques of specimen preparation. Two hours lecture and one three-hour lab per week.
- \*MEE 505. THE PHASE DIAGRAM** **THREE CREDIT HOURS**  
 Thermodynamic properties of solutions and intermediate phases. Equilibrium behavior of phase mixtures. Representation of multi-component phase diagrams. Experimental determination and prediction of phase diagrams. Prerequisite: Mee 302.
- MEE 506. MECHANICAL BEHAVIOR OF MATERIALS** **THREE CREDIT HOURS**  
 Description of the state of stress and strain in materials. Deformation behavior of polymers and crystalline materials. Modes of fracture, creep and fatigue.
- \*MEE 511. CLASSICAL THERMODYNAMICS** **THREE CREDIT 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 diffusion, electronic phenomena in solids, direct energy conversion, and biological problems.
- \*MEE 512. CONDUCTION HEAT TRANSFER** **THREE CREDIT HOURS**  
 Steady state and transient state conduction. Evaluation of temperature fields by formal mathematics, numerical analysis, and analogic experiments.
- \*MEE 513. JET PROPULSION** **THREE CREDIT HOURS**  
 Principles of jet propulsion and engine classification, aerothermodynamics, diffuser and nozzle flow, energy transfer in turbo-machinery, turbojet and turbo-fan engines, turbo-prop and turboshaft engines, rocket motors and brief introduction to related materials. Prerequisite: Mee 418.
- \*MEE 514. DIRECT ENERGY CONVERSION** **THREE CREDIT HOURS**  
 Introduction to the principles of direct energy conversion. The following topics are discussed: irreversible thermodynamics; semiconductors; thermoelectric, thermomagnetic, photovoltaic, and thermionic devices; magnetohydrodynamics; fuel cells. Prerequisites: Mee 302, Mee 303.

\*Open for enrollment of undergraduate students with the consent of the department chairman.



**\*MEE 515. STATISTICAL THERMODYNAMICS** **THREE CREDIT 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. Information theory, irreversible thermodynamics. Prerequisites: Mee 301, Mth 219.

**\*MEE 516. CONVECTION HEAT AND MASS TRANSFER** **THREE CREDIT 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: Mee 410.

**MEE 517. RADIATION HEAT TRANSFER** **THREE CREDIT 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. Prerequisite: Mth 403.

**MEE 518. SOLID STATE ENERGY CONVERSION** **THREE CREDIT HOURS**  
 A study of thermoelectric devices and solar cells with applications to power generation and cooling. Emphasis on complete design including contact resistance, temperature dependent properties and heat transfer. Two hours lecture and one three-hour lab per week. Prerequisite Mee 410.

**MEE 521. VISCOUS FLOW** **THREE CREDIT HOURS**  
 Fundamentals of viscous flow. Navier-Stokes and boundary layer equations. Exact and approximate solutions of these equations. Thermal boundary layers and boundary layers in compressible flow. Prerequisite: Mee 418; Corequisite: Mth 403.

**\*Open for enrollment of undergraduate students with the consent of the department chairman.**

**MEE 522. POTENTIAL FLOW** **THREE CREDIT HOURS**  
 Fundamental equations, kinematics and dynamics of fluid flow. Principles of irrotational flow. Conformal representation of two-dimensional flow. Prerequisite: Mee 308; Co-requisite: Mth 404.

**\*MEE 523. COMPRESSIBLE FLOW** **THREE CREDIT 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. Prerequisite: Mee 418.

**MEE 524. MAGNETOHYDRODYNAMICS** **THREE CREDIT HOURS**  
 An introduction to the dynamics of electrically conducting fluids. Fundamental concepts of electromagnetic and fluid fields from macroscopic point of view. Channel flows, boundary layers. Magnetohydrodynamic propulsion and power generation. Brief introduction to kinetic theory of plasmas. Prerequisites: Mee 523, Mth 403.

**\*MEE 525. PRINCIPLES OF MECHANICS OF FLIGHT** **THREE CREDIT HOURS**  
 Power required and power available. Calculation of steady-state performance characteristics of aerospace vehicles. Dynamic analysis of systems with many degrees of freedom; dynamic stability and response of the rigid vehicle; influence of structural elasticity in vehicle dynamics; aero-elastic stability problems. Prerequisite: Mth 219.

**\*MEE 531. KINEMATIC SYNTHESIS OF MECHANISMS** **THREE CREDIT HOURS**  
 Synthetic design of mechanisms generating a predetermined motion. Introduction to spatial mechanisms.

**\*MEE 532. ENVIRONMENTAL ACOUSTICS AND VIBRACOUSTICS** **THREE CREDIT HOURS**  
 Physics of sound propagation. Physiological and legal aspects of sound. Measurement and analysis of sound and vibrations. Vibration and sound control techniques, source modifications, path modifications, receiver modifications. Acoustic considerations in machine design. Prerequisite: Mth 219.

**\*MEE 533. STRUCTURAL ANALYSIS I** **THREE CREDIT HOURS**  
 Elastic Analysis—Basic principles of stress and strain, introduction to Theory of Beams, and Elastic Instability. Prerequisites: Egm 303, Mth 219.

**\*MEE 534. STRUCTURAL ANALYSIS II** **THREE CREDIT HOURS**  
 Plates and Shells Analysis—Cylindrical bending of plates, circular and rectangular plates under symmetric and unsymmetric loadings; stability of plates; membrane theory of shells. Prerequisite: Egm 304.

**\*MEE 535. MECHANICAL VIBRATIONS** **THREE CREDIT HOURS**  
 Multi-degree of freedom systems, Lagrange's equations, transient vibrations, vibrations of continuous systems. Matrix and numerical methods. Introduction to finite element method. Introduction to nonlinear vibrations. Prerequisite: Mee 416.

**\*MEE 536. FEEDBACK CONTROL SYSTEMS** **THREE CREDIT HOURS**  
 Study of automatic control with particular emphasis on process control (hydraulic, pneumatic and mechanical systems), stability analysis, introduction to the numerical control of machine tools.

\*Open for enrollment of undergraduate students with the consent of the department chairman.



**MEE 537. MATRIX STRUCTURAL ANALYSIS** **THREE CREDIT HOURS**  
 Matrix formulations of structures using direct and energy approaches; displacement, force and combined methods; the finite element technique. Applications to spring-mass systems, bars, beams, trusses, plates and shells. Computer solution of selected problems. Prerequisite: Mee 534.

**MEE 538. INTRODUCTION TO AEROELASTICITY** **THREE CREDIT HOURS**  
 Description of the deformation characteristics of aircraft structures. Deformations under aerodynamic loads; differential equations, integral equation, energy methods of analysis. Galerkin's method. Wing divergence, control surface effectiveness, aeroelastic effects on load distribution, flutter. Prerequisites: Mth 219, Mee 533.

**MEE 539. THEORY OF PLASTICITY** **THREE CREDIT HOURS**  
 Fundamentals of elasticity and plasticity, yield criteria, plastic stress-strain relations, theories of work hardening. Extremum principles. Application to problems of bending, torsion, plane stress and plane strain. Slip line and limit analysis. Prerequisite: Mee 533.

**MEE 550. MECHANICAL ENGINEERING PROJECT** **ONE TO SIX CREDIT HOURS**  
 Student participation in a departmental research, design, or development project under the direction of a project advisor. To obtain credit, the student must show satisfactory progress in the project as determined by a committee presided over by the project advisor and must present a written report and a seminar to the faculty of the Mechanical Engineering Department and other interested persons.

**MEE 551. MATERIALS SCIENCE IN ENGINEERING PROJECT** **ONE TO SIX CREDIT HOURS**  
 Student participation in a materials science in engineering project under the direction of a project advisor. To obtain credit, the student must show satisfactory progress in the project as determined by a committee presided over by the faculty advisor and must present a written report and a seminar to the faculty of the Mechanical Engineering Department and other interested persons.

**MEE 597. SPECIAL TOPICS IN MATERIALS SCIENCE IN ENGINEERING** **ONE TO SIX CREDIT HOURS**  
 Special assignments in materials science in engineering subject matter to be arranged and approved by the student's faculty advisor and department chairman.

**MEE 598. SPECIAL PROBLEMS IN MECHANICAL ENGINEERING** **ONE TO SIX CREDIT HOURS**  
 Special assignments in Mechanical Engineering subject matter to be arranged and approved by the student's Faculty Advisor and the Department Chairman.

## English (ENG)

Dr. B. J. Bedard, *Chairman*  
 Dr. M. H. Means, *Assistant Chairman*

Prerequisite for enrolling in any of the following courses for graduate credit is at least twenty-four semester hours in literature. All 500 level courses normally meet for two hours but yield three hours credit. The starred courses can be repeated for graduate credit when the topic or content changes.

- \*ENG 505. CREATIVE WRITING** **THREE CREDIT HOURS**  
Supervised practice in writing in various literary forms. Conducted both by group discussions and by individual conferences and critiques. Permission of Chairman required.
- \*ENG 514. STUDIES IN MEDIEVAL LITERATURE** **THREE CREDIT HOURS**  
A treatment of the principal forms and movements in the literature of the Middle Ages, usually read in translation.
- ENG 516. CHAUCER I** **THREE CREDIT HOURS**  
An intensive analysis of *The Canterbury Tales*.
- ENG 517. CHAUCER II** **THREE CREDIT HOURS**  
A study of *Troilus and Criseyde* and the minor poems of Chaucer. Eng 516 is *not* a prerequisite.
- \*ENG 522. STUDIES IN SIXTEENTH CENTURY LITERATURE** **THREE CREDIT HOURS**  
A treatment of the non-dramatic literature of the English Renaissance.
- ENG 526. SHAKESPEARE I** **THREE CREDIT HOURS**  
A consideration of the development of Shakespeare's art from the beginning to *Twelfth Night*. The course includes the early comedies and tragedies, the histories, and the romantic comedies.
- ENG 527. SHAKESPEARE II** **THREE CREDIT HOURS**  
An analysis of Shakespeare's development from *Hamlet* to *The Tempest*. The course includes the major tragedies, problem plays, and dramatic romances. Eng 526 is *not* a prerequisite.
- \*ENG 532. STUDIES IN SEVENTEENTH CENTURY LITERATURE** **THREE CREDIT HOURS**  
A consideration of the principal poets and prose writers of the Stuart, Commonwealth, or Restoration Periods.
- \*ENG 536. STUDIES IN DRAMA TO 1642** **THREE CREDIT HOURS**  
A survey of English drama from the beginning to the closing of the theatres.
- \*ENG 538. STUDIES IN MILTON** **THREE CREDIT HOURS**  
A treatment of the major and minor poems and related prose of Milton.
- \*ENG 542. STUDIES IN EIGHTEENTH CENTURY LITERATURE** **THREE CREDIT HOURS**  
A study of the writers of the Augustan, Post-Augustan, and Pre-Romantic Ages.
- \*ENG 546. STUDIES IN THE NOVEL** **THREE CREDIT HOURS**  
A consideration of the development and characteristic forms of the novel.
- \*ENG 552. STUDIES IN ROMANTICISM** **THREE CREDIT HOURS**  
The nature and progress of English Romanticism as revealed in the principal poets of the early part of the Nineteenth Century.
- \*ENG 556. STUDIES IN NINETEENTH CENTURY LITERATURE** **THREE CREDIT HOURS**  
A treatment of the significant poets and essayists of the Victorian Age.
- \*ENG 562. STUDIES IN TWENTIETH CENTURY LITERATURE** **THREE CREDIT HOURS**  
A study of significant movements, forms, and writers in the literature of the Twentieth Century.

- \*ENG 566. STUDIES IN DRAMA SINCE 1660** **THREE CREDIT HOURS**  
 A selective study of significant developments in drama from the Restoration to the present.
- \*ENG 570. STUDIES IN EARLY AMERICAN LITERATURE** **THREE CREDIT HOURS**  
 A study of the cultural and literary roots of American literature.
- ENG 572. THE ROMANTIC AGE IN AMERICAN LITERATURE** **THREE CREDIT HOURS**  
 A consideration of the writers of the mid-nineteenth century.
- \*ENG 576. MAJOR AMERICAN WRITERS** **THREE CREDIT HOURS**  
 An intensive comparative study of two or three American writers considered in depth.
- \*ENG 582. STUDIES IN AMERICAN LITERATURE SINCE THE CIVIL WAR** **THREE CREDIT HOURS**  
 A consideration of the principal movements in poetry, fiction, or drama of the late Nineteenth or Twentieth Century.
- \*ENG 587. STUDIES IN THE HISTORY OF CRITICISM** **THREE CREDIT HOURS**  
 A consideration of significant developments in the history of critical thought.
- \*ENG 588. STUDIES IN CRITICISM** **THREE CREDIT HOURS**  
 A treatment of significant topics in theoretical and/or practical criticism.
- \*ENG 590. TEACHING OF COLLEGE ENGLISH** **ONE CREDIT HOUR**  
 Discussion, instruction, and practice in the methods of teaching composition and literature. Required of and open only to Assistants.
- \*ENG 591. STUDIES IN LITERATURE** **ONE TO SIX CREDIT HOURS**  
 An analysis of selected literary problems or areas.
- ENG 595. RESEARCH AND BIBLIOGRAPHY** **THREE CREDIT HOURS**  
 An introduction to the methods and tools of literary scholarship. Required of all degree applicants.
- ENG 599. THESIS** **THREE-SIX CREDIT HOURS**

## History (HST)

Dr. Leroy Eid, *Chairman*

Courses numbered 5—also appear in the undergraduate catalogue. Enrollment is open to both graduate students and advanced undergraduate students. Courses numbered 6—are restricted to graduate students. The particular emphasis of starred (\*) courses will be announced each term. They may be repeated for graduate credit when the topic and content changes.

- HST 502. MAIN CURRENTS IN ANCIENT HISTORY** **THREE CREDIT HOURS**  
 Aspects of the civilizations of the Ancient Near East, Greece, and Rome selected because of their integration into Western Civilization. Emphasized topics: the Hebrew world view and value system, Greek democracy, Roman political and social institutions.

- HST 504. EARLY EUROPE** **THREE CREDIT HOURS**  
 From the Diocletian reform of the Roman Empire to the mid-eleventh century, the course examines the decline of Rome and the construction of European Civilization. Emphasized topics: Byzantine and Islamic contributions, barbarian migrations, development of Christianity and the institutional Church, Carolingian Empire and the revival of learning, and the emergence of European monarchies.
- HST 506. THE RISE OF EUROPEAN STATES** **THREE CREDIT HOURS**  
 Political and social aspects from the mid-eleventh to the mid-fourteenth century. Topics include: evolution of towns and commerce, crusading movement, rise of universities, medieval art and culture, and political construction and interaction of European monarchies.
- HST 507. RENAISSANCE AND REFORMATION** **THREE CREDIT HOURS**  
 The development of European history from the 14th to the middle of the 17th century. Emphasis on the economic, political, social, and religious aspects of the Renaissance, Protestant Revolution, and Catholic Reformation.
- HST 508. EARLY MODERN SPAIN AND PORTUGAL** **THREE CREDIT HOURS**  
 A history of Spain and Portugal from the 15th century to the 18th century; Catholic Kings, Charles V, Phillip II, Henry the Navigator; and the Later Hapsburgs will be dealt with in detail; Spain and Portugal in Europe and the wider world.
- HST 511. ERA OF ABSOLUTISM, ENLIGHTENMENT** **THREE CREDIT HOURS**  
 Designed to bridge the gap between the later Reformation and the era of the French Revolution. Intellectual and cultural developments will be covered, with emphasis on political, economic and social trends of the Old Regime.
- HST 513. THE REVOLUTIONARY ERA, 1789-1918** **THREE CREDIT HOURS**  
 A historical analysis of the European nations and peoples emphasizing the themes of War and Revolution. The course covers the revolutions of the period as well as ideological, scientific, and technological developments.
- HST 514. TWENTIETH CENTURY EUROPE** **THREE CREDIT HOURS**  
 Topics included: causes and outcome of World War I; internal policies of nations between the two World Wars; diplomatic actions leading to World War II; and the impact of World War II.
- HST 515. SOVIET UNION SINCE 1917** **THREE CREDIT HOURS**  
 A detailed survey and analysis of the historical development of the U.S.S.R. from the Revolution of 1917 to the present time.
- HST 516. MILITARY HISTORY SINCE 1789** **THREE CREDIT HOURS**  
 This course touches upon the evolving concept and philosophy of war, the development and inter-relationships of weapons, tactics and strategy, and the role of military affairs in politics.
- HST 524. THE PARLIAMENTARY CONCEPT IN ENGLISH HISTORY** **THREE CREDIT HOURS**  
 A study of the origins and development of common law and parliamentary government in England, stressing the medieval period.

- HST 526. TUDOR-STUART ENGLAND** **THREE CREDIT HOURS**  
 A study of England—1485 to 1714. For the Tudor period, chief emphasis will be given to the development of the national state, royal absolutism, and the Reformation. The evolution of the constitutional question will be the main theme in the treatment of the Stuart era and Cromwellian Interregnum. The social, economic and cultural aspects of the period, as well as its diplomacy, will be fully covered.
- HST 527. ENGLAND IN THE 18TH CENTURY** **THREE CREDIT HOURS**  
 A survey of the changes in British political, social and economic institutions. The neo-classical and Romantic movements, Wesleyism, and the beginnings of Evangelicalism will be studied.
- HST 532. NORTH AFRICA IN MODERN TIMES** **THREE CREDIT HOURS**  
 A study of Morocco, Algeria, Tunisia, and Libya since the 16th century. Stress is placed on the institutional histories of these countries which enabled them ultimately to expel European imperialism.
- HST 536. SOUTH AFRICA IN MODERN TIMES** **THREE CREDIT HOURS**  
 The establishment of the Bantu people and institutions and their subjection to assaults by Boers and British. Such study seeks to illuminate the present dominant governmental policy of apartheid.
- HST 537. WEST AFRICA IN MODERN TIMES** **THREE CREDIT HOURS**  
 West Africa's significance since the 18th century, with special references to the slave trade, the commercial revolution, religious ferment, imperialistic rivalry, and the recent independence movement.
- HST 538. THE MIDDLE EAST, 19TH AND 20TH CENTURIES** **THREE CREDIT HOURS**  
 A survey of the Ottoman Empire, Iran, Egypt, and the modern states of the Middle East, emphasizing the development of nationalism and the place of the Middle East in international politics.
- HST 543. MODERN CHINA** **THREE CREDIT HOURS**  
 A survey of the political, cultural and international developments in China from the eighteenth century to the present.
- HST 546. SOUTHEAST ASIA** **THREE CREDIT HOURS**  
 A survey of the cultural and political history of Southeast Asian countries, emphasizing recent developments.
- HST 547. DIPLOMATIC HISTORY OF THE FAR EAST SINCE 1840** **THREE CREDIT HOURS**  
 A survey of the diplomatic relations of China, Korea, and Japan among themselves and with other powers. The course selects major diplomatic events from 1840 to the present.
- HST 548. JAPAN SINCE PERRY** **THREE CREDIT HOURS**  
 A historical study of the economic, social, and political developments of modern Japan from the end of the "Seclusion" to the present time.
- HST 552. REVOLUTION AND CONFEDERATION** **THREE CREDIT HOURS**  
 The course will treat the following topics: the problems of empire-relationships since 1754; the causes, conduct, and consequences of the American Revolution; the postwar problems leading to the adoption of the Federal Constitution.

**HST 553. AMERICAN COLONIAL HISTORY** **THREE CREDIT HOURS**  
 A study of the foundations of American Nationality: European background of America, development of the colonial system, transplanting of ideas and institutions from the Old World, growth of democratic tendencies.

**HST. 554. THE AGE OF JEFFERSON AND JACKSON** **THREE CREDIT HOURS**  
 Emphasizes the whole range of historical, cultural, social and political trends that are traditionally associated with the presidencies of Jefferson and Jackson. The period covered extends from the 1790's to the 1850's.

**HST 555. THE OLD SOUTH** **THREE CREDIT HOURS**  
 A study of political, social, economic, and cultural history, emphasizing presiding themes of pre-Civil War Southern life—ruralism, cotton culture, extractive economics, slavery, developing political minority status in the nation. A general knowledge of American History is a prerequisite.

**HST 556. CIVIL WAR AND RECONSTRUCTION** **THREE CREDIT HOURS**  
 Remote and immediate causes of the Civil War, especially from 1850 to 1861: problems of North and South during the war; consequences of the war; efforts to create a new Union, 1865-1877; problems created by those efforts.

**HST 572. APPALACHIA AND THE NEW SOUTH** **THREE CREDIT HOURS**  
 A study and appraisal of the internal and external forces that have shaped the Southern states since the Civil War. All aspects of Southern life will be considered.

**HST 574. THE GILDED AGE, 1877-1900** **THREE CREDIT HOURS**  
 A study in the political, diplomatic, economic, social, and cultural developments of the age. The rise of big business, organized labor, and the Populist revolt will be studied.

**HST 575. THE PROGRESSIVE PERIOD, 1900-1920** **THREE CREDIT HOURS**  
 A study in depth of the major historical trends that dominated these years which saw the universal acceptance of America's claim to world power. Due attention will be placed on cultural as well as political developments.

**HST 576. BETWEEN THE WARS** **THREE CREDIT HOURS**  
 Intensive study of chief facets of United States history from 1919 to 1941. Topics emphasized include: Normalcy, the Depression, the evolving New Deal, and the approach to World War II.

**HST 577. CONTEMPORARY AMERICAN HISTORY** **THREE CREDIT HOURS**  
 Diplomatic and domestic history of the United States since the beginning of World War II. Topics include: Wartime Conference Diplomacy, the War, Russia and the Cold War, Cultural Trends of Mid-Century, Social Equality and the Politics of Protest.

**HST 578. INTERPRETATIONS IN AMERICAN HISTORY** **THREE CREDIT HOURS**  
 Specific topics will be chosen for investigation and interpretation as determined by the instructor. The objective of the course is to study new interpretations of historical events. A general knowledge of American History is a prerequisite.

**HST 582. THE HISTORY OF MEXICO** **THREE CREDIT HOURS**  
 Study of Mexican history since 1820. Origins of revolution of 1910 and its development to the present emphasize Mexico's struggle for democracy. Diplomatic and cultural relations between Mexico and the U.S. are considered.

- Hst 583. THE HISTORY OF BRAZIL** **THREE CREDIT HOURS**  
 A history of Brazil since 1908 emphasizing the Empire, slavery, the early Republic, Getulio Vargas, and the contemporary scene. Economic and social history will be stressed.
- Hst 584. CARIBBEAN SINCE 1801** **THREE CREDIT HOURS**  
 Study of the cultural, social, economic and political history of the islands and the northern shore of South America in modern times, stressing areas that have gained independence or autonomy.
- Hst 600. HISTORIOGRAPHY** **THREE CREDIT HOURS**  
 The course will concentrate on a study of the principal historians and the chief contributions to the development of historical writing. Some familiarity with historical method will be required in the composition of research papers.
- \*Hst 610. STUDIES IN EARLY EUROPEAN HISTORY** **THREE CREDIT HOURS**  
 Selected developments in government, law, urban life, and learning from Rome's decline to the 15th century. Byzantine and Islamic contributions are included.
- \*Hst 620. STUDIES IN MODERN EUROPEAN HISTORY** **THREE CREDIT HOURS**
- \*Hst 630. STUDIES IN AFRICAN AND MID-EAST HISTORY** **THREE CREDIT HOURS**
- \*Hst 640. STUDIES IN ASIAN HISTORY** **THREE CREDIT HOURS**
- Hst 650. THE PHILOSOPHY OF HISTORY** **THREE CREDIT HOURS**  
 After surveying the various metaphysical interpretations of the meaning of history, the course then analyzes the literature concerned with the epistemological problems of writing history.
- \*Hst 660. STUDIES IN U.S. HISTORY BEFORE 1877** **THREE CREDIT HOURS**
- \*Hst 670. STUDIES IN U.S. HISTORY AFTER 1877** **THREE CREDIT HOURS**
- \*Hst 680. STUDIES IN LATIN AMERICAN HISTORY** **THREE CREDIT HOURS**
- \*Hst 696. SPECIAL STUDIES** **ONE TO THREE CREDIT HOURS**  
 Tutorial readings or research in special fields. By permission of the Chairman only.
- Hst 699. THESIS** **THREE TO SIX CREDIT HOURS**

## Information Science (ISC)

Dr. Samuel M. Bower, *Director*

- ISc 501-2. INTRODUCTION TO INFORMATION SCIENCE** **SIX CREDIT HOURS**  
 Overview of the psychological and scientific principles that underly information. Emphasis is on explaining the foundations of information processing and communication concepts relating such foundations to the development of information systems. Required of all students in program during first year.
- ISc 503. INTRODUCTION TO CYBERNETICS** **THREE CREDIT HOURS**  
 This course involves the study of the theories of information processing in complex systems. It discusses aspects of cybernetics, fundamentals of feedback control theory, self-adaptive systems, biological control system, and other related areas. Prerequisite: ISc 501.

**ISc 510. COMPUTERS AND RESEARCH DESIGN** **THREE CREDIT HOURS**

An introduction to computer technology with emphasis on the use of computers in facilitating experimentation in both the physical and social sciences. The course concerns both the hardware and software aspects of computers and the coupling of such knowledge with scientific methodology. Students are required to include 510L.

**ISc 510L. COMPUTERS AND RESEARCH DESIGN LAB** **ONE CREDIT HOUR**

Students are expected to design an experiment in their particular field of interest, write a computer program, and process the data through the computer for analysis and the determination of experimental conclusions.

**ISc 515. MATHEMATICS AND INFORMATION SCIENCE** **THREE CREDIT HOURS**

Introduction to those mathematical areas needed by the information scientist for the theoretical analysis of information handling problems and the design of system models.

**ISc 516. ADVANCED STATISTICAL APPLICATION TO INFORMATION SCIENCE** **THREE CREDIT HOURS**

Extend statistical analytical concepts to those normally encountered in the information science literature. Prerequisite: Six hours in Statistics either at the graduate or undergraduate level. ISc 515.

**ISc 520. COMMUNICATION THEORY** **THREE CREDIT HOURS**

Introduction to the principles of communication in general and to the concepts of communication and information theory in particular. Prerequisite: ISc 501.

**ISc 525. FOUNDATIONS OF BEHAVIORAL THEORY** **THREE CREDIT HOURS**

This course is intended for the student with less than nine hours in psychology. The material studied is highly condensed to bring into perspective the more important of the available psychological data and theory. Primarily oriented for the student who has majored in physical science or engineering. Required of all students admitted with less than nine undergraduate credit hours in psychology.

**ISc 550. INFORMATION SYSTEM TECHNOLOGY** **THREE CREDIT HOURS**

Survey of the technology used in information systems. Consideration will be given to technological needs for specialized information environments such as medicine, industry evaluating information presentation technologies. Prerequisite: ISc 501.

**ISc 553. INFORMATION PRESENTATION** **THREE CREDIT HOURS**

Various methods of presenting data are surveyed and studied. Mechanical and electronic methods of presenting information are considered in detail. Basic psychological data on the visual, auditory sensory systems are studied to provide the student with the basis of evaluating information presentation technologies. Prerequisite: ISc 501.

**ISc 560. ORGANIZATION AND RETRIEVAL OF INFORMATION** **THREE CREDIT HOURS**

Basics of information storage and retrieval in library, management, and scientific environments are studied. Stress is placed on prevailing research findings on psychological problems of information availability and utilization. Emphasis is on the study of organization and retrieval theory rather than on the related mechanics. Prerequisite: ISc 501.

**ISc 561. DESIGN OF MANAGEMENT INFORMATION DECISION SYSTEMS** **THREE CREDIT HOURS**

To formulate design principles based upon a review of some of the critical issues discussed in the literature and upon the synthesis of ideas formulated in open class discussion of the literature and a series of exemplary design problems.



- ISc 565. SOCIOLOGY OF INFORMATION SYSTEMS** **THREE CREDIT HOURS**  
 An assessment of the philosophical foundations of information and the ethical, moral, political, and social implications of the development of large, complex data processing systems. Prerequisite: ISc 501.
- ISc 570. HUMAN COMMUNICATION** **THREE CREDIT HOURS**  
 Introduction to the sciences related to human communication: psychoacoustics, linguistics, and semantics. Emphasis is on the study of speech production and perception, and the development, structure and use of natural language. Prerequisite: ISc 520.
- ISc 571. MAN-MACHINE COMMUNICATION** **THREE CREDIT HOURS**  
 Introduction to man-machine communication problems. Emphasis is on methods and techniques which permit communication between man and machine by human forms of natural languages: character recognition, speech recognition, and speech synthesis by machine. Prerequisite: ISc 570.
- ISc 575. ARTIFICIAL INTELLIGENCE** **THREE CREDIT HOURS**  
 A study of computer models of concept learning, pattern recognition, problem solving, human rote memory, adaptive systems, simulations of individuals belief systems, neuroticism, and the psychotherapeutic communication process.
- ISc 576. COMPUTATIONAL LINGUISTICS** **THREE CREDIT HOURS**  
 A study of computer models of sentence and text understanding, computer question answering systems, and natural language processing by computer. Prerequisite: ISc 575.
- ISc 580. HUMAN INFORMATION PROCESSING** **THREE CREDIT HOURS**  
 Intended as an advanced course in behavioral theory for students possessing at least nine hours in psychology. The course applies contemporary notions in learning, perception, decision making to the developments in Information Science. Prerequisite: ISc 525, for students with less than nine hours Psychology.
- ISc 590. GRADUATE SEMINAR** **ONE CREDIT HOUR**  
 Enable the student to be familiar with the interest of other graduate students in the program; listen to lectures from the graduate students on research proposals, thesis, etc. Attend lectures of distinguished individuals in the field. Required of all students during Fall and Spring semesters.
- ISc 596. PRACTICUM IN THE DEVELOPMENT OF INFORMATION SYSTEMS** **THREE CREDIT HOURS**  
 Provide experience to the student in working with information problems. Students are assigned to other departments and activities of the university of specific projects. Prerequisite: Permission of advisor.
- ISc 597. READINGS** **ONE TO THREE CREDIT HOURS**  
 Allow individuals interested in specific areas of information to read intensively on the subject with the general guidance of his advisor.
- ISc 598. SPECIAL PROBLEMS** **ONE TO THREE CREDIT HOURS**  
 Areas in Information Science of particular interest to the student are pursued. Where dictated individual research is initiated. Permission of advisor.

**Mathematics (MTH)**

Dr. Kenneth C. Schraut, *Chairman*

**MTH 513. FUNDAMENTAL CONCEPTS OF ABSTRACT ALGEBRA** **FOUR CREDIT HOURS**  
 An introduction to the basic concepts of abstract algebra such as number postulates, groups, rings, fields, mappings, classes, and sets, as well as certain concepts taken from the classical theory of polynomial rings. A study of the relation of this material to the topics of high school algebra.

**MTH 514. FUNDAMENTAL CONCEPTS OF ANALYSIS** **FOUR CREDIT HOURS**  
 This course will include the concepts of number, sequence, function of a single real variable, limit, continuity, integration, differentiation, infinite series and the relationship of these concepts to the material in the high school curriculum.

**MTH 515. FUNDAMENTAL CONCEPTS OF LINEAR ALGEBRA AND VECTOR GEOMETRY** **FOUR CREDIT HOURS**  
 This course will include a study of the basic concepts of linear algebra such as linear independence, bases, linear transformations and matrices, determinants and systems of equations, as well as an introduction to vector geometry using the methods of linear algebra.

**MTH 516. FUNDAMENTAL CONCEPTS IN THE FOUNDATIONS OF GEOMETRY** **FOUR CREDIT HOURS**  
 An examination of the various types of geometry, from an axiomatic point of view, including incidence geometries, affine geometries, projective geometries, as well as a more detailed study of the classical Euclidean, hyperbolic and elliptic geometries.

**MTH 517. FUNDAMENTAL CONCEPTS OF PROBABILITY AND STATISTICS** **FOUR CREDIT HOURS**  
 Probability functions, conditional probability, Bayes Theorem, independent events, probability distributions including the binomial, Poisson, uniform, normal, and gamma distributions, moments and moment generating functions, Chebyshev's inequality, the law of large numbers, distribution of functions of random variables, the central limit theorem.

**MTH 518. FUNDAMENTAL CONCEPTS OF STATISTICS WITH COMPUTER APPLICATIONS** **FOUR CREDIT HOURS**  
 Introduction to the Spectra 70/46 time sharing equipment using BASIC language. Descriptive statistics, Analysis of variance, computer simulation techniques, regression and correlation procedures.

*NOTE: The above courses are normally offered only in the summer term in connection with the National Science Foundation sponsored Teacher's Institute. These courses may not be applied toward the regular Master's degree program in Mathematics.*

**MTH 519-520. STATISTICAL INFERENCE** **THREE CREDIT HOURS EACH TERM**  
 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, multivariate normal distributions.

**MTH 521. REAL VARIABLES I** **THREE CREDIT HOURS**  
 The topology of the real line, continuity and differentiability, Riemann and Stieltjes integrals, Lebesgue measure, relationship between Riemann integrability-Jordan content and measure, Lebesgue integral.

- MTH 522. REAL VARIABLES II** **THREE CREDIT HOURS**  
 Absolute continuity, differentiation and integration, the classical Banach spaces, Fourier series, extensions of the Lebesgue integral. Prerequisite: Mth 521.
- MTH 523. MEASURE THEORY AND INTEGRATION I** **THREE CREDIT HOURS**  
 General theory of measure and integration over abstract spaces, abstract  $L_p$  spaces; product measures, Fubini's theorem, finite signed measures, Jordan-Hahn decomposition, Radon-Nikodym theorem, Riesz Representation theorem. Prerequisite: Mth 521.
- MTH 524. MEASURE THEORY AND INTEGRATION II** **THREE CREDIT HOURS**  
 Integration over locally compact spaces, Baire measures, Borel measures, regular measures, content, Riesz-Markov theorem, advanced topics. Prerequisite: Mth 522, 523 and 571.
- MTH 525. COMPLEX VARIABLES I** **THREE CREDIT HOURS**  
 Fundamental concepts, analytic functions, integration, singularities and series.
- MTH 526. COMPLEX VARIABLES II** **THREE CREDIT HOURS**  
 Entire, meromorphic, periodic and multiple-valued functions; analytic continuation, conformal mapping, and other topics. Prerequisite: Mth 525 or equivalent.
- MTH 531. ADVANCED DIFFERENTIAL EQUATIONS I** **THREE CREDIT HOURS**  
 Existence and uniqueness theorems, linear equations and systems, self-adjoint systems and boundary value problems, numerical methods. Prerequisite: Mth 403 or equivalent.
- MTH 532. ADVANCED DIFFERENTIAL EQUATIONS II** **THREE CREDIT HOURS**  
 Asymptotic behavior and stability, Liapounov's theorems, perturbation theory. Prerequisite: Mth 531.
- MTH 535. PARTIAL DIFFERENTIAL EQUATIONS I** **THREE CREDIT HOURS**  
 Classification of partial differential equations; methods of solution for the wave equation, Laplace's equation, and the heat equation; numerical solutions, applications. Prerequisite: Mth 403 or equivalent.
- MTH 536. PARTIAL DIFFERENTIAL EQUATIONS II** **THREE CREDIT HOURS**  
 Existence and uniqueness theorems, canonical form, Green's theorems and operational methods, boundary value problems. Prerequisite: Mth 535.
- MTH 545. SPECIAL FUNCTIONS** **THREE CREDIT HOURS**  
 The special functions frequently encountered in engineering and the physical sciences are studied. The hypergeometric function and generating functions are used throughout to develop the theory. The theories of infinite products and asymptotic expansions are also discussed. Prerequisites: Mth 404 or 461.
- MTH 551. METHODS OF MATHEMATICAL PHYSICS I** **THREE CREDIT HOURS**  
 Linear transformations and matrix theory, linear integral equations, calculus of variations, eigenvalue problems. Prerequisite: Mth 403 or equivalent.
- MTH 552. METHODS OF MATHEMATICAL PHYSICS II** **THREE CREDIT HOURS**  
 Linear and non-linear oscillators, partial differential equations and potential theory, functional transformations, special functions. Prerequisite: Mth 551.

**MTH 555-556. ADVANCED NUMERICAL ANALYSIS**      **THREE CREDIT HOURS EACH TERM**  
 Quadrature methods and the numerical solution of ordinary differential equations; matrices and large scale linear systems; norms and spectral radii of matrices; modern iterative matrix methods, including the successive overrelaxation method; numerical solution of partial differential equations. Considerations will be given to methods suitable for use on digital computers. Prerequisite: Consent of instructor.

**MTH 561. MODERN ALGEBRA I**      **THREE CREDIT HOURS**  
 Groups, rings, integral domains and fields; extensions of rings and fields; polynomial rings and factorization theory in integral domains; groups with operators; modules and ideals.

**MTH 562. MODERN ALGEBRA II**      **THREE CREDIT HOURS**  
 Finite and infinite field extensions, algebraic closure, constructible numbers and solvability by use of radicals, Galois theory, advanced topics in groups and rings. Prerequisite: Mth 561.

**MTH 565. LINEAR ALGEBRA**      **THREE CREDIT HOURS**  
 Vector spaces, linear transformations and matrices; determinants, invariant direct-sum decomposition, rational and Jordan canonical forms; inner product spaces, the spectral theorem, bilinear and quadratic forms.

**MTH 571. TOPOLOGY I**      **THREE CREDIT HOURS**  
 An axiomatic treatment of the concept of a topological space; various operators on a set that define a topology; bases and subbases; connectedness, compactness; continuity, homeomorphisms, separation axioms and countability axioms; convergence in topological spaces.

**MTH 572. TOPOLOGY II**      **THREE CREDIT HOURS**  
 Compactification theory, paracompactness and metrizability theorems, uniform spaces, function spaces, and other advanced topics of current interest. Prerequisite: Mth 571 or equivalent.

**MTH 573. TOPOLOGICAL VECTOR SPACES I**      **THREE CREDIT HOURS**  
 The study of various topologies within linear spaces with emphasis on Banach and Hilbert spaces. The Hahn-Banach theorem and its consequences. Closed graph and open mapping theorems. Prerequisites: Mth 522, 565, and 571, or equivalents.

**MTH 574. TOPOLOGICAL VECTOR SPACES II**      **THREE CREDIT HOURS**  
 Banach algebras and spectral theory are studied in detail. Prerequisite: Mth 573.

**MTH 575. DIFFERENTIAL GEOMETRY**      **THREE CREDIT 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 590. TOPICS IN MATHEMATICS**      **THREE CREDIT HOURS EACH TERM**  
 This course will be given upon appropriate occasions and will deal with specialized material not covered in the regular courses. It may be taken more than once in different areas. Prerequisite: Consent of advisor.

**MTH 598. THESIS**      **THREE TO SIX CREDIT HOURS**

**Philosophy (PHL)**Dr. Richard R. Baker, *Chairman*

- PHL 503. PHILOSOPHY OF MAN** **THREE CREDIT HOURS**  
 A philosophical investigation of man's dignity as discovered through an analysis of his nature, his origin, and his destiny. (Only for those students without sufficient philosophical background for PHL 510.)
- PHL 510. PHILOSOPHY OF SCIENCE** **THREE CREDIT HOURS**  
 An examination of the philosophical problems of the natural, social, and management sciences. Topics include: the aims of inquiry; the objects of scientific study; theories; models; hypotheses; laws; measurements; inferences; predictions; explanations.
- PHL 525. THOMISTIC TEXTS AND COMMENTARIES** **THREE CREDIT HOURS**  
 This course features carefully selected philosophical readings from the writings of Aquinas to be submitted to a critical analysis through the aid of commentaries, including a correlation to the primary Grecian, Neoplatonic, Patristic and Arabic historical sources. A reading knowledge of Latin is desirable.
- PHL 540. ARISTOTLE'S *De Anima* AND ST. THOMAS' COMMENTARY** **THREE CREDIT HOURS**  
 A comparative study relative to problems touching on the philosophy of man, as well as some problematics of human knowledge; but principally contrasting the animistic hylomorphism of Aristotle with the synolistic hylomorphism of Aquinas.
- PHL 541. TEXTS OF PLATO** **THREE CREDIT HOURS**  
 A detailed analysis of prescribed texts of Plato. The texts selected may vary from year to year. This course, therefore, may be repeated for credit when the topics vary.
- PHL 542. TEXTS OF ARISTOTLE** **THREE CREDIT HOURS**  
 A detailed analysis of prescribed texts of Aristotle. The texts selected may vary from year to year. This course, therefore, may be repeated for credit when the topic varies.
- PHL 543. TEXTS OF PRESOCRATIC PHILOSOPHERS** **THREE CREDIT HOURS**  
 An in depth study of the origins of philosophical thought from Hesiod and Thales to Socrates. This course will contrast the mythological and scientific traditions for philosophical development.
- PHL 545. MODERN FRENCH PHILOSOPHY** **THREE CREDIT HOURS**  
 An examination of the leading philosophical movements in France with particular emphasis on the rationalism of Decartes, the spiritualistic realism of Bergson, the positivism of Comte, and the existentialism of contemporary philosophers.
- PHL 550. PHILOSOPHY OF HISTORY** **THREE CREDIT HOURS**  
 After surveying the various metaphysical interpretations of the meaning of history, the course then analyzes the literature concerned with the epistemological problems of writing history.
- PHL 553. KANTIANISM I** **THREE CREDIT HOURS**  
 A close analysis of Kant's monumental work, the *Critique of Pure Reason*, with emphasis on its metaphysical implications, followed by a brief study of Kantian ethics in the *Foundations of the Metaphysics of Morals*.
- PHL 554. KANTIANISM II** **THREE CREDIT HOURS**  
 A study of Kantian ethics through a careful analysis of Kant's *Critique of Practical Reason*, with emphasis on the questions of law, freedom, happiness and God.

- PHL 555. MODERN GERMAN PHILOSOPHY** **THREE CREDIT HOURS**  
 A tracing of post-Kantian influences in modern Germanic philosophy through the idealistic developments of Fichte, Schelling and Hegel; stressing their "rationalistic" theological thought, their return to metaphysics and their varying intellectual intuitionisms.
- PHL 556. PHILOSOPHY OF HEGEL** **THREE CREDIT HOURS**  
 A detailed examination of Hegel's *Phenomenology of Mind*, with additional reference to his *Science of Logic*, *Lectures on the Philosophy of Religion*, and *Lectures on the History of Philosophy*.
- PHL 560. MODERN BRITISH PHILOSOPHY** **THREE CREDIT HOURS**  
 A survey of the 17th and 18th century reactionary and transitional empiricists from Bacon and Hobbes through Locke, Berkeley and Hume. Points of stress include: (1) their psychologico-epistemological approach to experience and fact; (2) their relation to positivism; (3) a critique of ideas, the value of knowledge, the notion of substance, causality and realism.
- PHL 565. AMERICAN PRAGMATISM** **THREE CREDIT HOURS**  
 An investigation of Dewey's concept of experience and its roots in the philosophical writings of Peirce and William James.
- PHL 570. EXISTENTIALIST PHILOSOPHY** **THREE CREDIT HOURS**  
 A penetrating study of the existentialist movement, its nature and causes, along with a survey of the position of some of the outstanding existentialists, such as Kierkegaard, Sartre, Jaspers, Heidegger, and Marcel.
- PHL 571. PERCEPTION AND COGNITION** **THREE CREDIT HOURS**  
 A survey of some fundamental and relevant neuro-physiological, psychological, and phenomenological studies on perception, with emphasis on the various epistemological issues that are at stake.
- PHL 575. CONTEMPORARY PHILOSOPHIES OF EVOLUTION** **THREE CREDIT HOURS**  
 A study of the influence of evolutionary thought in Bergson, Pragmatism of James and Dewey, Marxism, contemporary Christian thought, especially that of Teilhard de Chardin.
- PHL 576. CONTEMPORARY PROBLEMS IN THE PHILOSOPHY OF GOD** **THREE CREDIT HOURS**  
 Seminar dedicated to the reading, analysis, and discussion of the works of contemporary philosophies of God. The works of Alfred North Whitehead, Samuel Alexander, Charles Hartshorne, Paul Tillich, Karl Barth, Rudolf Bultmann, Emil Brunner, Dietrich von Bonhoeffer, N. Berdyayev, N. Lossky, R. Niebuhr, H. Cox, A. Hamilton, P. Van Buren, C. B. Daly, I. T. Ramsey, J. Moreau, and of other minor authors will be analyzed.
- PHL 580. CONTEMPORARY NATURALISM AND REALISM** **THREE CREDIT HOURS**  
 An expository and critical study of some areas of contemporary currents in philosophical thought: naturalism, principally the American naturalism of John Dewey; the intentionality and axiological qualities of a realistic philosophy; the philosophy of the human personality in its philosophico-Christian dimensions.
- PHL 585. PHENOMENOLOGY** **THREE CREDIT HOURS**  
 An analysis of the phenomenological method based primarily on a critical study of Husserl's *Cartesian Meditations*, the fundamental commentary of the founder of phenomenology on his own method.

- PHL 590. DIRECTED STUDIES** **THREE CREDIT HOURS**  
 This course is offered to help the graduate student either to fill unavoidable gaps in his previous training or to study in depth a particular problem, philosopher or historical era. It will be given by qualified members of the staff of the Philosophy Department, after recommendation of the Chairman and Director of Graduate Studies in Philosophy.
- PHL 591. SEMINAR** **THREE CREDIT HOURS**  
 Discussions and reports. The topics, authors, and/or problems will be chosen by the professor conducting the seminar and the students.
- PHL 592. ANALYTIC PHILOSOPHY** **THREE CREDIT HOURS**  
 A survey of the trends of philosophic thought in America and England since 1900 as an introduction to the problems and tenor of analytic philosophy.
- PHL 594. SYMBOLIC LOGIC** **THREE CREDIT HOURS**  
 The history of symbolic logic; formalization of language; propositional and predicate calculi; interpretations; logical truth and validity; consistency, completeness and other metatheoretic considerations; systematization of classical syllogistic logic and other topics.
- PHL 598. TEACHING INTERNSHIP IN PHILOSOPHY** **ONE CREDIT HOUR**  
 Participation in seminars on the teaching of philosophy and in the directed teaching of a "Basic Problems in Philosophy" undergraduate course. Required of, and open only to, graduate philosophy assistants.
- PHL 599. THESIS** **THREE-SIX CREDIT HOURS**

**Physics (PHY)**Dr. Joseph Kepes, *Chairman*

Any 300-400 level course in Physics may be taken for graduate credit under the usual conditions. All such courses must have the approval of the department.

- PHY 505. MODERN PHYSICS FOR ENGINEERS** **THREE CREDIT HOURS**  
 Selected topics in atomic physics, the solid state, and nuclear physics; elementary quantum mechanics and application to the free-particle and the one-electron atom; X-rays, elementary particles, cosmic rays will also be studied to some extent.
- PHY 511. CLASSICAL MECHANICS** **THREE CREDIT HOURS**  
 Analytical dynamics; variational techniques; Hamilton's Principle; the Lagrangian, the Hamiltonian, Hamilton-Jacobi and Poisson Bracket formulations of mechanics; Galilean and Lorentz invariance; and relativistic dynamics. Prerequisite: Phy 303-304 or equivalent.
- PHY 512. CLASSICAL THEORY OF FIELDS** **THREE CREDIT HOURS**  
 Hamilton's Principle extended to fields; Lagrangian formulation used to obtain conservation laws, symmetry and invariance principles; the Klein-Gordon, Maxwell, and Dirac equations cited as examples of scalar, vector, and spinor fields; interacting fields and radiative solutions. Prerequisite: Phy 511 or consent of Instructor.
- PHY 515. STATISTICAL MECHANICS** **THREE CREDIT HOURS**  
 Basic assumptions; statistics of independent particles; the Maxwell Boltzman Distribution; Fermi-Dirac, Bose-Einstein Statistics; applications of distribution laws.

- PHY 518. THEORETICAL PHYSICS I** **THREE CREDIT HOURS**  
 Topics can include calculation techniques in Modern Physics, complex variable theory, dispersion relations, linear vector spaces, operators, matrix mechanics, eigenvalue equations. Prerequisites: MTH 403-4, or consent of instructor.
- PHY 519. THEORETICAL PHYSICS II** **THREE CREDIT HOURS**  
 Topics can include Orthogonal functions, Dirac delta function, Laplace's equation, Poisson's equation, D'Alembert's equation, transformation theorems, Green's function, Group theory. Prerequisites: Mth 403-4, or consent of instructor.
- PHY 520. ADVANCED SOLID STATE PHYSICS** **THREE CREDIT HOURS**  
 Crystal structure, thermal properties of solids; insulators; band theory of solids; semi-conductors; luminescence. Prerequisite: Phy 525 or consent of instructor.
- PHY 521. ADVANCED NUCLEAR PHYSICS** **THREE CREDIT HOURS**  
 Basic properties of the nucleus; the deuteron; nuclear binding energies; scattering; nuclear forces; high energy particles. Prerequisite: Phy 525 or consent of instructor.
- PHY 523. ADVANCED ELECTRICITY AND MAGNETISM I** **THREE CREDIT HOURS**  
 The boundary value problems of electrostatics and magnetostatics in material media; conservation laws; existence and nature of electromagnetic radiation derived from Maxwell's equations; wave guides and Resonant Cavities.
- PHY 524. ADVANCED ELECTRICITY AND MAGNETISM II** **THREE CREDIT HOURS**  
 Radiating Systems, interference, and diffraction; special applications of electromagnetic theory made to plasmas, charged particle collisions, Cherenkov radiation, Bremsstrahlung, and multipole fields. Prerequisite: Phy 523.
- PHY 525. QUANTUM MECHANICS I** **THREE CREDIT 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. Prerequisite: Phy 511.
- PHY 526. QUANTUM MECHANICS II** **THREE CREDIT HOURS**  
 Linear vector spaces and spin; time dependent and time independent perturbation theory; the formal theory of scattering is developed and the importance of symmetries and rotations is discussed. Prerequisite: Phy 525.
- PHY 531. ADVANCED GRADUATE LABORATORY** **THREE CREDIT HOURS**  
 Advanced experiments in classical mechanics, electricity, magnetism, atomic, nuclear and solid state physics. Prerequisite: Approval of Graduate advisor.
- PHY 590. GRADUATE THESIS** **UP TO SIX CREDIT HOURS**  
 A research problem in selected topics of physics resulting in a written thesis.
- PHY 595. GRADUATE SEMINAR** **NO CREDIT**  
 Weekly Seminars presented by graduate students, faculty and guest lecturers on current topics.
- PHY 599. SPECIAL PROBLEMS IN (NAMED AREA)** **ONE TO THREE CREDIT HOURS**  
 Laboratory or library work in one of the following selected topics: Solid State Physics, Polymer Physics, X-Rays, Nuclear Physics, Modern Optics, General Physics, Advanced Quantum Mechanics. May be taken more than once.



**Political Science (POL)**

Dr. Antonio E. Lapitan, *Chairman*  
 Mr. Lyndon Abbott, *director MPA Program*

Graduate students in Political Science may take certain 400 level courses for graduate credit, with the permission of the Chairman of the Department.

**POL 501. SCOPE AND METHODS OF POLITICAL SCIENCE** **THREE CREDIT HOURS**  
 Explores the relation of Political Science to other disciplines, the proper methodologies, and the basic concepts of the study of politics.

**POL 506. POLITICAL GEOGRAPHY** **THREE CREDIT HOURS**  
 Basic geopolitical concepts of land, sea, air, and military power are studied in the context of global geostrategy. A series of critical areas are taken in depth.

**POL 508. SEMINAR: AMERICAN FOREIGN POLICY** **THREE CREDIT HOURS**  
 Attention will be given to the process of policy development and the substance of American foreign policies in regard to selected areas and problems.

**POL 509. SEMINAR: NATIONAL SECURITY POLICY** **THREE CREDIT HOURS**  
 A critical study of the assumptions and content of Post World War II national security policies and an evaluation of the processes by which the policies have been made.

**POL 510. PUBLIC ADMINISTRATION** **THREE CREDIT HOURS**  
 A study of the administrative system and the administrative process in the American national government. Structural and behavioral approaches are compared.

**POL 514. HISTORY OF POLITICAL THEORY** **THREE CREDIT HOURS**  
 A study of the Western political heritage as fashioned by the great Western political thinkers from Plato through Marx and Lenin.

**POL 520. SEMINAR: POLITICS OF DEVELOPING NATIONS** **THREE CREDIT HOURS**  
 A systematic analysis of the political processes and the nature of political development in developing countries.

**POL 521. INTERGOVERNMENTAL RELATIONS** **THREE CREDIT HOURS**  
 Interaction of different levels of government in the United States; problems of federalism; interstate compacts; federal-urban problems.

**POL 522-528. SEMINAR: COMPARATIVE POLITICS** **THREE CREDIT HOURS**  
 A systematic analysis of the political structures and processes of selected country or countries in each of the following areas with emphasis on their capabilities to maintain political stability.

- |                        |                        |
|------------------------|------------------------|
| Pol 522 Soviet Union   | Pol 526 Latin America  |
| Pol 523 Eastern Europe | Pol 527 Far East       |
| Pol 524 Western Europe | Pol 528 Southeast Asia |
| Pol 525 Africa         |                        |

**POL 530. SEMINAR: INTERNATIONAL LAW** **THREE CREDIT HOURS**  
 Principles and practice in public international law, including study of sources, institutions, and leading cases.

**POL 535. FISCAL ADMINISTRATION** **THREE CREDIT HOURS**  
 Study of tax systems, the budgetary process, and public fiscal management, with emphasis on current practice and problems.

- POL 540. PROBLEMS IN PUBLIC ADMINISTRATION** **THREE CREDIT HOURS**  
A seminar on selected problems in public management. May be repeated once.
- POL 545. SEMINAR: URBAN POLITICS** **THREE CREDIT HOURS**  
A study of the formal and informal patterns of political action and government in urban areas, relations among government units, community power structure and the formulation and execution of public policy.
- POL 552. GOVERNMENT PLANNING** **THREE CREDIT HOURS**  
Urban land utilization with an emphasis upon zoning, housing, and economic development. Urban renewal and criteria for land-use in inner-city areas are considered.
- POL 557. SEMINAR: STATE GOVERNMENT AND POLITICS** **THREE CREDIT HOURS**  
A study of the political institutions, systems, and processes of state government with consideration of the problems of federalism and constitutional reform.
- POL 560. SEMINAR: AMERICAN POLITICAL THOUGHT** **THREE CREDIT HOURS**  
A study of basic political ideas that have influenced the development of American thought.
- POL 567. STUDIES IN POLITICAL SCIENCE** **THREE CREDIT HOURS**  
Directed research and readings on specific topics in American politics and institutions; public law, theory and methodology; comparative politics; and international relations. May be repeated once.
- POL 569. SEMINAR IN POLITICAL THEORY** **THREE CREDIT HOURS**  
A research seminar with emphasis upon the various facets of classical or contemporary political theory. May be repeated once when the content changes.
- POL 571. SEMINAR: CONSTITUTIONAL LAW** **THREE CREDIT HOURS**  
A study of the judicial process in the development of the American Constitution. Competing constitutional philosophies are explored in the context of landmark cases. Emphasis is placed upon contemporary developments.
- POL 572. ADMINISTRATIVE LAW** **THREE CREDIT HOURS**  
The judicial functions and activities of federal agencies; formal and informal processes in administrative hearings; basic principles of administrative law; judicial interpretation; the question of the increased judicialization of the administrative process.
- POL 573. SEMINAR: CIVIL LIBERTIES** **THREE CREDIT HOURS**  
Concentration on the endless philosophical conflict between the demand for individual liberty on the one hand and the need for authority on the other. Major focus will be on the United States.
- POL 574. SEMINAR: AMERICAN POLITICS** **THREE CREDIT HOURS**  
This course will involve, in each term in which it is offered, an analysis of presidential leadership and politics, statutory regulation of political parties, or demography and political behavior. May be repeated once.
- POL 575. SCIENCE AND PUBLIC POLICY** **THREE CREDIT HOURS**  
A study of the relationship between scientific-technical developments and governmental institutions, policies, and processes.

- POL 576. PUBLIC PERSONNEL ADMINISTRATION** **THREE CREDIT HOURS**  
A survey of the development of personnel administration in government. Specific questions such as position classification, morale, and recruitment are considered. Supplemented by visiting lecturers from government agencies.
- POL 577. MUNICIPAL GOVERNMENT** **THREE CREDIT HOURS**  
An analysis of urban government in the United States, with emphasis on contemporary problems of organization of services, urban renewal, and city planning.
- POL 578. STUDIES IN PUBLIC ADMINISTRATION** **THREE CREDIT HOURS**  
Directed research and readings on specific topics in public administration. May be repeated once.
- POL 581. ORGANIZATIONAL THEORY** **THREE CREDIT HOURS**  
A study of organization and contemporary bureaucracy in terms of decision-making and rationality; problems of authority; behavioral political, and technical influences on organization; and evaluation of various theoretical approaches to organization.
- POL 582. COMPARATIVE PUBLIC ADMINISTRATION** **THREE CREDIT HOURS**  
A study of the governmental administrative systems of Europe and the developing countries.
- POL 585. SEMINAR: SOVIET FOREIGN POLICY** **THREE CREDIT HOURS**  
A study of the basic Soviet foreign policy process, emphasizing the role of the Community Party and its ideology. Discussion of areas of Soviet foreign policy.
- POL 589. SEMINAR: INTERNATIONAL RELATIONS** **THREE CREDIT HOURS**  
A research seminar with emphasis placed upon the current theory and problems of international relations or organizations. May be repeated once when the content changes.
- POL 595. GOVERNMENT INTERNSHIP** **THREE-SIX CREDIT HOURS**  
Assignment to appropriate government agencies or units for the purpose of gaining wide experience with the administrative system through a rotating program of work experience.
- POL 599. THESIS** **THREE-SIX CREDIT HOURS**  
A research monograph demonstrating basic command of appropriate literature and research methodology.

## **Psychology (PSY)**

*Dr. Samuel M. Bower, Chairman*  
*Dr. Antos C. Rancurello,*  
*Director of Clinical Programs*

- PSY 501. ADVANCED STATISTICS** **THREE CREDIT HOURS**  
To provide a greater depth of understanding of the basic concepts of statistics and to introduce the students to some advanced statistical methods. Prerequisite: Permission of Instructor.
- PSY 508. ADVANCED EXPERIMENTAL PSYCHOLOGY** **THREE CREDIT HOURS**  
Theory of scaling; concepts on the transformation of data as applied to problems of sensory and cognitive functions. Prerequisite: Psy 501, permission of advisor. Two hours lecture and one two-hour lab per week.

**PSY 515. ASSESSMENT OF INTELLIGENCE** **THREE CREDIT HOURS**

Focuses on individual assessment techniques and methods of intellectual appraisal and evaluation with children, adolescents and adults. Emphasizes psychometric theory, instrument development and clinical application of those individually administered instruments for assessing cognitive functioning. Major instruments for which experience in administration, scoring and interpretation will be provided are the Stanford-Binet, Wechsler Intelligence Scale for Children, Wechsler Pre-School and Primary Scale of Intelligence and the Wechsler Adult Intelligence Scale. Prerequisites: Psy 306, Psy 402.

**PSY 516. PROJECTIVE TECHNIQUES** **THREE CREDIT HOURS**

Survey of the historical background and theoretical rationale underlying the use of personality assessment techniques, particularly projective methods with children, adolescents and adults. The Rorschach and Thematic Apperception Test are emphasized, including administration, scoring methods and interpretation. Other methods and techniques of personality evaluation are also considered. Prerequisites: Psy 567.

**PSY 517. SMALL GROUP FUNCTION** **THREE CREDIT HOURS**

Analysis of small group theory, research, and techniques with special emphasis on their implications for, and applications in group psychotherapy. Specific issues in theory, techniques, training, and areas of application in group psychotherapy are discussed. Prerequisite: Permission of instructor.

**PSY 519. PRACTICUM IN PROJECTIVE TECHNIQUES** **THREE CREDIT HOURS**

To give the student a first opportunity to gain familiarity with the administration, scoring, and interpretation of projective tests. The Rorschach and TAT will be emphasized, but the student will also be expected to show progressive mastery of other projective tests. Prerequisite: Psy 516. Permission of instructor. Requires 15-20 hours per week supervised experience in a clinical setting.

**PSY 521. DEVELOPMENTAL PSYCHOLOGY** **THREE CREDIT HOURS**

Theory and research on psychological development from conception through adolescence, maturation of behavior systems, the role of social learning in development, the effects of early experience on personality development, critical stages in development. Prerequisite: Permission of instructor.

**PSY 522. ADVANCED COGNITIVE PROCESSES** **THREE CREDIT HOURS**

Basic research paradigms for the experimental investigation of cognitive processes will be discussed. Special attention will be given to the current information processing theories of cognition. Topics will include: selective attention, visual short-term memory, pattern recognition, encoding processes, verbal short-term memory, search and retrieval processes, theories of human memory, and rule learning in concept information. Consideration will be given primarily to current research literature. Prerequisite: Permission of instructor.

**PSY 530. VERBAL LEARNING** **THREE CREDIT HOURS**

To familiarize the students with the basic approach, concepts, and findings in the area of the psychology of learning. Prerequisite: Permission of instructor.

**PSY 531. LEARNING THEORY** **THREE CREDIT HOURS**

To familiarize the students with the important learning theories of the past and the present, and the major issues among the theories. Prerequisite: Psy 501 and 530.

**PSY 532. PERCEPTION****THREE CREDIT HOURS**

A systematic study of methods and research findings in the field of human perception, together with an evaluation of theoretical interpretations. Prerequisite: Psy 501 and permission of instructor.

**PSY 533. DECISION PROCESSES****THREE CREDIT HOURS**

The purpose of this course is to provide an understanding of the theoretical and empirical developments in the psychology of human decision-making and choice behavior. The relation of various models of decision behavior to other problem areas in psychology, e.g., learning and perception, are studied. Prerequisite: Psy 501.

**PSY 536. HISTORY OF PSYCHOLOGY AS A HUMAN SCIENCE I****THREE CREDIT HOURS**

General overview of basic theoretical, methodological, and research issues in psychology as they emerged in the history of philosophy and science followed by an in-depth study of the origins of psychology as a science and its subsequent developments from 1875 to 1930. The values of historical standpoints and contributions of psychology during this period are re-integrated into the more comprehensive conception of psychology as a human science. Prerequisite: Permission of instructor.

**PSY 537. HISTORY OF PSYCHOLOGY AS A HUMAN SCIENCE II****THREE CREDIT HOURS**

In-depth study of theoretical, methodological, and research issues in psychology as they became polarized in contemporary behavioristic trends on the one hand, and contemporary personalistic, existential, and phenomenological trends on the other. A reintegration of the main contributions of these trends enabling the student to develop a competent outlook of psychology as a human science. Prerequisite: Psy 536, permission of instructor.

**PSY 541. COMPUTER APPLICATIONS TO BEHAVIORAL SCIENCE****THREE CREDIT HOURS**

A survey is made of several psychological studies in which the use of the computer was critical to the experimental design. Prerequisite: Psy 501, permission of instructor.

**PSY 552. CLINICAL PSYCHOLOGY****THREE CREDIT HOURS**

An integrated approach to the subject matter of clinical psychology through clinical inquiry (research) and clinical service (practice). Emphasis will be placed upon recent trends in Community Psychology. Prerequisites: Psy 313, permission of instructor.

**PSY 565. PSYCHOPHYSIOLOGY****THREE CREDIT HOURS**

The neurophysiological analysis of attention, sensation, perception, emotion, motivation, and learning. Electrophysiological methods are studied as techniques in the study of the nervous system and behavior. Prerequisite: Permission of instructor.

**PSY 566. CLERKSHIP****THREE CREDIT HOURS**

To train the student to develop sensitivity in clinical interviewing, behavior observation, test interpretation and psychotherapeutically oriented activities under supervision. Prerequisite: Psy 516, 519. Requires 20 hours per week supervised work in a clinical setting.

**PSY 567. THEORIES OF PERSONALITY****THREE CREDIT HOURS**

In-depth critical analysis of contemporary personality theories. Re-integration of their main assumptions and research findings into a unified and comprehensive view of the human person. Prerequisite: Permission of instructor.

**PSY 568. THEORIES OF PSYCHOTHERAPY** **THREE CREDIT HOURS**  
 In-depth critical analysis of contemporary theories of psychotherapy. Re-integration of their main contribution into a more functional and more diversified approach to the practice of psychotherapy. Prerequisite: Psy 552, 567, permission of instructor.

**PSY 570. THE PRACTICE OF PROFESSIONAL PSYCHOLOGY** **THREE CREDIT HOURS**  
 A treatment of selected issues relevant to the practice of professional psychology. Psychology as a science and profession; value orientation; legal status of practicing psychologist; ethical issues and practices; interprofessional relations; and practical problems of everyday functioning in professional psychology. Prerequisite: Psy 552, permission of instructor.

**PSY 571. INDIVIDUAL PSYCHOTHERAPY: THEORY AND PRACTICE** **THREE CREDIT HOURS**  
 A didactic and experiential treatment of the more personalistic approaches to individual psychotherapy (e.g., Adlerian, Rogerian). Theoretical, experimental, and ethical issues covered, but stress is placed on the development of skill in the therapeutic process per se. Prerequisite: Psy 567, 568.

**PSY 579. PRACTICUM IN INTERVIEWING AND COUNSELING** **TWO CREDIT HOURS**  
 This course is designed to give the graduate student experience in counseling undergraduate students under supervision. This course would follow courses in theory in the counseling area. Prerequisite: Permission of instructor.

**PSY 585. EXPERIMENTAL SOCIAL PSYCHOLOGY** **THREE CREDIT HOURS**  
 Develop an understanding and working knowledge of scientific method in general and social psychology methods in specific. Demonstrate an ability to plan, conduct, and report on investigations in social psychology. Stress is placed on applying design methods to concepts and issues relevant to social psychology. Prerequisite: Psy 302, 308, 408.

**PSY 592. SEMINAR IN STATISTICS** **THREE CREDIT HOURS**  
 To give the student a working knowledge of specialized statistical techniques such as analysis of variance, nonparametric statistics, correlational methods, etc. The specific statistical technique covered in the course may be different from one offering to the next depending upon the interests and desires of the graduate students and the judgments of the departmental faculty. Prerequisite: Psy 501.

**PSY 593. MATHEMATICAL PSYCHOLOGY I** **THREE CREDIT HOURS**  
 To familiarize the students with the role of mathematics as a discursive, normative, and descriptive tool in psychology. Prerequisite: Psy 501.

**PSY 594. MATHEMATICAL PSYCHOLOGY II** **THREE CREDIT HOURS**  
 Continuation of Psy 593 with emphasis upon computer applications. Prerequisite: Psy 593.

**PSY 596. EXPERIMENTAL RESEARCH** **ONE-TWELVE CREDIT 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: Permission of advisor.

**PSY 597. READINGS** **ONE-THREE CREDIT HOURS**  
 Intended to stimulate graduate students for establishing competence in areas of research and investigation. May be repeated. Permission of Instructor.

**PSY 599. THESIS** **THREE CREDIT HOURS**  
 Under guidance of Advisor, student develops problem, constructs apparatus, collects data and provides interpretation of the data for staff assessment.

**Theological Studies (THL)** Rev. Matthew F. Kohmescher, S.M., *Chairman*

Any of the 400 level undergraduate courses in Theological Studies may count for graduate credit under the usual conditions.

**THL 501. BIBLICAL HEBREW** **THREE CREDIT HOURS**  
 An introduction to the morphology and syntax of biblical hebrew designed to facilitate the handling of basic tools and the reading of simple prose texts.

**THL 502. BIBLICAL GREEK** **THREE CREDIT HOURS**  
 An introduction to Koine (NT) Greek. Vocabulary, Grammar, and Syntax. Selective readings of New Testament texts.

**THL 510. CHRISTIAN DOCTRINE IN THE EARLY CHURCH** **THREE CREDIT HOURS**  
 An analysis of the development of doctrine from the sub-apostolic age to the beginning of the Middle Ages. Areas covered include: The Apostolic Fathers. The Apologists. Gnosticism. Irenaeus. Marcion. Tertullian. The Schools of Antioch, Alexandria, and Cappadocia. John of Damascus.

**THL 511. CHRISTOLOGICAL CONTROVERSIES SURROUNDING CHALCEDON** **THREE CREDIT HOURS**  
 A critical, in-depth study of the great Christological controversies leading to the formulation of the Definition of Chalcedon in 451 A.D. and subsequent to this Definition.

**THL 513. THE DOCTRINE OF THE TRINITY** **THREE CREDIT HOURS**  
 An examination of some of the classical interpretations of the Trinity from the early church to modern times. The problems involved in the relation of the Trinity to the Doctrine of God, Christology and the work of the Holy Spirit.

**THL 514. JEWISH THOUGHT IN THE EARLY CHRISTIAN ERA** **THREE CREDIT HOURS**  
 An analysis of the influence of Jewish thought in the early Christian period with particular reference to Philo of Alexandria and Hellenistic Judaism.

**THL 515. FATHERS OF THE CHURCH** **THREE CREDIT HOURS**  
 An analysis of the life and thought of individual Fathers of the Church. May be taken more than once. 1. Augustine, 2. Origen.

**THL 519. SCHOLASTICISM** **THREE CREDIT HOURS**  
 The course proposes to treat the origins and development of the theological methodology known as scholasticism, as well as the great themes and synthesis associated with the major scholastics of the Thirteenth Century, Thomas of Aquinas and Bonaventure.

**THL 522. MEDIEVAL THEOLOGIAN** **THREE CREDIT HOURS**  
 A critical study of the life and thought of individual medieval theologians. May be taken more than once. 1. Thomas Aquinas.

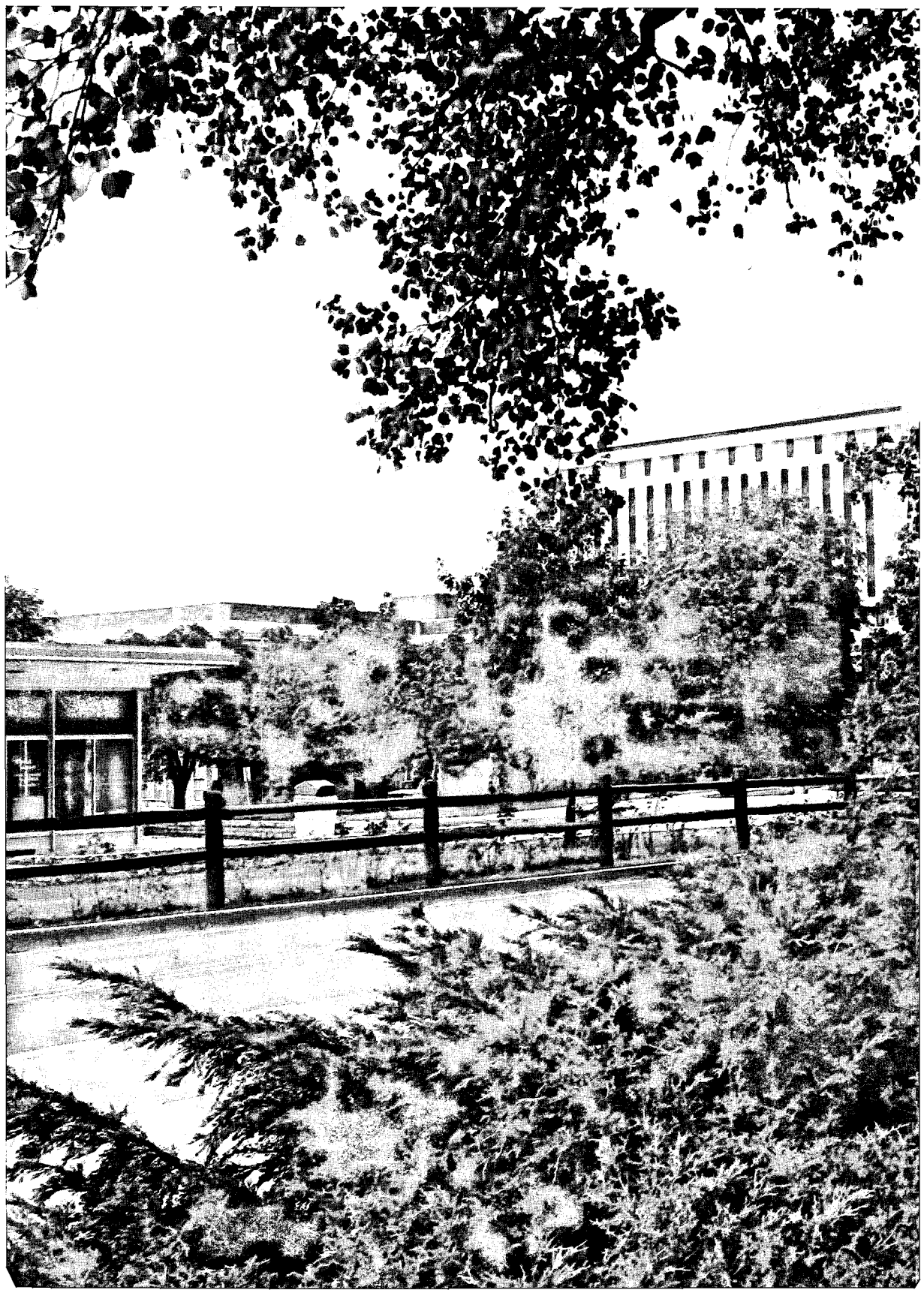
**THL 525. THEOLOGY OF TRENT** **THREE CREDIT HOURS**  
 A critical and historical study of the teachings of the Council of Trent.

- THL 526. THE THEOLOGY OF REFORMERS** **THREE CREDIT HOURS**  
 Historical, critical and comparative studies of the theologies of Martin Luther, John Calvin, Huldreich Zwingli, and the Radical Reformers. Primary sources will be carefully and critically examined.
- THL 528. THE REFORMATION AND AMERICAN THOUGHT** **THREE CREDIT HOURS**  
 An analysis, historical and critical, of the impact of the Continental and English Reformation on the formation and development of American Theological thought. Reactions, criticisms, and secessions.
- THL 542. OLD TESTAMENT BACKGROUNDS** **THREE CREDIT HOURS**  
 An introduction to Ancient Near Eastern Studies, a survey of the literature and the relationship to the Old Testament. May be taken more than once. 1. Mythology, 2. Historiography.
- THL 543. FORM CRITICISM** **THREE CREDIT HOURS**  
 An investigation of the origin, development, and methodology of Form Criticism. Special attention will be given to both the theoretical understanding and practical application of this method of biblical criticism.
- THL 544. OLD TESTAMENT EXEGESIS** **THREE CREDIT HOURS**  
 A critical and exegetical study of selected writings of the Old Testament. May be taken more than once. 1. Hexateuch, 2. Historical Books, 3. Prophets, 4. Psalms, 5. Wisdom Literature.
- THL 547. OLD TESTAMENT THEOLOGY** **THREE CREDIT HOURS**  
 An examination of the discipline of Old Testament Theology. Special consideration will be given to the relationship of history and theology.
- THL 551. NEW TESTAMENT BACKGROUNDS** **THREE CREDIT HOURS**  
 A thorough study of selected individual points, e.g. Gnosticism, Qumran, etc., which are needed for an understanding of the New Testament. May be taken more than once. 1. Qumran, 2. Gnosticism.
- THL 552. THE QUESTION OF THE HISTORICAL JESUS** **THREE CREDIT HOURS**  
 This course addresses itself to two large problem areas of New Testament interpretation, the complex of issues surrounding the question of the historical Jesus and the new hermeneutic, studying them in their historical perspective, present state of development and possible future directions.
- THL 554. NEW TESTAMENT EXEGESIS** **THREE CREDIT HOURS**  
 A critical and exegetical study of selected writings of the New Testament. May be taken more than once. 1. Synoptics, 2. Luke-Acts, 3. John, 4. Pauline Corpus.
- THL 557. NEW TESTAMENT THEOLOGY** **THREE CREDIT HOURS**  
 A thorough study of one theme in the theology of the New Testament. May be taken more than once.
- THL 560. THEOLOGICAL MOVEMENTS** **THREE CREDIT HOURS**  
 A study of selected movements in theology in the 19th and 20th centuries. May be taken more than once. 1. Liberalism and Modernism, 2. Process Philosophy and Theology.



- THL 561. MODERN THEOLOGIANS THREE CREDIT HOURS  
 An in-depth study of the life and work of selected modern theologians. May be taken more than once.
- THL 562. FAITH AND REASON THREE CREDIT HOURS  
 An historical and critical treatment of selected problems inherent in the theological process. May be taken more than once.
- THL 564. THE CHRISTIAN DOCTRINE OF GOD THREE CREDIT HOURS  
 This course will concentrate primarily on the recent discussion about God, examining the major options in contemporary theology, including the theologies of the "death of God."
- THL 565. CHRISTOLOGY THREE CREDIT HOURS  
 An examination of the problems faced by contemporary theologians in discussing Jesus and his significance for Christian faith, and many of the solutions offered to these problems.
- THL 566. ECCLESIOLOGY THREE CREDIT HOURS  
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 A study of the role of the Mother of God in the Incarnation with special treatment of the Divine Maternity and its relation to the Spiritual Maternity and to the other functions of Mary.
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- THL 572. APPROACHES TO MORALITY THREE CREDIT HOURS  
 An attempt to establish the foundations of Christian morality, consisting of an historical survey of approaches and developments from the New Testament period to the present.
- THL 573. EVOLUTION AND ETHICS THREE CREDIT HOURS  
 The contemporary theology of Christian existence as a whole, stressing the conscious unity of existence; the implications of evolution for theology and ethics.
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 An examination of the implications of the historical view of life for contemporary catechesis. A comparison and critique of various approaches to the interpretation of history's impact upon the understanding of man and the meaning of life. (Presupposes a course in the theology of revelation.)
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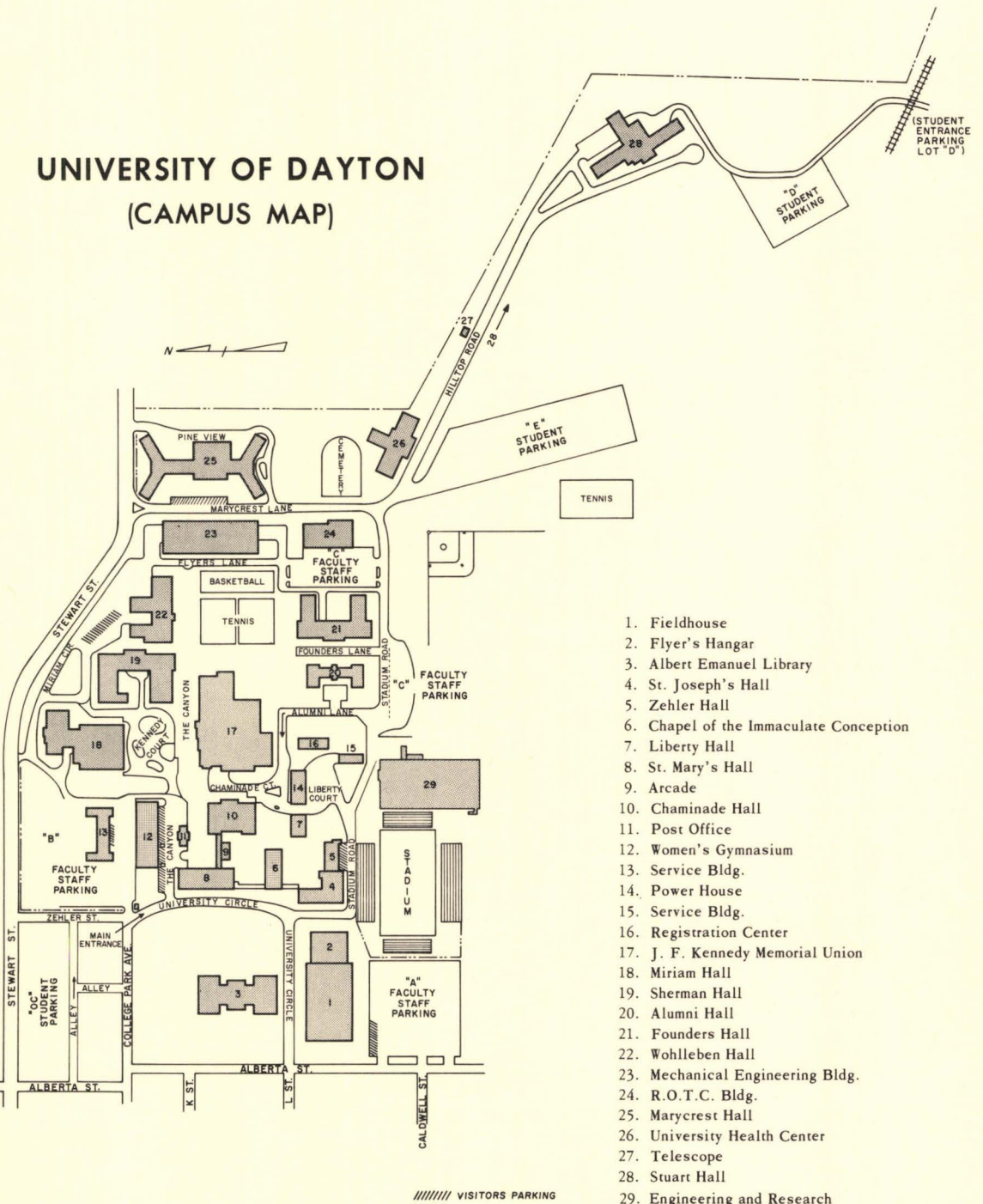
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3. Albert Emanuel Library
4. St. Joseph's Hall
5. Zehler Hall
6. Chapel of the Immaculate Conception
7. Liberty Hall
8. St. Mary's Hall
9. Arcade
10. Chaminade Hall
11. Post Office
12. Women's Gymnasium
13. Service Bldg.
14. Power House
15. Service Bldg.
16. Registration Center
17. J. F. Kennedy Memorial Union
18. Miriam Hall
19. Sherman Hall
20. Alumni Hall
21. Founders Hall
22. Wohlleben Hall
23. Mechanical Engineering Bldg.
24. R.O.T.C. Bldg.
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