Mrs. Sheehan

YOUNGSTOWN STATE UNIVERSITY BULLETIN

GRADUATE CATALOG ISSUE 1976-77

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GRADUATE CATALOG ISSUE

EFFECTIVE MARCH 29, 1976

YOUNGSTOWN, OHIO

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The Academic Calendar 1976-77

FALL QUARTER 1976

Sept. 16	Thurs.	1000	Faculty Meeting
Sept. 20	Mon.	0800	Classes begin
Sept. 25	Sat.	1100	Last day to add a class
Sept. 27	Mon.	1700	Last day to apply for fall quarter graduation
Oct. 30	Sat.	1100	Last day for withdrawing with a W
Nov. 11	Thurs.		Legal holiday—University closed
Nov. 24	Wed.	2300	Thanksgiving academic break begins
Nov. 29	Mon.	0800	Thanksgiving academic break ends
Dec. 6	Mon.	0800	Final examinations begin
Dec. 11	Sat.	1430	Final examinations end
Dec. 24	Fri.		Christmas holiday—University closed
Dec. 31	Fri.		Legal holiday—University closed

WINTER QUARTER 1977

Jan. 3	Mon.	0800	Classes begin
Jan. 8	Sat.	1100	Last day to add a class
Jan. 10	Mon.	1700	Last day to apply for winter quarter graduation
Jan. 17	Mon.		Legal holiday—University closed
Feb. 12	Sat.	1100	Last day for withdrawing with a W
Feb. 21	Mon.		Legal holiday—University closed
Mar. 14	Mon.	0800	Final examinations begin
Mar. 19	Sat.	1430	Final examinations end
Mar. 26	Sat.	1000	Winter Commencement

SPRING QUARTER 1977

Mar. 28	Mon.	0800	Classes begin
Apr. 2	Sat.	1100	Last day to add a class
Apr. 4	Mon.	1700	Last day to apply for spring quarter graduation
May 7	Sat.	1100	Last day for withdrawing with a W
May 30	Mon.		Legal holiday—University closed
June 6	Mon.	0800	Final examinations begin
June 11	Sat.	1430	Final examinations end
June 18	Sat.	1000	Spring Commencement

SUMMER QUARTER 1977

June 16	Thurs.	0800	Classes begin—entire summer quarter and first term
June 20	Mon.	1800	Last day to add a class—first term
June 22	Wed.	1700	Last day to add a class—entire summer quarter
June 27	Mon.	1800	Last day to apply for summer quarter graduation
July 4	Mon.		Legal holiday—University closed
July 7	Thurs.	1700	Last day for withdrawing with a W—first term classes

July 21	Thurs.	2200	First term ends (Final examinations for first term classes are given during last scheduled class period)
July 23	Sat.	0800	Second term begins
July 27	Wed.	1700	Last day to add a class—second term
July 28	Thurs.	1700	Last day for withdrawing with a W—Entire summer quarter classes
Aug. 12	Fri.	1700	Last day for withdrawing with a W—second term classes
Aug. 26	Fri.	2200	Final examinations end—entire summer quarter classes (Final examinations given during last scheduled class period)
Aug. 26	Fri.	2200	Final examinations end—second term classes (Final examinations given during last scheduled class period)
Aug. 26	Fri.	2200	Second term and entire summer quarter end
Aug. 27	Sat.	1000	Summer Commencement

Times provided above are based on the 24-hour system, in which the day begins at midnight and hours are numbered consecutively through 2400. Thus, 8:00 a.m. is 0800, and 8:00 p.m. is 2000.

All registration is by appointment only and is concluded prior to the beginning of classes for each quarter.

General Information

YOUNGSTOWN STATE UNIVERSITY

Youngstown State University is located in downtown Youngstown, a major industrial center in Northeastern Ohio midway between Pittsburgh and Cleveland.

Youngstown State University had its beginning in 1908 with the establishment of the School of Law of the Youngstown Association School, sponsored by the Young Men's Christian Association.

In 1920, the State of Ohio empowered the school to grant the degree Bachelor of Laws; in the same year the school offered a four-year course in business administration. In 1921, the school changed its name to The Youngstown Institute of Technology, and liberal arts classes were offered, in the evening, for the first time.

In 1927, the College of Arts and Sciences, offering daytime classes for the first time, was established. In 1928, the Institute changed its name to the Youngstown College, and in 1930, the College conferred the degree Bachelor of Arts for the first time.

Dana's Musical Institute, founded in nearby Warren in 1869, became the Dana School of Music of the College in 1941. In 1946, the engineering department, organized several years before, became the William Rayen School of Engineering; two years later the business administration department became the School of Business Administration; and in 1960, the department of education became the School of Education. The Graduate School and the Technical and Community College were established in 1968. In 1972, the University became a member of a consortium formed by the University of Akron, Kent State and Youngstown State universities to sponsor the Northeastern Ohio Universities College of Medicine. The College of Fine and Performing Arts was established in 1974.

In 1944, the trustees of the Young Men's Christian Association transferred control of the institution to members of the Corporation of Youngstown College, and in 1955, the corporation was rechartered as The Youngstown University. In 1967, the University joined the Ohio system of higher education and the name was changed to Youngstown State University. A Board of Trustees of nine members was appointed by the Governor with concurrence by the Senate. As in the case of other state-assisted institutions in the Ohio higher education system, the University is also responsible to the Ohio Board of Regents.

From 1931 to 1966, Dr. Howard W. Jones served as chief executive of the University. In September 1966, he was succeeded by Dr. Albert L. Pugsley, former administrative vice president at Kansas State University.

Dr. Pugsley was the University's second president. Dr. John J. Coffelt, vice president for administrative affairs at the University since 1968, became president in 1973.

The University offers complete curriculums in the liberal arts and in many technical and professional undergraduate fields. The degrees Bachelor of Arts, Bachelor of Engineering, Bachelor of Fine Arts, Bachelor of Music, Bachelor of Science, Bachelor of Science in Applied Science, Bachelor of Science in Education, and Bachelor of Science in Business Administration are granted. A rapidly expanding selection of two-year programs leading to the degrees Associate in Arts, Associate in Applied Business, and Associate in Applied Science is offered. The University is accredited by the North Central Association of Colleges and Secondary Schools and by appropriate professional accrediting bodies. A co-educational institution, it had an enrollment of 300 students in 1930, grew to 2,000 in the 1940's, tripled by the 1950's, reached 10,000 in the mid-sixties, and recorded nearly 15,600 in the fall of 1975.

Equal Opportunity Practices

In the operations and activities of Youngstown State University there shall be no discrimination on the basis of race, color, sex, religious belief, country of national origin, or ancestry. This policy shall apply to employment as well as all operational aspects of the University involving students, faculty, the use of University buildings and other facilities, and to promotion or discharge of members of faculty or other employees.

THE CAMPUS

During its earlier years the institution had a number of homes. Starting in the old Central Y.M.C.A. building, it occupied various sites on Wick Avenue until the completion of Jones Hall in 1931. Additional buildings have been constructed and nearby properties converted to University use, so that today the campus extends through much of an area four blocks long and three blocks wide.

The University is currently engaged in a multi-million dollar campus development program. The first major step was the completion in 1966 of Kilcawley Center, which provides 89,000 square feet of floor space. The building contains dining and snack bar facilities, a large student lounge, faculty lounge, meeting rooms, a dormitory unit for 210 men, and space for numerous other student activities. A 92,000-square-foot addition opened in 1974 provides facilities for a central information and message center; recreation and games; social activities and parties; conferences and committee meetings; exhibition of painting, sculpture and

other art forms; student government and activities offices; food service; and reading, TV viewing, and general lounging.

In 1967, the Ward Beecher Science Hall, a large addition to the Science Building, was completed, bringing the total floor space to 132,000 square feet. This structure contains laboratories, classrooms, a planetarium, and offices for chemistry, biology, physics, geology, and astronomy. The planetarium is the largest in Ohio in seating capacity (126 seats), and in 1967 ranked 18th in size in the country.

The University opened its Engineering Science Building in 1968. This building, with a floor space of 171,000 square feet, houses the William Rayen School of Engineering and the Computer Center. The structure contains an auditorium seating 288, a fluid-flow laboratory that extends two stories, a chemical engineering chamber that extends three floors to accommodate absorption and distillation equipment.

In September 1970, the Lincoln Project building, made possible by The University Foundation, Inc., was dedicated. The six-story structure houses the School of Business Administration, the offices of the Graduate School, and the Department of Sociology and Anthropology. In addition to ample office space, the 59,000 square feet of floor space provides 34 classrooms, two seminar rooms, and a lecture hall with 96 seats.

Beeghly Physical Education Center was completed early in 1972. The building contains some 198,000 square feet of floor space and houses the Department of Health and Physical Education and the Athletic Department. Its facilities include a gymnasium with spectator seating for nearly 6,000, and an Olympic-size swimming pool. There are 17 classrooms including laboratories for health research and kinesiology; separate gymnasiums for wrestling, weight lifting, gymnastics, and physical education for the handicapped; handball and squash courts; and a rifle range.

The Technical and Community College Building, completed in 1976, houses the departments and the dean of the Technical and Community College as well as the Media Center, the Geography Department, and the Mathematics Department. One of the largest buildings on campus, it contains 52 classrooms, 70 laboratories, 169 offices, and 23 conference-seminar rooms in 191,000 square feet of floor space.

FACILITIES AND SERVICES

The William F. Maag Library

The University's William F. Maag Library opened in January 1976. The new facility, a six-story structure built at a cost of six million dol-

lars, is an attractive and comfortable environment for study and research. A member of the Ohio College Library Center automated system, the Library provides reference, government document, interlibrary loan and other services necessary to meet the needs of the University community.

The Library offers instructional and research materials in books, periodicals and microforms. These holdings number nearly 350,000 bound volumes and over 380,000 microforms. Periodicals, microforms and micro readers are housed on the first floor. Copy machines are available in this area for student use. The second floor is the main floor, where user services and Library offices are located. The book collection is distributed throughout the second through sixth floors in open stacks, with split level design between stack and reading areas. Study carrels and Scholar Studies are located on five of the floors.

The Computer Center

Another centralized facility is the Computer Center. Serving both academic and administrative needs, the Center operates an IBM 370/145 computer having one million characters of core memory and one billion characters of disk memory. The computer is complemented by a variety of peripheral equipment: tape memory, high-speed printers, paper tape reader, punched card readers, card punch, and X-Y plotter with 30-inch continuous-feed drum.

The graduate student is able to access the computer using punched cards or interactive terminals at four sites around the campus. For this purpose, the student has available 30 television and typewriter terminals, 16 keypunches, three card reading stations, two printing stations, and an analog-to-digital station linking laboratory instruments to the computer. All of these services are available to the graduate student in connection with course work and research projects.

The Bookstore

The Youngstown State University Bookstore, located at the west end of Kilcawley Center, sells required texts, materials, and supplies. In addition, because of their value as collateral reading, the Bookstore stocks a wide selection of standard works in inexpensive editions. Should a selection not be available, the Bookstore will order it upon a suitable down payment. There are other stores in the Youngstown area servicing the University that will add variety to available material. While the Youngstown State University Bookstore does not attempt to compete with these stores, it does carry a selection of personalized soft

goods, speciality, and gift items. The aims of the Youngstown State University Bookstores are predicated on service to students, faculty and staff.

Kilcawley Center

Kilcawley Center reflects a meaningful commitment to students in its governance, operations, and programming. The policy-making body of the Center, Kilcawley Center Governing Board, consists of fifteen voting members—eight undergraduate students, three faculty members, two administrators, and an alumnus. The director of Kilcawley Center is a non-voting *ex-officio* member. The Board is charged with the responsibility of creating policy to provide a comprehensive social, cultural, and recreational program for the Center.

Students are also prominent in the day-to-day operation of the Center, and comprise approximately 80 percent of the staff. They work in diverse areas, with six students acting as supervisors in the Center.

Counseling and Testing

The Counseling Center staff includes several counseling psychologists and a testing director. All are experienced professionals who specialize in working with college students who might be concerned with adapting to college life, academic progress, career choice, drugs, family, marriage, or problem pregnancies.

The Counseling Center administers the American College Test (ACT), the Graduate Record Examination, the Miller Analogies Test, the Law School Admission Test, Medical College Admission Test, and the Admission Test for Graduate Study in Business. Information regarding other national examinations is available.

Counseling services are free to all students of the University. Fees, however, are associated with the testing programs.

No information is released to officers of the administration, to faculty members, to parents, or to outside agencies without the student's explicit authorization, except when there is a clear and immediate threat to the life or welfare of the student himself* or the community at large. Information obtained in the course of counseling remains confidential and in no way reflects upon the student's academic record.

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*In this bulletin, the masculine pronoun has been used for the sake of convenience. Unless otherwise noted, the feminine pronoun will be considered included in each instance.

Health Service

A Health Service Office is maintained by the University for the purpose of providing emergency medical care to students while they are on campus. The cost of the service is included in the general fee; however, all additional treatment by non-University physicians, clinics, or hospitals must be paid for by the student. Any accident which results in injury to the student involved should be reported to the Health Service Office within twenty-four hours.

A voluntary group-accident-and-sickness insurance program specifically written to meet the needs of University students is available at the time of initial registration for each academic year. The program is underwritten by the World Book Life Insurance Company of Chicago, Illinois, and administered by E.J. Smith and Associates, Inc., of Chicago, Illinois. A brochure explaining this program is available at the Health Service Office, Student Affairs Office and Bursar's Office. All foreign students who are not permanent residents of the United States and all residents of the Kilcawley Men's Residence Hall are required to participate in this or a comparable program of Health and Accident Insurance during their entire period of enrollment at Youngstown State University.

Career Planning and Placement

The University maintains a Career Planning and Placement Service to provide assistance to students in the exploration of occupational objectives, and to provide assistance to all graduating students and alumni seeking permanent employment. Credentials service is provided to certified teachers applying for positions with schools, colleges, or universities.

Students are also assisted in finding part-time off-campus employment while enrolled in the University. The central location of the University makes it possible for many students to earn all or part of their expenses by working in nearby stores and industrial plants.

Housing

Although admission to the University does not obligate the University to secure living accommodations for the student, the University will assist the student in finding a satisfactory place to live. In accordance with the basic principles of the University concerning human rights, no campus or off-campus housing facility that discriminates on the basis of race, color, or creed will be recommended to students.

The University provides a list of suggested off-campus housing for

men and women. The housing has been inspected and has met minimum University standards. The University does not place students in off-campus housing; therefore, personal arrangements must be made for these facilities. Only those facilities which appear on the University's approved housing lists are recommended.

The University has residence hall facilities for two hundred men. Residence hall accommodations include room and food service on a contract basis for the quarters requested. Further information and applications can be obtained by writing to the Assistant Dean of Student Affairs.

Food Service

Any student not residing in Kilcawley Men's Residence Hall may purchase a meal ticket on a quarterly basis. Arrangements may be made through the Office of the Auxiliary Services Business Manager. The cafeterias in Kilcawley Center also serve meals and light lunches a la carte.

International Students

The international student is a welcome member of the Youngstown State University community. His contribution to the University community is to enrich and to share with other knowledge, understanding, and appreciation of his culture.

It is expected that an international student will have attained a certain degree of proficiency in the use of English at the time he arrives on the campus, so that he will be able to engage in academic endeavor with benefit to himself. The University affords its international students the same opportunity to be participants in University affairs as all other students. Students from abroad, whether initial or transfer students, are governed by the directives contained in the brochure entitled "Information for Prospective International Students."

The International Student Office provides the foreign student with those special services necessary and unique to his educational pursuit and his stay in the United States. All new students should contact the International Student Advisor, Mrs. Edna McDonald, immediately upon arrival in Youngstown. Citizens of the United States who wish to study abroad also may seek advice from this office.

The International Student Organization is a voluntary organization providing the foreign student with opportunities for contacts with students from other countries, with his own fellow countrymen, with American students, and with many faculty members. Presently there are over 30 countries represented on campus.

The Graduate School

DEVELOPMENT AND ORGANIZATION

On March 28, 1967, the Trustees of The Youngstown University authorized the President and faculty of the University to begin the process of developing graduate programs at the master's degree level, such programs to commence in the fall quarter of 1968. In May 1967, the Faculty Senate of The Youngstown University considered and authorized the development of master's degree programs in various academic departments of the University. The Youngstown State University Board of Trustees, at its first meeting on August 15, 1967, established the office of the Dean of the Graduate School and the general regulations governing the appointment of a Graduate Faculty. It also identified and authorized the initial graduate degree programs that were to be offered. These programs were approved by the Ohio Board of Regents on December 15, 1967, and received preliminary accreditation by the Commission on Colleges and Universities of the North Central Association of Colleges and Secondary Schools in July 1968. The Graduate School is a member of the Council of Graduate Schools in the United States and of the Midwestern Association of Graduate Schools.

The Graduate School is administered by a dean who is also a member of the Graduate Council. The elected members of the Graduate Council consist of one representative of each of the academic units of the University in which graduate programs are offered, two faculty members-at-large elected by the Graduate Faculty and one representative of the Graduate Student Advisory Committee. Standing committees of the Graduate Council are committees on Curriculum, Policy, Graduate Faculty Membership, and Scholarships, Assistantships, and Awards.

THE PROGRAMS

The master's degree programs offered by Youngstown State University are as follows:

Master of Arts (Economics, English, History).

Master of Business Administration (Accounting, Accounting/Finance, Management, Marketing).

Master of Music (Performance; Music Theory and Composition; Music History and Literature; Music Education).

Master of Science (Biological Sciences, Chemistry, Criminal Justice, Mathematics).

Master of Science in Education (Master Teacher Program for Elementary and Secondary School Teachers: Educational Administration and Supervision, Elementary and Secondary Schools: School Guidance and Counseling; and Special Education).

Master of Science in Engineering (Civil, Electrical, Mechanical, Materials Science).

ADMISSIONS

Students are admitted to the Graduate School by the Dean of the Graduate School on recommendation of the department in which the applicant wishes to do his major work. Acceptance for admission is required before registration in any course for graduate credit.

The complete application for admission, including supporting materials, should be received by the Graduate School at least four weeks before the beginning of the term in which the applicant plans to register. Youngstown State University will admit graduate students in the fall, winter, spring, and summer quarters, except that foreign students may not enter during the summer quarter.

The attention of foreign students is called to the special requirements governing their application for admission.

Application Procedure

Application for admission must be made on a form provided by the Graduate School, following the procedure outlined below. The materials necessary for making application can be secured by writing to the Dean of the Graduate School, Youngstown State University, Youngstown, Ohio 44555.

1) Complete the application form and return it to the Dean of the Graduate School. No application fee is required to accompany the application.

2) Request the registrar of each college or university you have attended, *except* Youngstown State University, to send *directly* to the Dean of the Graduate School two copies of an official transcript of your work. Personal copies of transcripts will not be accepted. Official transcripts will not be returned. The attention of foreign students is called to the special requirements governing their application for admission.

Applications for admission cannot be reviewed until the official transcripts of all previous college or university work are received. It is imperative, therefore, that the applicant see that these reach the Grad-

uate School at the earliest possible date. Omission of information called for on the application form will necessitate requests for the additional information and therefore delay processing of the application, so the applicant should take care to provide all the information requested in his first submission of materials.

As soon as possible after receipt of application materials, the Graduate Dean will notify the student of the action taken on his application, and if the student is admitted, will provide him with information on registration procedures.

Admission Requirements

Requirements for admission to the Graduate School are:

1) A bachelor's degree from an accredited college or university.

2) A cumulative grade point average in undergraduate work of at least 2.5 (on a 4.0 scale).

3) Satisfactory preparation for the graduate program in which the student wishes to enroll, as specified by the department of the major. (See below for regulations on foreign student admissions.)

The applicant is reminded to check the specific admission requirements of the program in which he wishes to enroll, as these may have requirements in addition to those outlined above.

Students may be admitted with either *regular* or *provisional* status.

Regular status will be granted to students who satisfy the admission requirements for the master's program in which they wish to enroll.

On recommendation of the faculty member in charge of the program involved, the subject to the approval of the Graduate Dean, a student may be accepted with provisional status if his undergraduate record shows slight deficiencies in comparison with the admission requirements of the program to which he seeks entrance. Students who are admitted on provisional status may be required to make up deficiencies by taking the appropriate undergraduate courses without graduate credit. The academic record of all students on provisional status shall be reviewed when 12 quarter hours of degree credit course work have been completed. The advisor will change the status from provisional to regular if he considers the student's deficiencies have been met and the student's record justifies such a change, and will report the change to the Dean of the Graduate School on the Change of Status form. A continuance of provisional status must be recommended to the Dean of the Graduate School by memorandum reporting the name of the student, cause for provisional status, and justification for the continuance.

Non-Degree Students

Students with a bachelor's degree who desire to register for certain graduate courses, but who do not expect to work toward an advanced degree, may be admitted to the Graduate School as non-degree students on recommendation of the department applied to with the approval of the Dean of the Graduate School. A maximum of 12 credits earned as a non-degree student may later be applied toward a degree if accepted by the department in which the student wishes to earn a degree and approved by the Dean of the Graduate School.

Restricted Graduate Students

Students who wish to take a workshop for graduate credit but who have not completed the regular Graduate School admissions process will be permitted to register in the Graduate School as *restricted graduate students.* Such permission is granted by the Dean of the Graduate School, through his workshop representative, upon receipt of a statement signed by the applicant that a baccalaureate degree has been received.

The *restricted graduate student* category may not be carried for more than 12 quarter hours credit or beyond a calendar year period. Each workshop requires separate permission. Any other category of admission must be obtained through regular application to the Graduate School.

Workshop courses, upon approval of the graduate advisor, and up to a maximum of 12 quarter hours, may be applied to degree work at a later date if regular admission to the Graduate School is obtained and if those courses are part of the degree program.

Workshop courses are those specifically designated as such in the Graduate Catalog or by the Graduate Council.

Transient Students

Transient status may be granted to a student who is in a degree program at an accredited graduate school and who submits a graduate transient student form signed by the dean of the graduate school to which he wishes to transfer his credits, showing that he is a graduate student in good standing. The form to be used in such cases may be secured from the Office of the Youngstown State University Graduate School. Under some circumstances transient status may be renewed for a second quarter, but both graduate deans must approve the renewal.

If a graduate transient student later wishes to become a regular

graduate student, he must be admitted to a degree program by following the usual admission procedures.

Transfer Credits

Up to 12 quarter hours (eight semester hours) of graduate work completed at other accredited institutions may be applied toward a master's degree at Youngstown State University, provided the student earned at least a *B* grade in such courses. The number of transfer credits to be accepted in each case is to be determined on the basis of evaluation and recommendation by the department of the student's major. It is the responsibility of the student to initiate a request for the approval of transfer credits.

Test Information

In certain master's programs test results must be submitted as part of the admissions procedure. The registration forms for both the Graduate Record Examination and the Graduate Management Admission Test may be secured from the Counseling and Testing Center, Youngstown State University; but the applicant must register for the test with The Educational Testing Service, Box 955, Princeton, New Jersey 08540. The student should check with the Youngstown State University Testing Office to learn the deadline dates for registering for these examinations.

Foreign Student Admissions

A graduate of a foreign university must submit with his application, application fee, and reply cards:

1) Official certification (three copies, one of which must be a true copy) of the degree he has earned and the level of scholarship he has achieved;

2) Copies of all course and examination records beyond the secondary school level (three copies of each document, one of which must be a true copy in each case), including grades received, certified as official by the home institution or institutions in which such records were made;

3) Evidence of ability to support himself during the period of his study at Youngstown State University;

4) A physician's certification of his health;

5) The results of the aptitude test and/or the advanced test of the Graduate Record Examination administered by the Educational Testing Service, Princeton, N.J., or some other appropriate examination, as required by certain departments;

6) An interview with and/or an application referral from an Institute of International Education representative where feasible.

After a review of these materials, and the judgment by the Graduate School of Youngstown State University that he is otherwise acceptable for admission, the foreign student must demonstrate proficiency in the use of the English language by earning satisfactory scores on the Test of English as a Foreign Language (TOEFL) administered in the student's home country by the Educational Testing Service, Princeton, N.J., or on the test administered by the English Language Institute, Ann Arbor, Michigan, or by providing such other evidence as is required by the Youngstown State University Graduate School. The applicant will be informed as to the procedure applying in his case.

Only after providing the required evidence of satisfactory mastery of the English language will the foreign student be granted admission to the Graduate School of Youngstown State University. A foreign student who is accepted will be required to take another test in English after arriving at Youngstown State University to help determine the necessity for remedial work in English. In certain cases, a reduction in the credit hour load of graduate course work may be permitted by the Graduate Dean upon recommendation of the foreign student advisor.

While doing graduate work at Youngstown State University, all foreign students must enroll in a plan of group insurance to cover hospital and/or surgical care. A plan is available to students at the University, but other comparable plans may be accepted.

There is an orientation program held during the first two weeks of the quarter for all international students.

REGISTRATION

Advisement

Before initial registration the student must consult with the faculty member in charge of the program to which he has been admitted, or with an advisor to whom he is assigned, for advice in developing a program of study leading to the desired degree. The ultimate responsibility for selection of graduate courses, based upon the requirements of the student's program as set forth in the catalog, remains with the student. Continued consulation with the advisor is encouraged. Because of the nature of certain programs, an advisor may require consultation before each registration.

Registration Procedure

Every student registers in person for each quarter by appointment from the Registrar's Office. Registration is concluded on or before the

Late and Final Registration date published in the *Schedule of Classes*. Detailed information on registration is contained in the *Schedule of Classes* and in the *Directions for Registration* received with registration materials. Registration is not officially completed until all tuition and fees are paid.

No student may enter a course after the seventh calendar day of the quarter or after the fifth calendar day of a summer term.

Change of Registration

A registered student wishing to alter his schedule must complete a Change of Registration form and present it with a properly completed Change of Registration Scan Sheet to the Registrar's Office. A Change of Registration is not official until a student has presented the Change to the Bursar's Office.

Withdrawal from a course must be accomplished through the Change of Registration procedure. Simple failure to attend class or notification to an instructor is insufficient. A grade of *F* will be recorded unless a student officially withdraws.

Cancellation of Registration

Any student who effects a complete withdrawal from courses prior to the first day of classes is considered to have cancelled his registration.

OTHER REGULATIONS

Time Limit

All work (including transfer credits) offered in fulfillment of the minimum credit hour requirement for the degree must have been taken within the six-year period immediately preceding the date on which the last requirement is completed. When graduate study is interrupted by military service, the six-year limit may be extended.

Graduate students who fail to take courses or otherwise to pursue their graduate education for a period of two years, will be readmitted only under regulations in force at the time of reapplication.

Graduate Courses

Courses in which graduate credit may be earned are of two types.

1) 900- and 1000-level courses, which are open to graduate students only. *At least one half* of the credits applied toward the degree must be earned in courses in the 900- and 1000-series.

2) Upper Division undergraduate courses (700- and 800-series

courses) in which the student may enroll for graduate credit only with the approval of his advisor.

Only certain Upper Division undergraduate courses may be taken for graduate credit. Those that are in this category are listed in the *Courses* section of this catalog. To earn graduate credit in an Upper Division course the student must have been admitted to the Graduate School at the time the course is taken. Graduate students in undergraduate courses which offer graduate credit may be expected to pursue the subject matter in greater depth than the undergraduate student. This may require additional work assignments.

Seminar

A seminar is generally considered to consist of a group of advanced students studying a subject under a professor, each making some pertinent contribution and all exchanging results through informal lectures, reports, and discussions.

Second Master's Degree

A student who has a master's degree from Youngstown State University and desires a second master's degree must earn a minimum of 18 quarter hours of credit in addition to the total that he had when he completed the requirements for the first degree and must complete the requirements for another graduate program. Students with a master's degree from another university will be limited to a maximum of 12 quarter hours of transfer credit.

Interrupted Enrollment

Students anticipating re-enrollment following a fall, winter or spring quarter of non-enrollment must apply for readmission well in advance of the registration period, to allow time for the administrative work that must precede the generation of registration material for them. Students who have a break in their attendance must apply for readmission as former students.

Academic Standards

A cumulative quality point average of at least 3.0 (on a 4.0 scale) is required for graduation. This pertains only to courses taken at Youngstown State University. (See *Grading System* for grades less than *C*.)

Good academic standing for graduate students is a cumulative grade point average of at least 3.0 (on a 4.0 scale). (All graduate credit courses for the degree program are included in the grade point average determi-

nation.) Graduate students who are not in good standing in any given quarter may continue to take graduate work until required to withdraw from the graduate program in which they are enrolled by recommendation of the department concerned and with approval of the Dean of the Graduate School.

Full-Time Status

A full-time student is one carrying 12 or more credit hours in courses that give credit toward the degree.

Reduced Load for Employed Students

The Graduate School recommends that the employed student carry less than a full academic load as determined in consultation with his major advisor or graduate committee.

Graduate Courses for Undergraduates

An undergraduate student who has senior standing and a cumulative grade point average of at least 2.7, and who does not require a full schedule to complete his baccalaureate degree requirements at Youngstown State University, may enroll in 900- and 1000-level courses for graduate credit, provided such enrollment does not cause his total schedule for the quarter to exceed 16 quarter hours. Before registering for courses the student must have the approval of his advisor, the instructor of each course in which he wishes to enroll, and the Dean of the Graduate School. The credit earned cannot be counted toward fulfillment of the requirements for a bachelor's degree, and may not be used for graduate credit at Youngstown State University until the student is admitted to the Graduate School and the credit is accepted by the department in which the student continues his graduate work. The maximum amount of such credit that will be acceptable at Youngstown State University is 15 hours.

Permission to undergraduates to enroll in graduate courses for undergraduate credit will be granted only to students with proven exceptional academic ability; such permission will be based on a petition prepared by the student's major department containing a statement of criteria used to determine "exceptional" and approved by the department offering the course and the Dean of the Graduate School.

Grading System

The following grading system is used in reporting a final evaluation of the work of graduate students in courses or thesis research: *A, B, C, D, F.* The grade point equivalents are 4, 3, 2, 1, and 0 respectively.

Grades of *D* and *F* carry no graduate credit but will be used to determine the student's grade point average. Failure will normally be indicated by a *D*; a grade of *F* means the instructor doubts the student's ability to do work at the graduate level. A student has the privilege of repeating a course once, but the repetition is treated merely as another course, along with the first, in calculating the student's grade point average. The grade of *F* can also result from failure to withdraw officially from a course (see *Change of Registration*, above).

An incomplete grade of *I* may be given to a student who does satisfactory work in a course but who, for reasons beyond his control and deemed justifiable by the teacher, does not complete all requirements for a course by the time grades are submitted. A written explanation of the reason for the *I* will be forwarded to the Records Office for inclusion in the student's permanent record, with copies to the student, department chairman, and the dean of the school. Until the *I* is converted, it will not be included in the calculation of the student's point average.

The grade of *W* will be given for all withdrawals properly processed during the first six weeks of any quarter (or first three weeks of a summer session). ("Properly processed" describes withdrawals made in conformity with the instructions on the official Change of Registration form.) A withdrawal made after the three- or six-week period will be recorded as an *F* unless the withdrawal was the result of circumstances over which the student had no control as shown by evidence presented by the student in a petition to the Dean of the Graduate School. Any grade of *F* assigned because of absence may be reviewed upon petition to the Graduate Dean. Where withdrawals change the status of a student from full-time to part-time, the student immediately forfeits any privileges contingent upon full-time status, and notice of the change is sent to those legally requiring it (draft boards, scholarship or loan-supporting agencies, etc.).

In the case of thesis work still in progress at the time grades for the quarter are to be reported, a *PR* may be reported in place of a quality grade. This symbol indicates that the student is working in a manner which merits his being allowed to continue, but does not indicate a specific quality of work. In the quarter when the work is completed, the instructor will report an *A, B, C, D,* or *F* that will apply to all the work done in the preceding quarter or quarters as well.

Au signifies that the student was enrolled in the class as an auditor. This mark may be given only to a student who has begun a course as an auditor or who has changed his status to that of auditor before six weeks of a regular quarter or three weeks of a split summer session have elapsed.

Change of Curriculum

A student may transfer from one graduate program to another when an advisor in the program to which he is transferring has been appointed and has accepted the student as an advisee, and when the change has been reported to and approved by the Dean of the Graduate School. In such cases of transfer, courses taken in the original curriculum that also apply toward the degree in the new curriculum will be accepted and the credit hours and quality points earned in such courses will be counted in computing the student's grade point average. None of the credit hours or quality points earned in other courses in the original curriculum will be taken into account in the new curriculum.

Auditing Courses

A student may register for and attend any courses as an auditor. An auditor is not held responsible for the regular classwork, class attendance, and preparation of assignments, and receives no credit for the course. He pays the regular fees for the audit course, as well as any other applicable fees. Audit courses are carried in a student's load only for fee purposes and for required overload approval. A student who has registered for a course for audit may not change that status to credit after the last day to add a class.

Foreign Language Proficiency Examinations

The Department of Foreign Languages administers proficiency examinations in the following languages: French, German, Ancient Greek, Italian, Latin, Russian, and Spanish. The graduate student should consult his major department to learn specific degree requirements.

A grade of "pass" or "fail" on the proficiency examination will be registered with the Office of the Dean of the Graduate School.

It is not the responsibility of either the University or the Department of Foreign Languages to tutor students for these examinations or to recommend tutors.

Commencement

Intention of Graduation. At the beginning of the quarter prior to the quarter in which he expects to receive his degree, the student must notify his advisor of his intention to apply for graduation on a form provided for this purpose by the Graduate School, a copy of which must be filed with the Office of the Graduate School.

Formal Application for Graduation. Formal application for graduation must be filed before 12 noon on the Saturday ending the first full

week of the graduating quarter, on a form provided by the Office of the Graduate School.

There are three graduation ceremonies each year: Winter Commencement, in March, at the end of the second quarter of the academic year; Spring Commencement, in June, at the end of the third quarter; and Summer Commencement, in August or September, at the end of the summer session. A student who completes the requirements for a degree at the end of the fall quarter receives his degree in March and is present, if at all possible, at the Winter Commencement. If it is not possible for a student to be present at commencement, a request in writing to receive the degree *in absentia* must be made to the Dean of the Graduate School.

COSTS AND FEES

The charges for graduate work depend upon whether the student is a full-time or part-time student, and upon his legal residency.

STUDENT TUITION AND FEES EFFECTIVE FALL QUARTER, 1975*

FOR FULL-TIME STUDENTS

(12-16 Quarter Hours)

	Per Quarter	Per Year**
IN-STATE	$226.00	$ 678.00
IN-STATE MUSIC MAJORS (approximate)	310.00	930.00
OUT OF STATE	426.00	1278.00
OUT OF STATE MUSIC MAJORS (approximate)	510.00	1530.00

BREAKDOWN OF ACTUAL FEES CHARGED

INSTRUCTIONAL FEE	190.00
GENERAL FEE	36.00
NON-RESIDENT TUITION SURCHARGE	200.00
APPLIED MUSIC FEE PER QUARTER HOUR	14.00
CHARGES FOR EACH QUARTER HOUR ABOVE 16 HOURS:	
INSTRUCTIONAL FEE	18.00
NON-RESIDENT TUITION SURCHARGE	19.00

FOR PART-TIME STUDENTS

(Below 12 Quarter Hours)

INSTRUCTIONAL FEE PER QUARTER HOUR	18.00
GENERAL FEE	15.00
NON-RESIDENT TUITION SURCHARGE PER QUARTER HOUR	19.00
APPLIED MUSIC FEE PER QUARTER HOUR	14.00

*The University reserves the right to change any fee without notice.
**3 academic quarters

For Audited Courses

A student auditing a course or courses pays the regular fees, plus any other fees that may be applicable.

Participants in non-credit courses offered as part of the University's Continuing Education program will be charged fees as approved for the specific class.

If a student withdraws from an audit course and/or a course in Continuing Education the account will be revised and charges prorated in accordance with the regular University withdrawal and refund policies and their exceptions as stated further on in this section.

Other Fees

Application Fee. No fee is charged at the time of submitting an application for Graduate School. (See *Matriculation Fee.*)

Change of Registration Fee. A fee of $2.00 is charged anyone changing his registration unless a class in which the student is registered is cancelled or divided by the administration and/or student completely withdraws from the University. Appeals will be subject to the supervision of the Finance Committee. (Note: Students with changes in registration necessitating an increase in charges will receive a revised bill showing additional payment to be made within 10 days after the revision. Failure to make the additional payment before the due date on the revision will result in an assessment of an additional $5.00 late fee.)

Food Service Meal Ticket. Students not residing in a University residence hall may purchase a meal ticket for any given quarter at the cost of $220.00 This includes three meals a day, Monday through Friday, and two meals on Saturday and Sunday, for the entire eleven-week quarter, except holiday periods.

General Fee. This fee is used for the support of offices, personnel and general institutional services performed for the benefit of enrolled students, construction and operation of various student facilities such as the student center, together with artists and lecture programs, student government, intercollegiate athletics, student publications, extramural women's activities, and other activities benefiting the student body. Beginning with the first day of classes for each term, there can be no reduction or proration of this fee nor is it refundable.

Graduate Management Admission Test (GMAT) Fee. An aptitude test designed to measure abilities important to the study of business at the graduate level. The test is offered four times a year. The examination fee is $12.50 and registration forms are available at the University Counseling and Testing Center.

Graduate Record Examination Fee. Two Graduate Record Examinations, the Aptitude and Advanced tests, are administered on campus five times a year. Advanced tests are given in 20 different fields. Individual departments specify which test must be taken. The fee for the Aptitude test is $10.50, one Advanced test is $10.50. Registration forms are available at the Counseling and Testing Center.

Graduation Fee. A fee of $20.00 is charged anyone who is to receive a degree. The fee, which includes cap and gown and diploma, and which helps to defray the general expense attendant to the commencement exercises, must be paid before the official application for graduation is received by the dean of the school in which the student is enrolled. No reduction in this fee may be made for graduation *in absentia* or for approved use of non-academic apparel.

This fee applies for each degree granted (unless honorary), except that if two degrees are to be conferred at the same commencement, the total fee is $25.00 ($5.00 plus the regular $20.00).

All students shall pay only one fee for each degree received. Once a student has paid the graduation fee for a specific degree he shall not be recharged a graduation fee for that same degree even if several years lapse before the degree is conferred.

Health and Physical Education Locker and Towel Fees. Users of facilities in the Beeghly Health and Physical Education Center who require clothing change and shower facilities will be provided towel service and locker or basket service upon payment of a nonrefundable fee of $3.00 per person for each quarter of such use.

Loss of locker lock shall result in collection of a replacement fee of $2.00 from the user. Loss of towel shall result in collection of a replacement fee of $1.00 from the user.

Identification Card Replacement Fees. A fee of $5.00 is charged for replacement of an I.D. card; this cost includes a current term validation sticker. A fee of $3.00 is charged for replacement of only the current term validation sticker.

Irregular Examination Fee. When a student is given permission to take an examination at a time other than the scheduled one, a fee of $5.00 is charged, except in the case of illness, when the student must present a letter from his physician.

Late Payment Fee. A fee of $15.00 will be charged any student who pays his bill after the due date but before the payment cut-off date. Registration is considered complete only at the time of payment. Tuition

and fees shall be due and payable in full 10 days prior to the opening of classes or as otherwise shown in the academic calendar of the University.

Late Registration Fee. A fee of $15.00 will be charged any current student who failed to register during the assigned period and registers late with new and former students.

Matriculation Fee. Each student will be assessed a nonrefundable matriculation fee of $15.00 at the time of his initial registration in the Graduate School.

Miller Analogies Test Fee. A verbal analogies test to measure scholastic aptitude at the graduate level. This test is offered by appointment only through the University Counseling and Testing Center. The fee of $7.00 is payable at the Bursar's Office.

Proficiency Examination Fee. When a student takes an examination to demonstrate proficiency in a foreign language, he is charged a fee of $10.00.

Registration Withdrawal Fee. A fee of $5.00 is charged when a student withdraws from all his courses prior to the first day of the quarter, or when the terms under *Withdrawals and Refunds* are waived by the Bursar. A student who registers for a term and does not complete the registration with payment of fees charged, is also charged this fee when he is withdrawn for non-payment 10 days prior to the term.

Residence Hall Fees. Residence hall accommodations include room and food service on a contract basis for the quarter(s) requested. Charges are $1,075.00 for a full academic year, or $375.00 for the first quarter of residency and $350.00 for each subsequent quarter of the academic year.

Special Check-Handling Penalty Fee. A fee of $5.00 is charged any student who pays the University with a check that is not accepted by the bank against which it is drawn. A returned check intended for payment of registration fees will, in addition to this penalty fee, draw a late registration fee of $15.00. If the student's account is not paid in full, including these penalty charges, within five days after written notice, the student will be withdrawn from all classes for that term, and the account will be revised and charges prorated in accordance with regular University withdrawal and refund policies.

Student Locker Fee. A fee of $1.00 is charged for use of any locker on campus (except those in the Beeghly Health and Physical Education Center) for all or part of an academic year. All personal property must

be removed by the last day of the summer quarter. Locker assignments are made at the Bursar's Office window, Jones Hall, first floor.

Thesis Binding Fee. A $8.00 fee is charged for each copy bound by the University Library. The fee is the same for personal copies as well as those required by the University. Payment should be made at the Bursar's Office window, Jones Hall, first floor.

Transcript of Credits Fee. A fee of $1.00 is charged for each transcript issued by the University. This fee must be paid at the time of the transcript request. Transcripts will not be issued to anyone owing a balance to the University or any of its agents.

Vehicle Registration Permit (Sticker) Fee. A nonrefundable fee of $15.00 is charged each quarter for the purpose of providing access to campus student parking lots, and entrance to such lots is by such sticker affixed to the vehicle in the prescribed manner. A copy of the traffic regulations is issued to all students paying this fee.

Any vehicle not bearing a valid sticker is admitted to an appropriate campus lot on a basis of $1.00 per entrance, collectible at the gate.

Policy For Withdrawals And Refunds

A student may not enroll for less than a full term. If a student withdraws from a course or from the University, he must fill out an official Change of Registration form and present it to the Bursar's Office. Failure to attend class, or merely notifying the instructor or some other staff member is not an official notice of withdrawal.

If a student is permitted to withdraw from a course or from the University, the account will be revised and charges made according to the following schedule:

Date of Acceptance by Student Accounts Office*	Quarters	Summer Terms 5-1/2 Weeks
1-6 school days**	25%	50%
7-12 school days	50%	100%
13-18 school days	75%	
19th school day	100%	

*Figured from opening date of classes.
**Excludes Sunday, for each specified time period.

If a course is cancelled by the University, fees paid will be refunded in full, or in the event of a full scholarship or grant, proper credit will be made to the specified fund. See additional policies and procedures shown below under Exceptions.

Exceptions

A student who withdraws from the University or from a portion of his schedule for reasons beyond his control, such as illness, military service, job transfer, or shift change imposed by his employer, may have his fees revised in proportion to the number of weeks attended. He must withdraw officially and present evidence to validate his change; for example, a certificate from his physician giving the date he advised the student to withdraw from classes or reduce his academic load, copies of military active duty orders, or a letter from an employer giving the date working hour changes were imposed and a listing of former and current working hours. Charges will be prorated proportionately to the number of weeks enrolled. All requests for this action must be handled by mail. Correspondence should be addressed to the Youngstown State University Finance Committee, in care of the Bursar.

STUDENT RESIDENT STATUS

Residence for tuition purposes will be determined at the time of admission or readmission by the Dean of the Graduate School on the basis of the residency rules shown below and information supplied on the "Application for Admission" form.

If there should be any doubt on the part of the student regarding the appropriate classification, it should immediately be brought to the attention of the Dean of the Graduate School for a review.

Resident Status Appeals

Appeal for a change in classification should be made in writing to the Director of Admissions who may require the student to complete a form "Application for Nonresident Tuition Surcharge Exemption" available from that office. The Director's written decision will be sent to the student, who may appeal his classification in a personal interview with the Director of Admissions.

He also may request the Director of Admissions to arrange an appearance before the Residence Classification Board. Appearances before the Residence Classification Board generally will be held within two weeks of the request, if possible. The Residence Classification Board is the formal appeal authority in such matters and its decision is final.

Residency Rules

General Residency for Tuition Surcharge Purposes

The following persons shall be classified as residents of the State of

Ohio for tuition surcharge purposes:

1) Dependent students, at least one of whose parents or legal guardian has been a resident of the State of Ohio for all other legal purposes for 12 consecutive months or more immediately preceding the enrollment of such student in an institution of higher education.

2) Persons who have resided in Ohio for all other legal purposes for at least 12 consecutive months preceding their enrollment in an institution of higher education and who are not receiving, and have not directly or indirectly received in the preceding 12 consecutive months, financial support from persons or entities who are not residents of Ohio for all other legal purposes.

3) Persons who reside and are gainfully employed on a full-time or part-time and self-sustaining basis in Ohio and who are pursuing a part-time program of instruction at an institution of higher education.

Specific Exceptions and Circumstances

1) A person on active duty status in the United States military service who is stationed and resides in Ohio and his or her dependents shall be considered residents of Ohio for these purposes.

2) A person who enters upon active duty status in the United States military service while a resident of Ohio for all other legal purposes and his or her dependents shall be considered residents of Ohio for these purposes as long as Ohio remains the state of such person's domicile.

3) Any alien holding an immigrant visa shall be considered a resident of the State of Ohio for tuition surcharge purposes in the same manner as any other student.

4) No person holding a student or other temporary visa shall be eligible for Ohio residency for these purposes.

5) A dependent person classified as a resident of Ohio who is enrolled in an institution of higher education when his or her parents or legal guardian remove their residency from the State of Ohio, shall be considered a resident of Ohio for these purposes during continuous full-time enrollment and until his or her completion of any one academic degree program.

6) Any person once classified as a nonresident, upon the completion of 12 consecutive months of residency in Ohio for all other legal purposes, may apply to the institution he or she attends for reclassification as a resident of Ohio for these purposes. Should such person present clear and convincing proof that no part of his or her financial sup-

port is or in the preceding 12 consecutive months has been provided directly or indirectly by persons or entities who are not residents of Ohio for all other legal purposes, such person shall be reclassified as a resident.

Evidentiary determinations under this rule shall be made by the institution which may require, among other things, the submission of information regarding the sources of a student's actual financial support to that end.

7) Any reclassification of a person who was once classified as a nonresident for these purposes shall have prospective application only from the date of such reclassification.

Procedures

Institutions of higher education charged with reporting student enrollment to the Ohio Board of Regents for state subsidy purposes and assessing the tuition surcharge shall provide individual students with a fair and adequate opportunity to present proof of their Ohio residency for purposes of this rule. Such institution may require the submission of affidavits and other documentary evidence which it may deem necessary to a full and complete determination under this rule.

ASSISTANTSHIPS, SCHOLARSHIPS, AND LOANS

Financial assistance in the form of graduate assistantships, scholarships, and student loans is available to graduate students enrolled in specific degree programs. Applications for financial aid must be accompanied or preceded by application for admission. Under no circumstances will financial aid be awarded until the student has been admitted to the Graduate School. Graduate assistantships and scholarships are not available to foreign students in their first year of graduate study at Youngstown State University. Only upon recommendation of the department to the Dean of the Graduate School will exceptions to this rule be considered.

Application for an assistantship or a scholarship should be made to the Office of the Graduate School as early as possible before the quarter for which the student seeks aid. Consideration of applications will be tied to the availability of funds. Appointments to assistantships are made by the Dean of the Graduate School upon recommendation of the department concerned. In those instances in which the student indicates his acceptance of an award prior to April 15, the student may not accept another appointment without first obtaining formal release for this purpose.

Arrangements for a student loan are made through the Office of the Director of Financial Aids.

Types of Appointments: Two types of appointments are made by the Graduate School: graduate assistantships and scholarships.

Graduate Assistantships: The assistantship program is predicated on the idea that graduate students, when given the opportunity to assist the faculty, not only provide a service to the institution but also gain valuable experience through this work in association with the faculty.

Graduate assistants will be assigned three kinds of duties:

1) *Instruction.* Youngstown State University is committed to the maintenance of high standards of instruction in all courses. Master's degree candidates therefore will be assigned to classroom or laboratory duties only under the direct supervision of a full-service faculty member who will retain full responsibility for maintaining high academic and pedagogical standards. Graduate students will be assigned to instructional duties on the basis of teaching experience or other appropriate background.

2) *Research.* A limited number of assistantships are available which afford students the opportunity to participate in authorized faculty or University research programs. These assistantships are normally not awarded to entering students.

3) *Other academic services.* These are determined by the department of the student's major and approved by the Dean of the Graduate School.

Normally, graduate assistantships are awarded for a period of three quarters beginning with the fall quarter. To remain eligible for the assistantship, a student must discharge his duties satisfactorily and maintain good academic standing (See *Academic Standards*) throughout the period of the assistantship. An appointee must maintain enrollment in at least 21 quarter hours of graduate credit courses in his degree program for the regular academic year, and not less than six quarter hours of graduate credit courses in his degree program for any one quarter. (With the advisor's approval, course work that is not part of the graduate assistant's degree program may be counted toward the 21 quarter hours minimum for the assistantship.) In no case will an assistantship be awarded for more than two academic years. Approval to carry more than 12 quarter hours or less than six quarter hours in any quarter must be obtained from the department concerned and the Dean of the Graduate School. A graduate student awarded an assistantship may not ac-

cept employment at the University, or elsewhere, during the period for which service to the University is required under the appointment.

The stipend for a first-year assistantship is $3230. In recognition of outstanding performance an increment of up to $400 may be awarded a student who is appointed for a second year. The appointee is expected to devote approximately 20 hours per week to his assistantship duties. As already noted, appointments are limited to two years. In the event that research duties culminate in a thesis, the time required to compose and prepare the thesis shall be additional.

Scholarships. The Youngstown Educational Foundation has made funds available to the University to support a program of scholarship and grant-in-aid awards at the graduate level. A primary aim is to provide both academic recognition and financial help to YSU students. Applications will be considered from students who:

a) will be attending the Graduate School at Youngstown State University on a full-time basis, or on a part-time basis but with a load of at least six quarter hours, or

b) received their baccalaureate and/or master's degrees from Youngstown State University and who are registered in a full-time doctoral or professional degree program at another accredited institution.

Details on eligibility, general procedures, and applications are available from the Graduate School Office.

A grant-in-aid application should also include submission of the College Scholarship Service's Financial Aid form, which can be obtained from the Graduate School Office.

The Peter J. Isgro II Counseling Grant—Through a donation of $150 per year from Mr. Peter J. Isgro II, a grant, based on financial need, will be made to a full-time student in the Guidance and Counseling graduate program. Information may be obtained from the chairman of the Guidance and Counseling Department.

GRADUATE STUDENT REPRESENTATION

Within the first month of the fall quarter, each school or college of the University offering graduate degree programs will conduct an election under the supervision of the Graduate Council representative of that school of one student from each such school or college to membership in the Graduate Student Advisory Committee (GSAC).

Those eligible to vote or to be candidates in the election to GSAC

will be full-time graduate students (as defined in the Graduate Catalog), graduate assistants, or part-time students who shall have completed 12 or more hours of graduate credit, excluding transfer credit, prior to the fall term in which the election is held.

The GSAC shall consist of seven members, one student from each college or school having a graduate degree program and one faculty member of the Graduate Council. It will select from its own membership:

1) A graduate student member of the Graduate Council.

2) A graduate student member to each of the Graduate Faculty committees on Policy, Membership, Scholarships, Assistantships and Awards, and Curriculum.

All student members will have the right to vote.

The members of the GSAC will have the right to participate in Graduate Faculty meetings without vote.

At the request of the Dean of the Graduate School, the GSAC will select graduate student representatives to various University committees and governing bodies.

The GSAC may recommend to the Dean of the Graduate School or to the Graduate Faculty through the Graduate Council, measures to enhance the quality of graduate education at Youngstown State University or to promote the welfare of graduate students.

Vacancies involving elected positions shall be filled by the appointment of the candidate who received the next highest number of votes to the unexpired term. In case of a tie, a drawing of lots will be held to decide the appointment.

COURSE NUMBERING SYSTEM, ABBREVIATIONS, AND REFERENCE MARKS

It is important that the student familiarize himself with the course-numbering system and its significance, and with the abbreviations used to indicate the amount of credit.

Course Numbering. Courses listed in this bulletin are of two types. Courses in the 700-and 800-series are Upper Division undergraduate courses in which the graduate student may enroll for graduate credit with the approval of his advisor. Courses in the 900-and 1000-series are graduate-level courses normally open only to graduate students (but which undergraduates may elect under the conditions outlined in *Graduate Courses for Undergraduates).*

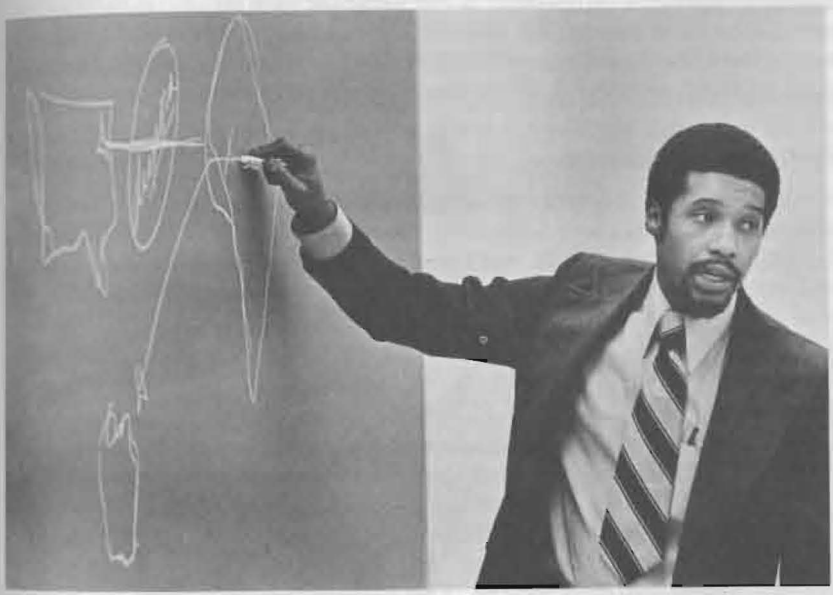
Abbreviations. The abbreviation "*q.h.*" at the end of a course description stands for "quarter hours of credit." Thus, credit for a three-quarter course may be indicated by the notation 3 + 3 + 3 *q.h.* meaning "three quarter hours of credit each quarter."

The abbreviation *n.c.* means "no credit." Thus, *2 n.c.* indicates that the course offers no quarter hours of credit but that the course is regarded as two hours for load and billing purposes.

"Prereq." stands for "prerequisite."

Hyphen. A hyphen between numbers (*e.g.*, 833-834-835) indicates that credit is not given toward graduation for the work of the first and second quarters until the work of the third quarter is completed, except when special permission is granted by the chairman of the department in which the course is given. *The first quarter of such a course is prerequisite to the second and the second quarter prerequisite to the third.*

Comma. Ordinarily, a comma between numbers (*e.g.*, 841, 842, 843) indicates that the course extends throughout the year, but that credit toward graduation is given for one or two quarters. If one quarter of such a course is prerequisite to another, it is so designated.



Graduate Programs

In the following pages, the general requirements of the various master's degree programs are described. The admission requirements that are stated are in addition to the requirements for admission to the Graduate School.

MASTER OF ARTS

ECONOMICS

Anthony H. Stocks

In Charge of Graduate Studies in Economics
219 Arts and Sciences Office Building

Admission Requirements

Admission to the program requires the applicant to hold a baccalaureate degree from a recognized college or university, to have achieved a cumulative grade point average of at least 2.5 (on a 4.0 scale), and to have completed 21 quarter hours (or its equivalent in semester hours) in economics, or preparation judged satisfactory by the department. These courses must include Principles of Economics and one course in statistics. Admission to the program may be obtained prior to submission of scores on the general aptitude and economics advanced test of the Graduate Record Examination but, if so, these examinations must be taken not later than the first date offered following admission.

Degree Requirements

Core course requirements are Microeconomics I and II, Macroeconomics I and II, and Statistical Problems. In addition to the core, the student will choose at least two additional areas of concentration and take at least six quarter hours of course work in each area. At least one of these areas must be Fiscal Economics, International Economics and Development, or Monetary Economics. Graduate credit electives may be taken in the social and applied sciences, and humanities, with the consent of the advisor.

A comprehensive examination in economic theory must be taken by the student. It is recommended that this examination be scheduled as soon as possible after completion of the core course requirements and prior to completion of 36 hours of graduate work. To be eligible for the comprehensive examination, the student must have a scholastic average of not less than 3.0 (*B*). The comprehensive examination may

not be taken more than twice. A student who has successfully passed the comprehensive examination pursues one of the following options for graduation:

Option A: The student must complete a minimum of 45 quarter hours of graduate course work.

Option B: The student must complete a minimum of 45 quarter hours of graduate course work including a master's thesis. The maximum amount of credit that may be earned for the thesis is nine quarter hours. The thesis must be submitted according to the general requirements established by the Graduate School. The student is required to defend his thesis in an oral examination before a committee of three or more faculty members of the department.

ENGLISH

Ward L. Miner

In Charge of Graduate Studies in English
303 Arts and Sciences Office Building

Admission Requirements

The student should have an undergraduate English major or preparation judged satisfactory by the department.

Degree Requirements

1) All students are expected to complete 45 quarter hours in courses at the 900-level; exceptions must have the approval of the department.

2) Students who enter without undergraduate credit for English 755, 756 (English Linguistics) or its equivalent must make up the deficiency by taking 755, 756 without graduate credit or 980, 981. English 900 is required of all candidates for the M.A. degree in English.

3) Reading knowledge of one foreign language is required. This requirement can be fulfilled by satisfactory completion of the second-year college course (or four years of one language in high school), or by successful achievement on a test approved by the Department of Foreign Languages.

4) Students must submit two satisfactory (*B* or better) graduate seminar papers which conform with department standards of form and style and are from two different instructors.

5) Degree requirements may be completed by meeting Option I or II.

Option I: A written final examination will be required for the degree. This examination will be divided into three parts: questions on (a) specific literary works announced at least four weeks prior to the examination, (b) and (c) two areas selected by the student from the following:

1) Old and/or Middle English Language and Literature
2) English Renaissance Literature
3) Restoration and 18th Century English Literature
4) Romantic and Victorian English Literature
5) American Literature before the Civil War
6) American Literature from the Civil War to World War I
7) Recent British and American Literature
8) Linguistics

Option II: Students must complete degree requirements 1 through 4 plus one additional course chosen in consultation with the advisor.

HISTORY

Frederick J. Blue

In Charge of Graduate Studies in History
212 Arts and Sciences Office Building

Admission Requirements

The student must have a grade point average in undergraduate study of at least 2.75 (on a 4.0 scale) and a minimum of 24 quarter hours of study in the field of history as an undergraduate (this may be waived upon petition to the Department of History).

Degree Requirements

The Department of History offers two options to candidates for a Master of Arts degree in history. Option I is designed for those students who wish to continue their studies toward a doctorate. Option II is primarily designed to meet the needs and improve the effectiveness of secondary teachers.

Option I

1) A total of 45 quarter hours at the 900 level including thesis (9 q.h.).
2) All students must take a course in Historiography (949 American or 950 European) and Historical Research (948).

3) Sixteen quarter hours of course work shall be in a field of concentration, exclusive of thesis credit.

4) A thesis is required of all candidates.

5) General written and oral examinations must be passed by all candidates.

6) Students working in American or British history will, in most instances, not be required to pass a foreign language examination. In areas where a foreign language is essential for research, the student will have to meet the requirement set by the department.

Option II

1) A total of 48 quarter hours of course work at the 900 level.

2) All students must take a course in Historiography (949 American or 950 European) and Historical Research (948).

3) Sixteen quarter hours of course work shall be in a field of concentration.

4) Students must submit two satisfactory (*B* or better) graduate seminar papers from two different instructors. The two research papers are to be deposited with the graduate program director to remain on file permanently.

5) General written and oral examinations have to be passed by all candidates.

6) Foreign language examination is not required.

Students under Option I are reminded that the Department of History expects that the thesis shall display a capacity for research in a variety of historical sources, the ability to interpret factual information, and shall constitute a properly documented report of the completed research.

Before any student under Option I is allowed to take his written and oral examinations, his advisor will designate to the chairperson of the Graduate Committee of the Department of History which foreign language, if any, the student is required to know and how this requirement has to be met.

Each candidate for the Master of Arts in history must pass a written and an oral examination in his major field of concentration. The primary purpose of these examinations is to determine the student's mastery of his major field; the examination will require factual and interpretative material as well as bibliography and historiography.

YOUNGSTOWN STATE UNIVERSITY

MASTER OF BUSINESS ADMINISTRATION

Dean S. Roussos
Director of MBA Graduate Studies
618 Lincoln Project

Admission Requirements

The M.B.A. program is open to all qualified men and women who show promise of success in graduate business study. Prior academic work in business subjects is not required for admission into the program, but students with subject-matter deficiencies will be required to take the necessary background courses as part of their program *(see below)*.

Requirements for *regular* admission to the program are: 1) a baccalaureate degree from an accredited institution; 2) a cumulative undergraduate grade point average of at least 2.5 (on a 4.0 scale); 3) adequate academic background in business subjects; and 4) a satisfactory score on the Graduate Management Admissions Test (GMAT).

An applicant whose undergraduate grade point average is less than 2.5 may be admitted *provisionally* on the basis of evidence that success in the M.B.A. program can be expected. Such evidence includes a higher grade point average in the junior and senior years or in appropriate postgraduate studies and successful work experience. Normally, a satisfactory GMAT must be received as part of the application for admission.

Applicants who have not taken the GMAT and who have at least a 2.7 grade point average may be admitted to the program as *provisional* students, but must submit a satisfactory GMAT score prior to the completion of 12 quarter hours.

Students accepted provisionally because of course deficiencies in undergraduate prerequisites will be expected to remove such deficiencies by completing appropriate undergraduate courses or the graduate survey courses. In either case, credits so earned do not count toward the 45 credit hours of Option I or 51 credit hours of Option II required for the M.B.A. degree. The foundation or prerequisite courses include the following: accounting (one year or Accounting 900); economics (one year or Economics 935); marketing (one course or Marketing 900); law (one course); statistics (one course); finance (one course); and management (one course or Management 900).

In addition to these basic courses that are required of all students pursuing the Master of Business Administration degree, additional courses may be required depending on the field of concentration.

Degree Requirements

The Master of Business Administration degree requires a minimum of 45 graduate credit quarter hours including a thesis (Option I) or a minimum of 51 graduate credit quarter hours without a thesis (Option II).

Each candidate for the M.B.A. degree must choose a field of concentration from one of the following: accounting, finance, management, or marketing.

The sequence of courses to be taken by M.B.A. students is: 1) foundations (prerequisite); 2) M.B.A. "core"; 3) concentration and electives. The Director of the M.B.A. program should be consulted for exceptions to this sequence.

The electives are to be chosen by the student, in consultation with an advisor. These courses may cover advanced work in a basic discipline or operational field; they may consist of courses offered by the School of Business Administration or they may be combined with related disciplines in other schools or departments of the University.

It is expected that most of the degree credit courses taken by students will be graduate (900-level) courses. Normally, a maximum of two Upper Division undergraduate courses (700- and 800-level) listed in the graduate catalog may be taken for graduate credit with the approval of an advisor. In addition, graduate credit will not be granted for these undergraduate courses taken after a higher level graduate course in the same subject.

MASTER OF MUSIC

Robert E. Hopkins

In Charge of Graduate Studies in Music
102A Dana School of Music

The following programs of study lead to the degree Master of Music: performance, music theory and composition, music history and literature, and music education.

Admission Requirements

Applicants for admission to graduate study for the Master of Music degree must present a baccalaureate degree in music from an accredited college or university. Admission requires an undergraduate grade point average of at least 2.5 (based on a 4.0 scale), and satisfactory scores on both the aptitude and music sections of the Graduate Record Examination. All applicants for the degree must pass entrance auditions before the appropriate faculties in performance and keyboard musicianship

(see performance course descriptions for prerequisites). Completion of two years' undergraduate piano study may be accepted in lieu of the keyboard musicianship examination. Applicants for the degree with major in music theory and composition or music history and literature must pass an entrance examination in the appropriate discipline. Applicants for the degree with major in voice performance are expected to have completed eight quarter hours or their equivalent each of French, German and Italian.

Degree Requirements

1) Candidates for the degree Master of Music must complete all requirements outlined in their respective courses of study (see chart, p. 49) and pass a final certifying examination.

2) Candidates must meet whatever undergraduate foreign language requirements are appropriate to their major. Music history and literature majors must pass a written examination in at least one foreign language, preferably French or German, prior to initiating thesis research.

3) Students who fail to meet the standards set by the School of Music may, upon recommendation of the Dana Graduate Committee, be required to withdraw at the end of the quarter.

4) Candidates for the degree Master of Music will continue study of their major performance area. With approval of the Dana Graduate Committee, a different performance area may be substituted for the major one.

5) A final qualifying examination is required of all candidates for the degree Master of Music. The examination may not be taken prior to the quarter in which all degree requirements will be completed. A resumé of procedural regulations governing the final qualifying examination is available from the office of the faculty member In charge of Graduate Studies in Music.

Requirements for the Degree
Master of Music

	Performance or	Music Theory and Composition	Music History and Literature	Music Education
Performance	18 q.h.	6 q.h.	6 q.h.	6 q.h.
Music Theory and Composition	6	21	6	6
Music History and Literature	6	6	21	6
Music Education	-	-	-	18 (a)
Thesis	-	6	6	6 (b)
Electives	18 (c)	9 (d)	9 (d)	6 (d)
TOTALS	48 q.h.	48 q.h.	48 q.h.	48 q.h.

a) Must include Music 970, 972, and 973.

b) Thesis requirement may alternatively be satisfied by any 6 q.h. of music education courses.

c) Must include available pedagogy, literature, and chamber music courses for the major performance area, if not previously studied for credit. May include up to 3 q.h. of ensemble courses. Performance majors may include up to 6 q.h. of performance courses.

d) May include up to 6 q.h. of performance courses and up to 3 q.h. of ensemble courses.

MASTER OF SCIENCE

BIOLOGICAL SCIENCES

Dale W. Fishbeck

In Charge of Graduate Studies in Biological Sciences
411 Ward Beecher Science Hall

Admission Requirements

Admission to the graduate program in biology leading to the Master of Science degree requires a baccalaureate degree from an accredited college or university, an undergraduate record showing a cumulative grade point average of at least 2.5 (on a 4.0 scale), and satisfactory completion of at least 25 quarter hours of undergraduate biology (or equivalent) courses plus organic chemistry and introductory physics.

Degree Requirements

The Department of Biological Sciences offers a Master of Science degree with two options, thesis and non-thesis. The thesis option requires a minimum of 45 quarter hours of credit; a passing grade on a comprehensive written examination; an oral review of the candidate by the departmental graduate committee; and an acceptable thesis reporting the results of a research project. The non-thesis option requires a minimum of 48 quarter hours of credit and a passing grade on a comprehensive written examination.

The student's course of study will be devised during a consultation with a departmental counselor and will be approved by the departmental graduate faculty. The course of study will be based on the student's area of specialization, background, and career interests.

CHEMISTRY

Thomas N. Dobbelstein

Chairperson of the Department
324 Ward Beecher Science Hall

Admission Requirements

For admission to the Department of Chemistry for graduate studies leading to the Master of Science degree, the applicant must present an undergraduate major in chemistry or its equivalent. In those cases where undergraduate preparation is slightly deficient, the applicant may be admitted with provisional status with the approval of the Dean of the Graduate School and the Chairperson of the Department of Chemistry.

Degree Requirements

Course Requirements: A minimum of 45 quarter hours of credit is required, including at least 30 quarter hours of course work other than Chemistry 990. Chemistry concentration areas are: analytical, biochemical, clinical, inorganic (including nuclear), organic (including polymer) and physical (including theoretical). A list of courses in each area is available from the department. The chemistry course work must include at least 15 quarter hours in these concentration areas of which at least nine quarter hours must be in one concentration area and at least six quarter hours must not be in that concentration area. All students must take at least one quarter hour of Chemistry 998, complete at least 30 hours of credit in chemistry courses, have a 3.0 or higher grade point average in chemistry courses, and complete an acceptable thesis for graduation.

Advising: Each entering student will be assigned a temporary advisor. A student should select a thesis advisor by the time he has completed 18 quarter hours of graduate courses. This advisor will assist the candidate in planning the remainder of his program.

CRIMINAL JUSTICE

Calvin J. Swank

Chairperson of the Department
2091 Technical and Community College Building

Admission Requirements

The master's degree program in criminal justice is designed to develop personnel with skills in action program planning and evaluation. To achieve this objective, the program is designed to 1) broaden the student's knowledge of the entire criminal justice process rather than a specialty within the process and to 2) develop skills in the integration of knowledge, the evaluation of scientific and scholarly literature, and the planning, implementation, and analysis of action programs in the criminal justice field.

Requirements for admission to the program are: 1) a bachelor's degree from a recognized college or university; 2) an accumulative grade point average in undergraduate work of 2.7 or above (on a 4.0 scale); and 3) to have completed 21 quarter hours (or equivalent) in the area of criminal justice, law, law enforcement, corrections, forensic science, criminology, or preparation judged satisfactory by the department. There are two admission periods into the program yearly, one beginning fall quarter and the other spring quarter.

Degree Requirements

The curriculum consists of three major components: 1) courses devoted to an analysis of the major substantive areas of the criminal justice field; 2) courses devoted to improvement of the research skills of the student, including the successful design, implementation, and completion of a thesis on some problem in the criminal justice field; and 3) courses through which the student may investigate in depth some area(s) of special interest to him or of relevance to his discipline.

The student shall be considered to have met the requirements for the degree when he has 1) completed the mandated courses in the *substantive* component (910, 920 and 930) and the *methodology* component (960, 940 and 945); 2) passed a written and oral qualifying examination which must be taken before completion of 24 hours of course work; 3) completed a minimum of 45 quarter hours of courses (including thesis credit and all must be 900-level courses or above) with a grade point average of 3.0 or better (on a 4.0 scale); and 4) successfully defended a thesis which normally will be submitted during the final quarter of enrollment.

Elective options are available in management and counseling to meet individual student goals. The student interested in criminal justice administration should consider Acctg.—Fin. 900, Man. 900 and 961 as courses to be elected in the special interest area. The student interested in counseling theory and practice should consider Psych. 950, Guid.—Couns. 962, 973 and 1001 as an elective sequence.

The academic program of each student is guided by a committee of three faculty members, subject to the approval of the Graduate Coordinator. The student selects a major advisor from among the graduate faculty of the Department of Criminal Justice. The major advisor serves as the chairperson of the student's faculty committee. The student and his major advisor select the other two members of the committee. One member is to be selected from the graduate faculty of the Department of Criminal Justice and the other member from the graduate faculty of the department or any other department within the University. This committee will 1) assist the major advisor in planning the student's program, 2) conduct the written and oral examination, and 3) supervise the thesis and conduct the oral defense of the thesis.

MATHEMATICS

Luke N. Zaccaro

Chairperson of the Department
1059 Technical and Community College Building

The master's degree in mathematics is awarded to qualified students satisfactorily completing a composite of courses, seminars and research activities aimed at increasing students' depth of understanding of and proficiency in mathematics so that they may be able:

1) to use mathematics in industry and government,
2) to improve their subject matter competency as high school teachers,
3) to teach mathematics at the two-year college level, and/or
4) to pursue further graduate study.

Admission Requirements

1) A baccalaureate degree from an accredited college or university.
2) An undergraduate cumulative grade point average of at least 2.7 (on a 4.0 scale) in all undergraduate mathematics courses.
3) Preparation judged satisfactory by the Department of Mathematics. Advanced calculus and abstract algebra are required as part of the preparation. Students with a slight deficiency may be admitted with provisional status with the approval of the Chairperson of the Department of Mathematics and the Dean of the Graduate School.

Degree Requirements

1) A minimum of 45 quarter hours of credit.
2) A cumulative grade point average of at least 3.0.
3) The student's combined undergraduate-graduate program must include studies in algebra, analysis, topology and applied mathematics.
4) Passing of a comprehensive examination is required. This may be written and/or oral, at the discretion of the department.
5) A student who prefers to write a thesis must first obtain the approval of the graduate mathematics faculty and the department chairperson. Thesis credit of up to nine quarter hours may be earned under Mathematics 999. These hours may be counted as part of the 45 quarter hours required for the degree. The student will be expected to make a successful oral defense of the thesis.
6) Before completing 12 quarter hours, the student must submit, through an advisor, the entire degree program for approval by the graduate mathematics faculty and the department chairperson.

MASTER OF SCIENCE IN EDUCATION

George M. Drew

Coordinator of Graduate Studies in Education
140 School of Education Building

The programs leading to the degree Master of Science in Education have the approval of the National Council for Accreditation of Teacher Education (NCATE) effective September 1, 1975. These programs are designed to prepare elementary and secondary teachers, elementary and secondary principals, elementary and secondary supervisors, and school guidance counselors at the master's degree level.

Graduate program directors are:

Clyde V. Vanaman, *Acting Chairperson of the Department of Elementary Education*	Master Teacher—Elementary; Educational Administration and Supervision—Elementary
Louis E. Hill, *Chairperson of the Department of Secondary Education*	Master Teacher—Secondary; Educational Administration and Supervision—Secondary
Lawrence A. DiRusso, *Chairperson of the Department of Guidance, Counseling, and Pupil Personnel*	School Guidance and Counseling
M. Dean Hoops, *Chairperson of the Department of Special Education*	Special Education

Admission Requirements

To be admitted to the Master of Science in Education degree program, the applicant must have earned a bachelor's degree from an accredited college or university. In general, the applicant must also have: 1) qualified for a teaching certificate (Ohio provisional or equivalent)*; 2) an undergraduate cumulative grade point average of at least 2.5 (on a 4.0 scale); 3) adequate preparation for the graduate program in which the student wishes to enroll as specified by the department of the major; and 4) a satisfactory score on the Aptitude Test of the Graduate Record Examination or on the Miller Analogy Test.

Programs of Study

In general, the programs provide for 1) a core of foundation courses, 2) required courses in the major discipline, 3) elective courses in the program being undertaken, and 4) additional work outside the School of Education. A minimum of 48 quarter hours is required for the degree in each program.

*Not required by the Department of Guidance, Counseling and Pupil Personnel.

A comprehensive examination at the close of the Foundations portion of the work will be required as a basis for becoming a degree candidate in Special Education and Secondary Education, with the exception of Master Teacher Secondary—Reading. Majors in Guidance and Counseling, Elementary Education and Master Teacher Secondary—Reading, must pass a comprehensive examination in their major area of study.

Students in all programs are required to take courses in Foundations of Education as indicated in the various degree program descriptions. However, students in the Guidance and Counseling program who are not seeking state certification in school guidance have no course requirements in Foundations of Education; they may take courses in Foundations according to their individual needs. The offerings and descriptions of the various courses of the Foundations of Education Department are provided in the *Courses* section of this bulletin.

The Master Teacher Program—Elementary

Option A: Curriculum

1) Required courses for specialization (21-28 quarter hours)

Ed. 909	Supervision of Student Teachers-Elementary	3 q.h.
Ed. 916	The Elementary School Curriculum	3 q.h.

Will serve as prerequisites to the following sequence of courses:

Ed. 917	Elementary School Reading Programs	3 q.h.
Ed. 918	Elementary School Mathematics Programs	3 q.h.
Ed. 919	Social Studies Programs in Elementary School	3 q.h.
Ed. 920	Elementary School Science Programs	3 q.h.
Ed. 921	Issues, Problems and Development in Elementary School Programs	3 q.h.

2) Foundations of Education (12 quarter hours. Take at any point in the program.)

Ed. 872	Statistical Methods in Education	3 q.h.
Ed. 900	Education in Western Culture *or*	
Ed. 905	History of American Education	3 q.h.
Ed. 901	Philosophical Foundations of Education	3 q.h.
Ed. 902	Sociological Aspects of Contemporary Education	3 q.h.
Ed. 904	Education Research (Prereq.: Ed. 872)	3 q.h.

3) Electives in elementary education may be chosen from any of the graduate elementary course offerings.

4) 6-18 quarter hours of courses from humanities, sciences, and other disciplines, including Psychology 903.

Option B: Reading Specialist

1) Required courses for specialization (31-32 quarter hours)

The following courses should be taken in sequence:

Ed. 882	Developmental and Content Area Reading	3 q.h.
Ed. 917	Elementary School Reading Programs (3) *or*	
Ed. 883	Secondary School Reading (4)	3 or 4 q.h.
Ed. 924	Diagnosis and Treatment of Reading Disability I	4 q.h.
Ed. 925	Diagnosis and Treatment of Reading Disability II	4 q.h.
Ed. 927	Practicum: Reading	4 q.h.
Ed. 930	Supervision of Reading	4 q.h.

The following courses may be taken at any point in the program:

Psych. 903	Psychology of Learning	3 q.h.
Psych. 907	Psychology of Adjustment	3 q.h.
Engl. 908	Literature of Children and Adolescents	3 q.h.

2) Foundations of Education (12 quarter hours) See description of requirement under Option A.

3) Electives: 4-5 quarter hours, to make a total of at least 48 quarter hours, required for the degree.

4) All Master Teacher—Reading students will be required to take a comprehensive examination in reading after the completion of Ed. 930.

Option C: Early Childhood Specialist

1) Required courses for specialization (23 quarter hours)

Ed. 916	Elementary School Curriculum	3 q.h.
Ed. 911	Early Childhood Programs	3 q.h.
Ed. 912	Curriculum and Methods in Early Childhood Education	4 q.h.
Ed. 913	Pre-School Education	3 q.h.
Ed. 914	Practicum in Early Childhood Education	4 q.h.
Ed. 929	Language Arts in Primary Schools	3 q.h.
Ed. 946	Supervision of Instruction	3 q.h.

2) Cognate area (6 quarter hours)

Psych. 903	The Psychology of Learning	3 q.h.
Guid. 825	Group Processes	3 q.h.

3) Foundations of Education (12 quarter hours) See description of requirement under Option A.

4) Suggested electives (Select 7 quarter hours)

Psych.	906	Child Growth and Development	3 q.h.
Soc.	902	The Child and Society	3 q.h.
Guid.	1030	Human Relations Training for School Personnel	3 q.h.

5) Early Childhood Specialist students will be required to take a comprehensive examination over required courses for specialization.

Educational Administration And Supervision—Elementary

Areas of specialization that lead to state certification are: Elementary Principalship, Supervision, Local Superintendent, and Superintendent.

Option A: The Principalship Program—Master's Degree

1) Educational administration (24 quarter hours in school administration courses)

Ed.	916	The Elementary School Curriculum	3 q.h.
Ed.	921	Issues, Problems and Development in Elementary School Programs	3 q.h.
Ed.	946	The Supervision of Instruction	3 q.h.
Ed.	947	Basic Principles of Elementary School Administration	3 q.h.
Ed.	949	School Law	3 q.h.
Ed.	951	The School Principal's Communication Relationships	3 q.h.
Ed.	961	Introduction to Pupil Personnel	3 q.h.
Ed.	1021	Field Experience for the Elementary Principal	3 q.h.

2) Foundations of Education (12 quarter hours) See description of requirement under Option A: Master Teacher—Elementary.

3) Elective in Special Education (3 quarter hours)

4) Interdisciplinary electives (6 quarter hours)

5) Other electives (3 quarter hours)

Option B: The Supervisory Program—Master's Degree

Graduates of the supervisory program are eligible for a provisional supervisory certificate from the State of Ohio when they have completed 27 months of successful classroom teaching under a standard certificate in the field for which the supervisor's certificate is sought.

An examination covering the education courses for specialization will be required as a basis for becoming a degree candidate.

1) Education courses required for specialization (12 quarter hours)

Ed. 946	The Supervision of Instruction	3 q.h.
Ed. 909	The Supervision of Student Teachers-Elementary	3 q.h.
Ed. 916	The Elementary School Curriculum	3 q.h.
Ed. 931	The Secondary School Curriculum	3 q.h.
Ed. 1022	Field Experience for Supervisory Candidates	3 q.h.

2) Foundations of Education (12 quarter hours) See description of requirement under Option A: Master Teacher—Elementary.

3) Required psychology courses (6 quarter hours)

Psych. 903	The Psychology of Learning	3 q.h.
Psych. 907	Psychology of Adjustment	3 q.h.

4) Courses related to the supervisory field (12 quarter hours)

5) Electives (6 quarter hours)

Option C: Local Superintendent's Certification Program

By action of the Ohio State Board of Education, eligibility for a Local Superintendent's Provisional Certificate will be established upon the applicant's completion of a master's degree with graduate work well distributed over the following areas:

1)

Ed. 947	Basic Principles of Elementary School Administration	3 q.h.
Ed. 948	Basic Principles of Secondary School Administration	3 q.h.

2) Two of the three:

Ed. 949	School Law	3 q.h.
Ed. 952	School Finance	3 q.h.
Ed. 956	Educational Facilities	3 q.h.

3) Ed. 946 The Supervision of Instruction 3 q.h.

4)

Ed. 916	The Elementary School Curriculum	3 q.h.
Ed. 931	The Secondary School Curriculum	3 q.h.

5) Foundations of Education (9 quarter hours)

Ed. 901	Philosophical Foundations of Education	3 q.h.
Ed. 902	Sociological Aspects of Contemporary Education	3 q.h.
Ed. 904	Educational Research	3 q.h.

6) Psych. 903 Psychology of Learning 3 q.h.

7) Ed. 1023 Field Experiences—Supervisor's 1-3 q.h.

Evidence of 27 months of successful classroom teaching experience and nine months of satisfactory experience in an administrative or supervisory position under an appropriate certificate are also required.

Option D: Superintendent's Certification Program

By action of the Ohio State Board of Education, eligibility for a Superintendent's Provisional Certificate will be established upon the applicant's completion of a master's degree with 90 quarter hours of graduate work well distributed over the following areas:

1)	Ed. 947	Basic Principles of Elementary School Administration	3 q.h.
	Ed. 948	Basic Principles of Secondary School Administration	3 q.h.
2)	Ed. 949	School Law	3 q.h.
	Ed. 952	School Finance	3 q.h.
	Ed. 954	School Community Relations	3 q.h.
	Ed. 955	Staff Personnel Administration	3 q.h.
	Ed. 956	Educational Facilities	3 q.h.
3)	Ed. 916	The Elementary School Curriculum	3 q.h.
	Ed. 931	The Secondary School Curriculum	3 q.h.
4)	Ed. 946	The Supervision of Instruction	3 q.h.

5) Foundations of Education (9 quarter hours) See description of requirement under Option C: Local Superintendent's Certification.

6)	Psych. 903	Psychology of Learning	3 q.h.
7)	Ed. 1023	Field Experiences—Superintendent's	1-3 q.h.

Evidence of 27 months of satisfactory experience in an administrative or supervisory position under the appropriate certificate is also required.

Educational Administration And Supervision—Secondary

Areas of specialization that lead to state certification are: Secondary Principalship, Supervision, Local Superintendent, and Superintendent.

Option A: The Principalship Program—Master's Degree

1) Foundations of Education

Ed. 900	Education in Western Culture *or*	3 q.h.
Ed. 905	History of American Education	3 q.h.
Ed. 901	Philosophical Foundations of Educational Theory and Practice	3 q.h.

Ed. 902	Sociological Aspects of Contemporary Education	3 q.h.
*Ed. 904	Educational Research	3 q.h.

2) Educational administration (24 quarter hours in school administration courses)

Ed. 931	The Secondary School Curriculum	3 q.h.
Ed. 946	The Supervision of Instruction	3 q.h.
Ed. 948	Basic Principles of Secondary School Administration	3 q.h.
Ed. 949	School Law	3 q.h.
Ed. 950	School Business Management	3 q.h.
Ed. 951	Communications and the School Principal	3 q.h.
Ed. 954	School Community Relations	3 q.h.
Ed. 961	Introduction to Pupil Services	3 q.h.
Ed. 1020	Field Experiences—Secondary Principal	1-3 q.h.

3) Electives (12 quarter hours)

a)	Elective in Special Education	3 q.h.
b)	Interdisciplinary electives	6 q.h.
c)	Educational administration elective from the following courses	3 q.h.
Ed. 952	School Finance	3 q.h.
Ed. 955	Staff Personnel Administration	3 q.h.
Ed. 956	Educational Facilities	3 q.h.

4) Comprehensive examination over Foundations of Education.

Option B: The Supervisory Program—Master's Degree

1) Foundations of Education

Ed. 901	Philosophical Foundations of Educational Theory and Practice	3 q.h.
Ed. 902	Sociological Aspects of Contemporary Education	3 q.h.
Ed. 872	Statistical Methods in Education	3 q.h.
Ed. 904	Educational Research	3 q.h.

2) Curriculum, supervision, instruction

Ed. 946	The Supervision of Instruction	3 q.h.
Ed. 910	The Supervision of Practice Teachers—Supervision in Secondary Schools	3 q.h.
Ed. 916	The Elementary School Curriculum	3 q.h.
Ed. 931	The Secondary School Curriculum	3 q.h.
Ed. 1022	Field Experience for Supervisory Candidates	3 q.h.

3) Psychology courses
   Ed. 903 The Psychology of Learning 3 q.h.
   Ed. 907 Psychology of Adjustment 3 q.h.
4) Courses related to the supervisory field 12 q.h.
5) Electives 3 q.h.

6) Comprehensive examination over Foundations of Education.

Option C: Local Superintendent's Certification Program

By action of the Ohio State Board of Education, eligibility for a Local Superintendent's Provisional Certificate will be established upon the applicant's completion of a master's degree with graduate work well distributed over the following areas:

1) Ed. 947 Basic Principles of Elementary School Administration 3 q.h.
   Ed. 948 Basic Principles of Secondary School Administration 3 q.h.
2) Two of the three:
   Ed. 949 School Law 3 q.h.
   Ed. 952 School Finance 3 q.h.
   Ed. 956 Educational Facilities 3 q.h.
3) Ed. 916 The Elementary School Curriculum 3 q.h.
   Ed. 931 The Secondary School Curriculum 3 q.h.
4) Ed. 946 The Supervision of Instruction 3 q.h.
5) Foundations of Education (9 quarter hours)
   Ed. 901 Philosophical Foundations of Educational Theory and Practice 3 q.h.
   Ed. 902 Sociological Aspects of Contemporary Education 3 q.h.
   *Ed. 904 Educational Research 3 q.h.
6) Psych. 903 Psychology of Learning 3 q.h.
7) Ed. 1023 Field Experiences—Superintendent's 1-3 q.h.

Evidence of 27 months of satisfactory experience in an administrative or supervisory position under the appropriate certificate is also required.

Option D: Superintendent's Certification Program

By action of the Ohio State Board of Education, eligibility for a Superintendent's Provisional Certificate will be established upon the applicant's completion of a master's degree with 90 quarter hours of graduate work well distributed over the following areas:

1) Ed. 947 Basic Principles of Elementary School Administration 3 q.h.
   Ed. 948 Basic Principles of Secondary School Administration 3 q.h.
2) Ed. 949 School Law 3 q.h.
   Ed. 952 School Finance 3 q.h.
   Ed. 954 School Community Relations 3 q.h.
   Ed. 955 Staff Personnel Administration 3 q.h.
   Ed. 956 Educational Facilities 3 q.h.
3) Ed. 916 The Elementary School Curriculum 3 q.h.
   Ed. 931 The Secondary School Curriculum 3 q.h.
4) Ed. 946 The Supervision of Instruction 3 q.h.
5) Foundations of Education (9 quarter hours) See description of requirement under Option C: Local Superintendent's Certification.
6) Psych. 903 Psychology of Learning 3 q.h.
7) Ed. 1023 Field Experiences—Superintendent's 1-3 q.h.

Evidence of 27 months of satisfactory experience in an administrative or supervisory position under the appropriate certificate is also required.

*Students having an inadequate background in measurements or statistics may be required to take Ed. 872 as a prerequisite to Ed. 904.

The Master Teacher Program—Secondary

Option A: Curriculum

1) Foundations of Education
   Ed. 900 Education in Western Culture *or* 3 q.h.
   Ed. 905 History of American Education 3 q.h.
   Ed. 901 Philosophical Foundations of Education Theory and Practice 3 q.h.
   Ed. 902 Sociological Aspects of Contemporary Education 3 q.h.
   *Ed. 904 Educational Research 3 q.h.
2) Psych. 903 Psychology of Learning 3 q.h.
   Ed. 910 Supervision of Practice Teachers—Secondary 3 q.h.
3) 24 quarter hours in appropriate teaching areas (art, biology, business education, chemistry, economics, English, French, geography, German, health and physical education, history, Italian, mathematics, music, physics, political science, Spanish, speech and dramatics, social studies, and sociology). In addition to consulting

with an education advisor, the student will consult with a faculty member in the teaching area to determine the sequence of teaching area courses which the student will place on file in the Department of Secondary Education.

4) Electives in teaching areas or professional education courses (6 quarter hours)
Recommended course:
Ed. 931 The Secondary School Curriculum 3 q.h.

5) Comprehensive examination over Foundations of Education.

Option B: Reading Specialist

1) Foundations of Education (12 quarter hours)
Ed. 900 Education in Western Culture *or* 3 q.h.
Ed. 905 History of American Education 3 q.h.
Ed. 901 Philosophical Foundations of Educational Theory and Practice 3 q.h.
Ed. 902 Sociological Aspects of Contemporary Education 3 q.h.
*Ed. 904 Educational Research 3 q.h.

2) Ed. 924 Diagnosis of Reading Disability I 4 q.h.
Ed. 925 Diagnosis of Reading Disability II 4 q.h.
Ed. 882 Development and Content Area Reading 3 q.h.
Ed. 883 Survey of Major Issues in Reading 4 q.h.
Ed. 927 Practicum: Reading 1-6 q.h.
Ed. 930 Supervision of Reading 3 q.h.
Engl. 908 Literature of Children and/or Adults 3 q.h.
Psych. 907 Psychology of Adjustment 3 q.h.
Psych. 903 Psychology of Learning 3 q.h.

3) Electives (3-8 quarter hours) Recommended courses:
Ed. 850 Reading Problems in the Secondary School 3 q.h.
Ed. 923 Review of Reading Research 4 q.h.

4) Comprehensive examination over reading courses at the completion of Ed. 930.

*Students having an inadequate background in measurements or statistics may be required to take Ed. 872 as a prerequisite to Ed. 904.

Guidance and Counseling Program

Although its major orientation is toward counseling in educational institutions, the primary objective of the program is to prepare the stu-

dent to serve as a professional counselor in any setting. Skills a counselor must possess to provide effective professional counseling services in education are skills which are common to all professional counselors regardless of the institutions in which they are employed. Therefore, the design of the curriculum is such that the following are accomplished:

- The student is provided a series of didactic courses and supervised experiences that will qualify him as a professional counselor.
- The student is oriented to counseling in an educational setting.
- The student is oriented to counseling in other community institutions.

Areas of specialization that lead to state certification are: Secondary Counseling, Elementary School Counseling and Visiting Teacher Services. Students are required to take 12-18 quarter hours in core courses and the rest in areas of specialization and electives.

All students must have appropriate undergraduate preparation for graduate work in counseling. Normally this would include sufficient course work in psychology and sociology. Students seeking the School Counselor Certificate in Ohio must have a valid teaching certificate. Students without teaching certificates may be admitted if their background and/or present occupation is related to education or the helping professions. Some states, including Pennsylvania, do not require teaching experience nor a teaching certificate to qualify for the school counselor certificate. Also, many students who receive the M.S. in Ed. degree with a major in counseling are being employed by community agencies and student personnel programs in colleges and universities.

Every applicant will be interviewed by the Guidance and Counseling Admissions Committee and must meet the admission standards prescribed by the department in the document "Admission Policies for the Department of Guidance and Counseling, 1971." Guidance and Counseling admission standards exceed the minimum standards set by the Graduate School and the School of Education; therefore, it is important that all applicants obtain a copy of the admission policies from the Guidance and Counseling Department prior to making formal application for admission.

After completing a sequence of 24 quarter hours of graduate course work, students are required to take the Guidance and Counseling Comprehensive Exam. Acceptable performance on the exam is necessary for continuation in the program.

It is important to note in the curriculum below that students wishing to be certified as counselors must complete a full quarter internship.

Those individuals who are employed full-time in schools or agencies will need to arrange for sabbatical leaves or leaves of absence with their employers to fulfill the requirements of the internship.

Core Course Requirements (22-27 quarter hours)

Guid.	962	Counseling: Principles, Theory, Practice	3 q.h.
Guid.	964	Measurement and Evaluation Techniques	3 q.h.
Guid.	1011	Counseling Lab Experience	3 q.h.
Psychology electives			3-9 q.h.
*Foundations of Education electives			9 q.h.

*Applies only to individuals seeking state certification.

Specialization Areas (18-27 quarter hours)

1) Secondary School Guidance

Guid.	961	Pupil Personnel	3 q.h.
Guid.	963	Occupational and Educational Information in Guidance	3 q.h.
*Guid.	1009	Internship for Secondary School Counselors	6-12 q.h.
Guid.	1017	Group Procedures in Counseling	3 q.h.
Electives in guidance and related disciplines			3-12 q.h.

2) Elementary School Guidance

Guid.	825	Group Processes in the School	3 q.h.
Guid.	963	Occupational and Educational Information in Guidance	3 q.h.
Guid.	970	Guidance Services in Elementary, Junior High, Middle School	3 q.h.
*Guid.	1008	Internship for Elementary School Counselors	6-12 q.h.
Electives in guidance and related disciplines			3-12 q.h.

*Students not seeking state certification in guidance may substitute six quarter hours of Guid. 974 and six quarter hours of electives for the internship with permission of advisor.

3) Visiting Teacher

Guid.	961	Pupil Personnel Services	3 q.h.
Ed.	949	School Law	3 q.h.
Guid.	974	Case Studies in School Guidance and Field Experience in Community Social Agencies	3-6 q.h.
Guid.	1007	Practicum for Visiting Teachers	6-9 q.h.
Electives in guidance and related disciplines			3-9 q.h.

Required course work for the M.S. in Education degree for all areas of specialization totals 54 quarter hours.

Program in Special Education

1) 24 quarter hours of special education and related courses:

Psych.	903	The Psychology of Learning	3 q.h.
Psych.	906	Human Growth and Development	3 q.h.
Ed.	976	Problems and Issues in Mental Retardation	3 q.h.
Ed.	977	Research and Problems in the Education of the Mentally Retarded	3 q.h.
Ed.	978	Administration and Supervision of Special Education	3 q.h.
Ed.	979	The Mentally Retarded in Society	3 q.h.
Psych.	980	Psychological Aspects of Mentally Retarded Children	3 q.h.
Psych.	(Sp. Ed.) 981	Advanced Seminar in Mental Retardation	3 q.h.

2) 12 quarter hours of electives in the general areas of supervision, administration, diagnosis of reading problems, psychology, and counseling. (For teachers already provisionally certified in elementary or secondary education but not in special education, the qualifying courses for special certification [courses numbered 851 through 855] will tentatively be permitted to satisfy this 12-hour requirement.)

MASTER OF SCIENCE IN ENGINEERING

Programs in civil, electrical, mechanical, and metallurgical engineering lead to the degree Master of Science in Engineering.

Admission Requirements

In addition to the requirements for admission to the Graduate School, applicants must show a grade point average in undergraduate study of at least 2.75 (on a 4.0 scale) in the courses in the field of specialized study, and meet essentially all of the undergraduate prerequisites for their proposed field of graduate study. Applicants with lesser qualifications may be admitted on the basis of evaluation of their undergraduate record by the engineering department in which they wish to enroll. Applicants may be required to take certain courses, to be determined by their advisors, to make up deficiencies. The student will not be given credit for such courses toward his graduate degree.

Degree Requirements

All engineering departments offer two graduate program options, one traditional, the other administrative.

Traditional Option

At least 45 quarter hours are required, divided in the following manner:

1) Mathematics: 8 quarter hours, usually Mathematics 910, 911: Advanced Engineering Mathematics I and II (4, 4 q.h.)

2) Interdepartmental Courses: 12 quarter hours from:
   M.E. 982 Engineering Analysis (4 q.h.)
   M.E. 986 Theory of Continuous Medium (4 q.h.)
   Met. Engr. 901, 902 Fundamentals of Materials Science I and II (4, 4 q.h.)
   I.E. 901 Optimization Techniques (4 q.h.)
   I.E. 902 Digital Simulation (4 q.h.)
   E.E. 901 Control Systems I (4 q.h.)
   E.E. 951 Network Analysis (4 q.h.)
   C.E. 910 Advanced Strength of Materials (4 q.h.)
   C.E. 941 Structural Mechanics (4 q.h.)

3) Departmental Courses: 25 quarter hours

Administrative Option

At least 48 quarter hours are required, divided in the following manner:

1) Out-of-Department Courses: 24 quarter hours from:
   Acct. 900 Financial Accounting for Management (5 q.h.)
   *Acct. 902 Management Accounting Systems (3 q.h.)
   Econ. 935 Basic Economic Analysis (4 q.h.)
   I.E. 750 Introduction to Engineering Relations (4 q.h.)
   I.E. 824 Engineering Economy (4 q.h.)
   I.E. 825 Advanced Engineering Economy (4 q.h.)
   I.E. 850 Introduction to Operations Research (4 q.h.)
   I.E. 851 Linear Programming (4 q.h.)
   I.E. 901 Optimization Techniques (4 q.h.)
   I.E. 902 Digital Simulation (4 q.h.)
   I.E. 903 Analysis of Stochastic Systems (4 q.h.)
   Mgt. 900 The Foundation of Management (3 q.h.)
   *Mgt. 916 Quantitative Analysis for Business Decisions 4 q.h.)
   *Mgt. 917 Management Information Systems (4 q.h.)

*Mgt. 951 Theory of Organization (4 q.h.)
*Mgt. 952 Management Theory and Thought (3 q.h.)
*Mgt. 961 Behavior Sciences in Management (4 q.h.)
*Mgt. 966 Advanced Production Management (3 q.h.)
Mktg. 900 Foundations of Marketing (3 q.h.)
*Mktg. 942 Marketing Administration (3 q.h.)
Math. 743 Mathematical Statistics I (4 q.h.)
Pub. Rel. 950 Theory and Practice of Public Relations (3 q.h.)

*The 900 course in the appropriate department—Accounting, Management, or Marketing, or an equivalent course, is prerequisite.

2) Departmental Courses: 24 quarter hours (This is a non-thesis option.)

CIVIL ENGINEERING

Paul X. Bellini

In Charge of Graduate Studies in Civil Engineering
260 Engineering Science Building

This program offers opportunities for advanced studies in two general areas of specialization: fluid mechanics and sanitary engineering; and structural mechanics.

A minimum of 18 credit hours of departmental courses in the primary area, plus a thesis, is required of all students. The thesis requirement may be waived by the department head upon recommendation of the departmental advisory committee. In that case the student will be required to take at least six hours of course work beyond the 45 required for the degree.

Before the thesis is approved by the advisor and department head, the student must have the approval of the departmental advisory committee via an oral defense of the thesis. In cases where the thesis requirement is waived, the student must, upon completing 40 hours of course work, pass an oral examination related to the course work; the exam will be administered by the department advisory committee.

After completing 12 hours of course work, the student must formulate, with his advisor, his remaining program of study.

ELECTRICAL ENGINEERING

Matthew Siman

In Charge of Graduate Studies in Electrical Engineering
290 Engineering Science Building

The Department of Electrical Engineering provides the opportunity for specialized study in control systems, electronics, electromagnetic fields, and computer and solar engineering.

After the completion of 12 credit hours, the student is assigned a program committee with which he will jointly develop his remaining program of study. The program must include E.E. 951 (Network Analysis).

Ordinarily, the student's program of study will include a nine credit hour thesis requirement. This requirement may be waived by the department head, upon the recommendation of the student's program committee, and replaced with nine credit hours of course work selected by the committee. A student attempting a thesis must orally present and successfully defend his thesis findings. A non-thesis student must pass a written and/or oral comprehensive examination relative to his major field of study.

MECHANICAL ENGINEERING

Frank J. Tarantine

In Charge of Graduate Studies in Mechanical Engineering
205 Engineering Science Building

Two general areas of specialization in course work and research are offered: mechanics of rigid and deformable solids, and heat and fluid flow.

Students pursuing the traditional option will be assigned to a graduate committee after completing a minimum of 12 credit hours, including Mathematics 910 and Mechanical Engineering 982. The committee, in consultation with the student, will plan his remaining course work and determine if his program is to include a thesis. A maximum of nine hours of credit toward the degree may be obtained for *Thesis* and *Graduate Projects.* If a thesis is undertaken, the student will be required to defend it in an oral examination. If a thesis is not undertaken, the student will be required to take at least three credit hours of course work beyond the minimum of 45 required for the degree. At the discretion of his graduate committee, a student may be required to take a qualifying examination as a degree requirement.

In the traditional option, Mathematics 910, Mathematics 911 and Mechanical Engineering 982 are required of all mechanical engineering students, along with the completion of 16 credit hours of 900-level mechanical engineering courses (excluding *Thesis* and *Graduate Projects).*

The requirements of the administrative option are outlined on page 67.

MATERIALS SCIENCE

Tadeusz K. Slawecki

Chairperson of the Department of Chemical Engineering and Materials Science
225 Engineering Science Building

For admission to the program in metallurgical engineering the candidate must have a bachelor's degree in engineering or in the natural sciences (physics, chemistry, or mathematics). Any candidate holding an undergraduate degree only in natural sciences will be required to take certain courses, to be determined by his advisor, to make up deficiencies. The student will not be given credit for such courses toward his graduate degree except with the permission of the departmental advisory committee.

The minimum quarter hours required for the degree is 46 hours, 21 quarter hours of which are applied towards the general advanced courses in other engineering disciplines. The remaining quarter hours are devoted to the specialized courses in metallurgical engineering and materials science. All students are required to take the following courses:

Met. Engr. 920	Advanced Physical Metallurgy I
Met. Engr. 922	Advanced Mechanical Metallurgy I
Met. Engr. 960	Research Seminar

Having established his option, the student chooses electives from the courses listed in his chosen option.

OPTION A: Metallurgical Engineering

Research

Met. Engr. 921	Advanced Physical Metallurgy II
Met. Engr. 923	Mechanical Properties of Materials II
Met. Engr. 951	Introduction to Electron Microscope and Field Ion Microscope
Met. Engr. 952	Dislocation and Plastic Flow
Met. Engr. 953	Thermodynamics of Solids

Industrial

Met. Engr. 910	Extractive and Process Metallurgy
Met. Engr. 921	Advanced Physical Metallurgy II
Met. Engr. 931	Engineering Alloys

Met. Engr. 932 Industrial Metallurgy
Met. Engr. 933 Chemical Metallurgy

OPTION B: Materials Science

Research

All courses listed under *research* option in Met. Engr. *plus* the following courses:

Met. Engr. 954 Advanced Polymer Science
Met. Engr. 955 Advanced Refractory Material
Met. Engr. 956 Advanced Nuclear Materials

Industrial

Met. Engr. 851 Introduction to Polymer Science
Met. Engr. 852 Advanced Engineering (Non-metallic) Materials I
Met. Engr. 853 Advanced Engineering (Non-metallic) Materials II
Met. Engr. 854 Advanced Engineering (Non-metallic) Materials III
Met. Engr. 954 Advanced Polymer Science
Met. Engr. 955 Advanced Refractory Materials
Met. Engr. 956 Advanced Nuclear Materials

In all options, the student undertakes a program of independent research. This program is jointly arranged by the candidate for the degree, the professor-in-charge, and the departmental advisory committee. The thesis requirement may be waived by the department head. In the non-thesis program, the student will be required to take six additional hours of course work beyond the 46 hours required for the program.

The administration of the program will be governed by the regulations of the Graduate School and of the department. The student must secure a copy of the graduate student folder from the department office.

Courses

Included in this section, in addition to the 900-and 1000-series courses that are open to graduate students only, are the Upper Division undergraduate courses (700- and 800-series) that may be taken for graduate credit but only with the approval of the student's advisor. For course descriptions and prerequisites for these courses, see the University Bulletin (Catalog Issue).

ACCOUNTING AND FINANCE

Robert E. Arnold, *Chairperson of the Department*

518 Lincoln Project

810. Statement Analysis. (3 q.h.)
813. Federal Tax Theory. (4 q.h.)
814. Federal Tax Practice. (4 q.h.)
820. Governmental and Funds Accounting. (3 q.h.)
835. Advanced Business Finance. (4 q.h.)
839. Security Analysis. (4 q.h.)

Accounting

900. *Financial Accounting for Management.* A survey of the fundamental concepts of financial accounting with special emphasis upon the interpretation and use of financial accounting data for administrative purposes. (Not applicable toward the MBA.) 5 q.h.

901. *Accounting Theory.* Underlying concepts and procedures, fund flow analysis, problems of multiple proprietary business entities, intercorporate investment and business combinations, estates and trusts, and nonprofit units. 3 q.h.

902. *Management Accounting Systems.* A study of the managerial aspects of accounting and their relationship to financial accounting principles. The process of classifying and analyzing raw data for validity and relevance and communicating this information in a format that can be interpreted by management with whom the responsibility of decision-making lies is discussed in detail. The various elements of cost planning and control including the measurement of the efficient use of materials, labor, and overhead through the development of standards for both fixed and variable costs and the comparison against actual costs in each category. The determination of variances and the establishment of flexible budgets by cost centers are reviewed. Distribution costs will be discussed. 3 q.h.

905. *Business Tax Planning.* A consideration of the practical utilization of income tax knowledge to minimize business income tax liability. The course will include the following: methods to organize or reorganize a business advantageously, steps to gain maximum business deductions, and strategic procedures to make property sales and exchanges. 3 q.h.

906. *Estate Planning.* A study of the tax implications involving estates. Emphasis on the importance of estate planning; the devices available for use in such planning; effective uses of lifetime gifts, trusts, life insurance, pension plans, profit sharing, and other fringe benefit plans. The effects of state inheritance tax and property laws upon estate planning will be emphasized. 3 q.h.

911. *Advanced Budgeting.* The principles and techniques applied in preparing and formulating various types of budgets and reports frequently used by management are discussed. Specific budgets including cash, capital additions, and special budgets to meet specific requirements of various manufacturing, distributing, and non-profit organizations are reviewed in detail. The controller's responsibility relative to budget development, implementation of budget procedures, and communication of budget and related information to responsible management are set forth in order to assist the decision-making process. Prereq.: Acctg. 901 and/or Acctg. 902. 3 q.h.

915. *Research Techniques.* Nature, methods and techniques of research and the use of research by management; the scientific method in business, sampling theory, variable analysis and research cases. 3 q.h.

996. *Research Problems Other Than Thesis.* Special projects undertaken by M.B.A. students under the direction of faculty members of professorial rank. The exact number to be used will be determined by the nature of the project. Credit will be determined in each case in the light of the nature and extent of the project. 1-6 q.h.

998. *Thesis.* 6 q.h.

Finance

921. *Financial Administration.* A study through case analysis of business financing, primarily through the use of long-term funds and from the viewpoint of the chief financial officer. The course is concerned with money and credits, business cycles, and present-value concepts; the formation and expansion of capital structures from the standpoints of the owner-manager, the creditors and potential investors, and includes the pricing and marketing of new security issues; new business financing, mergers, reorganizations, and bankruptcies. 3 q.h.

922. *Capital Management.* Managerial economics of capital budgeting, sourcing, rationing and control for large enterprises; forecasting demand and internal generation of capital; estimating costs of capital; measuring productivity of capital; intangible capital investments; administration of capital appropriations; public policy implications. 3 q.h.

923. *Advanced Securities Analysis.* The major emphasis will be on selection in both theory and practice by applying the appropriate analytical principles and techniques to fixed income, securities, common stocks, and senior securities with speculative features. A research paper involving the application of analytical techniques is a requirement. Prereq.: MBA 921, 922, Econ. 810, 900 (or approval of instructor). 4 q.h.

924. *Financial Analysis.* The major emphasis will be an in-depth finan-

cial study of several firms within an industry. This study will be accomplished by applying the appropriate analytical principles and techniques to the firms' financial statements. A research paper will be required. Prereq.: Fin. 923. 3 q.h.

996. *Research Problems.* Research under the supervision of a graduate faculty member with the approval of the department chairperson. Credit will be determined in each case in the light of the nature and extent of the project. 1-6 q.h.

998. *Thesis.* 6 q.h.

ADVERTISING AND PUBLIC RELATIONS

Frank J. Seibold, *Chairperson of the Department*

621 Lincoln Project

950. *Theory and Practice of Public Relations.* A study, analysis, and evaluation of policies and programs designed to identify an organization with the public interest, and to gain public understanding and support. 3 q.h.

955. *Theory and Practice of Advertising.* A study, analysis, and evaluation of advertising objectives relating to media selection, creative function, campaigns, and research for decision-making and control. Prereq.: 941 or 942 (or by consent of instructor). 3 q.h.

ART

Jon M. Naberezny, *Chairperson of the Department*

10 Clingan-Waddell Hall

The student planning to major in art is required to submit a portfolio of his work to the Graduate Committee of the Art Department when applying for admission to the Graduate School.

806. Indian Art. (3 q.h.)
807. Chinese/Japanese Art. (3 q.h.)
810, 811. Advanced Ceramics. (3 q.h.)
814. 20th-Century Art to 1925. (3 q.h.)
815. 20th-Century Art from 1925. (3 q.h.)

920. *Seminar in Art Education.* Problems and projects that pertain to the teaching of art at various levels of learning within our schools. The graduate program includes both studio work and pedagogical studies. 920 may be repeated for a maximum credit of 10 hours. Prereq.: Graduate standing and permission of faculty. 5 q.h.

925. *Research in Art Education.* An individual and inventive approach to solving existing problems in art education based upon the philosophy, psychology, principles, practices, and perceptions of past and contemporary trends in art education. 925 may be repeated for a maximum credit of 10 hours. Prereq.: 920 and permission of instructor. 5 q.h.

950. *Studio Problems in Painting.* Individual research of two-dimensional form through various media including oil, acrylic, water color, collage,

etc. May be repeated for a maximum credit of 10 hours. Prereq.: Graduate standing. 5 q.h.

951. *Studio Problems in Painting.* Continuation of 950. May be repeated for a maximum credit of 10 hours. Prereq.: 950. 5 q.h.

952. *Studio Problems in Painting.* Continuation of 951. May be repeated for a maximum credit of 10 hours. Prereq.: 951. 2-5 q.h.

960. *Studio Problems in Sculpture.* Individual research of plastic form through various media including plastics, wood, stone, metals, and related materials. May be repeated for a maximum credit of 10 hours. Prereq.: Graduate standing. 5 q.h.

961. *Studio Problems in Sculpture.* Continuation of 960. May be repeated for a maximum credit of 10 hours. Prereq.: 960. 5 q.h.

962. *Studio Problems in Sculpture.* Continuation of 961. May be repeated for a maximum credit of 10 hours. Prereq.: 961. 2-5 q.h.

BIOLOGICAL SCIENCES

Paul D. Van Zandt, *Chairperson of the Department*

409 Ward Beecher Science Hall

802. Ecology. (5 q.h.)
804. Aquatic Biology. (4 q.h.)
804L. Aquatic Biology Laboratory. (2 q.h.)
805. Ichthyology. (4 q.h.)
812. Mycology. (4 q.h.)
819. Taxonomy of Flowering Plants. (5 q.h.)
821. Plant Anatomy. (5 q.h.)
822. Plant Physiology. (5 q.h.)
823. Advanced Genetics. (4 q.h.)
824. Bacterial and Viral Physiology. (4 q.h.)
825. Radioisotopes. (4 q.h.)
831. Biological Seminar. (2 q.h.)
834, 835 Vertebrate Physiology. (4 + 4 q.h.)
836. Cell Biology. (4 q.h.)
837. Cytology and Techniques. (4 q.h.)
841. Animal Parasitology. (4 q.h.)
853. Biometry. (4 q.h.)
872. Protozoology. (4 q.h.)
873. Mammalogy. (4 q.h.)
874. Helminthology. (4 q.h.)

901. *Current Methods and Literature in Biology.* A course designed specifically for high school biology teachers. Methods in laboratory instruction, with special reference to the investigative laboratory, will be presented. Also, several manuscripts from the current literatures will be considered and discussed in detail. (Not applicable to M.S. in biology.) Prereq.: Currently teaching biology

in high school or preparing to teach biology in high school or permission of instructor. 4 q.h.

950. *Comparative Animal Physiology I.* Evolutionary development of respiratory, circulatory, nervous, and muscle systems in animal kingdom. Prereq.: Biology 833. 5 q.h.

952. *Experimental Design.* Controlling variables, experimental design, and treatment of data from biological experiments. Prereq.: 853. 4 q.h.

954. *Advanced Ecology.* Interrelationships of species within the community and their influence upon the ecosystem. Prereq.: Biology 802. 4 q.h.

955. *Ecosystem Analysis.* Analytical study of structure and change of the ecosystem. Prereq.: College calculus and Biology 802 or 954. 4 q.h.

956. *Physiological Ecology.* The study of physiological and behavioral adaptations of vertebrates faced with selected environmental stresses of their habitats. Includes metabolism, thermo- and osmoregulation. Prereq.: Biology 833 and 802. 4 q.h.

957. *Advanced Molecular Biology.* Structure and role of nucleic acids in protein synthesis. Prereq.: Biology 790. 3 q.h.

959. *Analytical Histochemistry.* An analysis of cell and tissue structure by histochemical and microspectrophotometric techniques. Prereq.: Consent of instructor. 4 q.h.

960. *Plant Growth and Development.* Motivating forces of plant development. Prereq.: Biology 790. 4 q.h.

961. *Pathogenic Bacteria.* Biology, epidemiology, and pathology of medically important bacteria. Prereq.: Biology 702. 4 q.h.

962. *Medical Mycology.* Morphology, physiology, and epidemiology of medically important fungi. Prereq.: Biology 702. 4 q.h.

963. *Virology.* Study of plant and animal viruses. Prereq.: Biology 702. 4 q.h.

970. *Experimental Parasitology.* Laboratory demonstration of bionomics of helminth parasites. Prereq.: Biology 701. 5 q.h.

972. *Systematic Zoology.* Principles, significance, and procedure of zoological taxonomy. Prereq.: Biology 701. 3 q.h.

989. *Arranged Independent Study.* Study that is supervised by a faculty member. May be repeated up to 6 q.h. Prereq.: Permission of instructor. 2 q.h.

990. *Master's Thesis Research.* Research selected and supervised by departmental advisor and approved by graduate faculty of Biology Department and Dean of Graduate School. Prereq.: Acceptance by departmental committee. 1 — 10 q.h.

991. *Botany Topics.* Arranged course in botany. Prereq.: Permission of instructor. 2 — 4 q.h.

992. *Invertebrate Zoology Topics.* Arranged courses on subjects of invertebrate zoology. Prereq.: Permission of instructor. 2 – 4 q.h.

993. *Vertebrate Zoology Topics.* Arranged courses on aspects of vertebrate zoology. Prereq.: Permission of instructor. 2 – 4 q.h.

994. *Genetics and Evolution Topics.* Arranged courses in principles of genetics and forces of evolution. Prereq.: Permission of instructor. 2 – 4 q.h.

995. *Parasitology Topics.* Arranged courses in field of parasitology. Prereq.: Permission of instructor. 2 – 4 q.h.

996. *Environmental Biological Topics.* Arranged courses in terrestrial and aquatic ecology. Prereq.: Permission of instructor. 2 – 4 q.h.

997. *Molecular Biology Topics.* Arranged courses in subjects at molecular level of life. Prereq.: Permission of instructor. 2 – 4 q.h.

998. *Vertebrate Physiology Topics.* Arranged courses for advanced topics in vertebrate physiology. Prereq.: Biol. 835 and permission of instructor. 2 – 4 q.h.

999. *Cell Biology Topics.* Arranged courses for advanced topics in cell biology. Prereq.: Biol. 836 and permission of instructor. 2 – 4 q.h.

BUSINESS EDUCATION AND SECRETARIAL STUDIES

Virginia B. Phillips, *Chairperson of the Department*

3081 Technical and Community College Building

820. Techniques of Office Simulation Procedures. (4 q.h.)

850. Intensive Office Education. (3 q.h.)

851. Cooperative Office Education. (3 q.h.)

860. Principles and Problems of Business Education. (3 q.h.)

904. *Improvement of Teaching Business Communications.* Communication theory; techniques and materials for teaching business letter writing, business report writing, oral communication in business. Prereq.: BE & SS 704 or equivalent. 3 q.h.

910. *The Improvement of Teaching Shorthand.* Techniques and materials for the teacher of shorthand, transcription, and business English. Research is emphasized. Prereq.: BE & SS 620 and BE & SS 631 or equivalent. 3 q.h.

920. *The Improvement of Teaching Typewriting.* Techniques and materials for the teacher of typewriting. Research is emphasized. Prereq.: BE & SS 620 or equivalent. 3 q.h.

930. *The Improvement of Teaching Basic Business.* Techniques and materials for the teacher of the basic business subjects, including general business, business law, and consumer economics. Research is emphasized. Prereq.: BE & SS 706, Econ. 621, and Management 511 or equivalent. 3 q.h.

940. *The Improvement of Teaching Bookkeeping and Accounting.* Techniques and materials for the teacher of bookkeeping and accounting. Research is emphasized. Prereq.: Acct. 606 or equivalent. 3 q.h.

950. *The Improvement of Teaching Office Practice and Office Machines.* Techniques and materials for the teacher of office practice and office machines. Research is emphasized. Prereq.: BE & SS 717 and BE & SS 805 or equivalent. 3 q.h.

CHEMISTRY

Thomas N. Dobbelstein, *Chairperson of the Department*

324 Ward Beecher Science Hall

719, 720, 721. Organic Chemistry. (4 + 4 + 4 q.h.)
722. Organic Chemistry. (2 q.h.)
729. Inorganic Chemistry I. (3 q.h.)
739, 740, 741. Physical Chemistry. (4 + 4 + 4 q.h.)
801. Elements of Physical Chemistry. (4 q.h.)

Note: The above courses may not be counted toward an M.S. in chemistry, but may be taken for graduate credit by students in other departments.

709. Introduction to Polymer Chemistry. (3 q.h.)
731. Nuclear Chemistry and Its Application. (3 q.h.)
803, 804. Chemical Instrumentation. (4 + 3 q.h.)
805. Applied Spectroscopy. (3 q.h.)
813. Thermodynamics and Kinetics. (3 q.h.)
821. Intermediate Organic Chemistry. (3 q.h.)
822. Organic Analysis. (3 q.h.)
823. Organic Synthesis. (3 q.h.)
829, 830. Inorganic Chemistry II, III (2 + 2 q.h.)
831. Inorganic Chemistry Laboratory. (2 q.h.)
836. Chemical Bonding and Structure. (3 q.h.)
845, 846. Biochemical Techniques. (2 + 2 q.h.)

911. *Advanced Analytical Chemistry.* The theoretical foundations of analysis with emphasis on recent analytical developments and the current literature. Prereq.: Chemistry 741 or 801. 3 q.h.

913. *Clinical Chemical Instrumentation.* The principles and uses of instrumental techniques as applied to clinical laboratory separation, characterization and analysis. Prereq.: Chemistry 604. 3 q.h.

915. *Automation in Clinical Chemistry.* The interfacing of laboratory instrumentation with data processing equipment. Prereq.: Chemistry 803 or 913. 3 q.h.

922, 923, 924. *Principles of Biochemistry I, II, III.* A comprehensive study of modern biochemistry. The molecular constituents of living organisms and their dynamic interrelationships will be discussed. Credit will not be given

for both: Chemistry 841 and 922; 842 and 923; 843 and 924. Prereq.: Chemistry 721 or 793; prereq. or concurrent, Chemistry 739 or 801 for 922; 740 or 801 for 923. 3 + 3 + 3 q.h.

931, 932. *Advanced Inorganic Chemistry I, II.* I) Current theories and types of bonding. Modern interpretations of the descriptive chemistry of the more representative elements and their compounds. II) Modern interpretations of the descriptive chemistry of transition and inner-transition elements and their compounds. Introduction to coordination chemistry. Prereq.: Chemistry 829 or 830. 931 prereq. to 932. 3 + 3 q.h.

935, 936. *Nuclear Chemistry I, II.* The principles and experimental procedures used in the study of nuclear transformations, natural and artificial disintegration. Prereq.: Chemistry 731 or 741. 935 prereq. to 936. 3 + 2 q.h.

941, 942. *Advanced Organic Chemistry I, II.* Reaction mechanisms and physical organic chemistry. Prereq.: Chemistry 721 and either 741 or 801. 941 prereq. to 942. 3 + 3 q.h.

945, 946. *Polymer Chemistry I, II.* A study of the polymerization process and the relationship between structure and the properties of polymers. Prereq.: Chemistry 709 and 741. 945 prereq. to 946. 3 + 3 q.h.

951. *Advanced Physical Chemistry I.* Application of quantum chemistry to spectroscopy, kinetics and thermodynamics. Prereq.: Chemistry 741. 3 q.h.

952. *Advanced Physical Chemistry II.* Further development of quantum theory as applied to chemical systems. Prereq.: Chemistry 951. 3 q.h.

955. *Statistical Mechanics.* Principles and methods of statistical mechanics; classical and quantum statistics with applications to gases, liquids, and solids. Prereq.: Chemistry 951 or consent of instructor. 3 q.h.

961. *Clinical Chemistry I.* Principles and methods of clinical chemistry including general laboratory procedures, quality control, and normal values. The chemistry of carbohydrates, proteins, lipids, and electrolytes including renal, liver, and pancreatic function tests, is discussed. Prereq.: Chemistry 923. 3 q.h.

962. *Clinical Chemistry II.* Principles and methods of clinical enzymology, endocrimology, and toxicology including thyroid and cortical function tests will be covered. Prereq.: Chemistry 961. 3 q.h.

963. *Clinical Chemistry Practicum.* Operation and management of the hospital clinical laboratory. The student will spend ten weeks full-time in an affiliated hospital laboratory. Prereq.: Chemistry 913 and 961 and consent of the Chairperson of the Chemistry Department. Applications for this course must be received by the Chairperson of the Chemistry Department during the first week of the quarter prior to the quarter in which the student wishes to register for the practicum. 3 q.h.

969. *Laboratory Problems.* A laboratory course which stresses individual effort in solving chemical problems. May be repeated up to 9 q.h. 3 q.h.

990. *Thesis.* Hours arranged.

991, 992, 993, 994, 995, 996. *Special Topics.* Topics selected by the staff from fields of current research interest or fields of special emphasis. 991 Analytical; 992 Biochemistry; 993 Inorganic; 994 Organic; 995 Physical, 996 Clinical. Each may be repeated for credit. 2 or 3 q.h. as scheduled

998. *Seminar.* May be repeated up to 2 q.h. 1 q.h.

CIVIL ENGINEERING

John N. Cernica, *Chairperson of the Department*

267 Engineering Science Building

829. Civil Engineering Materials. (4 q.h.)
875. Hydrology. (4 q.h.)
877. Systems Engineering. (4 q.h.)
879. Civil Engineering Analysis. (4 q.h.)
880. Advanced Structural Analysis. (4 q.h.)
881. Soil Mechanics. (4 q.h.)
882. Soil and Foundation Engineering. (4 q.h.)

910. *Advanced Strength of Materials.* The basic methods of structural mechanics, such as conditions of equilibrium and compatibility, stress-strain relations. General treatment of energy principles including virtual work, minimum potential energy; applications to statically determinate and indeterminate systems such as rings, curved beams, plates, and other elastic systems. 4 q.h.

917. *Open Channel Hydraulics.* Analysis and design of open channels for uniform and nonuniform flow; hydraulic jump analysis; boundary layer and roughness effects; flow over spillways; flow in channels of nonlinear alignment and nonprismatic section. 4 q.h.

941. *Structural Mechanics.* Study of beams under lateral load; beams with combined lateral load and thrust; buckling beams on elastic foundations; applications of Fourier series and virtual work principles to beam-type structures; stress and strain in three dimensions; applications to flexure of beams and plates and to constrained torsion; elements of engineering theory of plates. 4 q.h.

943. *Rigid Frame Analysis.* Basic procedures in analysis of rigid frames having members of constant or variable moment of inertia; method of angle changes, Castigliano's theorems, Maxwell-Mohr method, reciprocal deflections and influence lines, slope deflection, movement distribution, elastic center and column analogy. 4 q.h.

945. *Civil Engineering Analysis.* Applications of mathematical and numerical methods to the systematic analysis and development of problems in the field of civil engineering, including equilibrium, propagation problems in lumped-parameter and continuous systems. 4 q.h.

946. *Matrix Analysis of Structures.* Introduction to matrix algebra;

use of matrix methods in the analysis of statically and kinematically indeterminate structures; flexibility and stiffness methods. 4 q.h.

951. *Dynamics of Soils.* The influence of time-dependent loads on the significant physical properties of cohesive and cohesionless soils. Methods of analysis and design for foundations and soil structures subjected to vibratory, blast, and shock loads. 4 q.h.

952. *Advanced Foundation Engineering.* Principles of mechanics of materials applied to foundation problems; stresses and deformations in soils, consolidation theory; shallow and deep foundations. 4 q.h.

953. *Flow Through Porous Media.* Analysis of seepage volume and stresses due to flow of water through soils in connection with dams, slopes, excavations, subsurface drainage and wells. 4 q.h.

956. *Plates and Shells.* Fundamental assumptions and basic equations of the classical theory of plates and shells. Validity and limitations of the theory. Applications to specific problems of plate and shell structures. 4 q.h.

957. *Structural Stability.* A study of the elastic stability of engineering structures, beam columns, static buckling of elastic beams, frames, plates, and shells, dynamic stability of beams and plates. 4 q.h.

958. *Structural Dynamics.* Analysis of the response of structures to air blasts and earthquake motions; development of both the normal mode and frequency response methods in dealing with periodic and non-periodic excitations. 4 q.h.

959. *Advanced Metal Design.* Advanced topics in the structural design of girders, frames and trusses. Light gage metal structures. Use of modern alloys and hybrid systems. 4 q.h.

961. *Advanced Concrete Design.* Consideration of advanced design techniques for reinforced concrete members and structures such as composite and prestressed concrete beams and box girders, lift slabs, folded plates and shells. 4 q.h.

965. *Seminar in Civil Engineering.* The application of special topics in theoretical mechanics to problems in civil engineering. Subjects covered include elasticity, viscoelasticity, plasticity, and wave motion. 4 q.h.

967. *Theory and Design of Sewage Systems and Sewage Treatment Plants.* Theory of the various procedures and techniques utilized in the treatment of sewage. Design of sewage treatment facilities. 4 q.h.

969. *Sanitary Engineering Laboratory.* Theory and methods for chemical analysis of water, sewage, and industrial wastes. 4 q.h.

973. *Intermediate Fluid Mechanics.* Fluid properties. Basic laws for a control volume. Kinematics of fluid flow. Dynamics of frictionless incompressible flow. Basic hydrodynamics. Equations of motion for viscous flow, viscous flow applications, boundary layer theory. Unsteady flow. 4 q.h.

975. *Theory and Design of Water Distribution and Water Treatment Plants.* Theory of the various procedures and techniques utilized in the treatment of water for municipal and industrial use. Review of water quality criteria. Design of water purification facilities. 4 q.h.

990, 991, 992. *Thesis.* 3 + 3 + 3 q.h.

CRIMINAL JUSTICE

Calvin J. Swank, *Chairperson of the Department*

2091 Technical and Community College Building

910. *Law and Social Control.* An historical analysis of the evolution of criminal law as a mechanism of social control in democratic societies. 4 q.h.

920. *Social Administration of Criminal Justice.* An historical and comparative analysis of the administration of the criminal justice process in theory and practice in the United States and other selected nations. 4 q.h.

930. *Crime Control and Correction.* An historical analysis of theories of crime prevention and control, and the correction of criminal offenders including various methods of social intervention employed. 4 q.h.

940. *Statistical Techniques in Criminal Justice Research.* A consideration of the sources of statistical information in the criminal justice system and the limits of such data, with primary emphasis upon nonparametric statistics and their application to the field. 4 q.h.

945. *Research Methods in Criminal Justice.* Problems in the design and execution of criminal justice research; the development of research design of the kind most useful to criminal justice research problems. Prereq.:940 4 q.h.

950. *Specific Problems in Criminal Justice.* Lectures on specific topics relating to the crime problem and the criminal justice process. The topics may vary from quarter to quarter and will be announced prior to enrollment. This course is repeatable twice provided it is on different topics. 4 q.h.

955. *Independent Study.* Study under the personal supervision of a faculty member with the approval of the department chairperson. General topic areas permissible are:

a. Law Enforcement Practices and Programs
b. Correction Practices and Programs
c. Research Methodology in Criminal Justice

This course is repeatable once in a different topic area. 4 q.h.

960. *Program Planning and Evaluation.* A systematic review of procedures used to plan and evaluate criminal justice programs, with special attention to the posting of research questions in context; questions relating to the selections of designs, methods, and process of formative and summative evaluation and assessing the effectiveness of the experiments. 4 q.h.

999. *Research and Thesis.* 1-9 q.h.

ECONOMICS

Emily P. Mackall, *Chairperson of the Department*

218 Arts and Sciences Office Building

701. Money and Banking. (4 q.h.)
702. Public Finance. (4 q.h.)
787. Population Movements. (4 q.h.)
801. Economics of Industrial Organization. (4 q.h.)
802. Comparative Economic Systems. (4 q.h.)
803R. Business and Government. (4 q.h.)
804. The Economics of Central Planning. 4 q.h.
805. Business Cycles and Economic Growth. (4 q.h.)
806, 807, 808. History of Economic Thought I, II, III. (3 + 3 + 3 q.h.)
810. Managerial Economics. (4 q.h.)
811, 812, 813. Theory of International Trade and Development, I, II, III. (3 + 3 + 3 q.h.)
820. Regional Economic Analysis. (4 q.h.)
821. Location Theory. (4 q.h.)
831. Labor Markets. (4 q.h.)
833. Collective Bargaining and Arbitration. (4 q.h.)
835. Labor Legislation. (4 q.h.)

900. *Statistical Problems.* Selected topics concerning inference and regression. Analysis of variance, chi-square, F-test, and multiple and partial correlation. 3 q.h.

905. *Quantitative Methods for Economics.* A continuation of the analysis of calculus of one and several variables, difference and differential equations, vectors and matrices and linear programming as applicable to the static and dynamic models in micro and macro economic theory. Prereq.: Econ. 709 or equivalent. 3 q.h.

906. *Econometrics.* Analysis of linear regression model of two variables including problems of estimation, hypothesis testing and forecasting. Extension of the linear model to three and in general to "n" variables. Prereq.: Econ. 900 or equivalent. 3 q.h.

910, 911. *Microeconomic Theory I and II.* Theory of consumer behavior; theory of the firm; the determination of product and factor prices under varying market structures; capital theory and welfare economics; study of static and dynamic conditions of multi-market stability. 3 + 3 q.h.

912. *Welfare Economics.* A study of the foundation of economic policy; historical development of welfare theory and its application to problems of economic policy and planning; evaluation of competitive equilibrium, status of individual and community utility judgment and judgments on the distribution of income; analysis of implications for public policies. Prereq.: Econ. 910. 3 q.h.

919. *Seminar in Microeconomic Theory.* Selected readings in microeconomic theory. Prereq.: Econ. 911. 3 q.h.

920, 921. *Macroeconomic Theory I and II.* The study of the behavior of aggregated economic variables, the purpose being to determine the proper policy mix needed to obtain the economic goals of full employment, stable price levels, etc. Analysis is through rigorous investigation of models describing the neoclassical, Keynesian, and neo-Keynesian schools of thought. 3 + 3 q.h.

922. *Growth Economics.* The macro-structure and operation of the aggregate system with special attention to problems associated with capital accumulation, balanced growth and low level equilibrium. Prereq.: Econ. 920. 3 q.h.

929. *Seminar in Macroeconomic Theory.* Selected readings in macroeconomic theory. Prereq.: Econ. 921. 3 q.h.

930, 931, 932. *Economics for Teachers.* An examination of the major economic issues and problems of our society and the use of applicable economic theory for their solution. Meetings with representatives of various institutions of our society are included in order to relate the issues and theory to present-day society. (Intended for elementary education students.) Prereq.: 930 for 931; 931 for 932. 3 + 3 + 3 q.h.

935. *Basic Economic Analysis.* An analytical approach to the basic concepts of micro and macroeconomics with emphasis on the interpretation and application of these concepts to the firm and to the economy. (Not applicable to the M.A. in economics.) This course is especially designed for professionals in business and other related areas. 5 q.h.

940. *Monetary Theory I.* A theoretical investigation of the static relationships of the quantity of money, level of interest rates, security prices, commercial bank policy and their effects upon the levels of national income, prices, employment and rate of economic growth. Included is an examination of available policy tools and their effectiveness. 3 q.h.

941. *Monetary Theory II.* Analysis of the dynamics and impact of monetary policy with special references to current issues and problems in monetary theory and monetary research. Prereq.: Econ. 940. 3 q.h.

945. *Theory of Federal Finance.* A theoretical analysis of the effects of various policies upon the allocation of resources, distribution of income, level of employment, and rate of economic growth. Investigation of theories of taxation and public expenditure criteria. 3 q.h.

946. *Theory of State and Local Finance.* A theoretical and empirical investigation of state and local taxation and expenditure criteria, tax bases and incidence, problems of finance unique to local governmental units. 3 q.h.

950. *Theory of the Labor Market.* Intensive study of topics related to the problems and general performance of the various segments of the labor market in a free industrial society within a theoretical framework. 3 q.h.

951. *Issues in Collective Bargaining and Arbitration.* Intensive study and theoretical analysis of topics related to contemporary issues in collective bargaining. 3 q.h.

955. *Industrial Structure.* Comparison of the economic characteristics of industries: growth, technology, concentration, scale economies, geographic concentration, competition, and market structure. Theoretical and empirical comparisons. 3 q.h.

965. *Seminar in Regional Growth.* Readings in the theory and strategy of regional development. Major emphasis is placed upon the theories of regional growth and empirical tests of these concepts. Problems in the use of inter-industry regional models are explored, the importance of human resources investment to regional progress is discussed, and the nature of, causes of, and possible remedies for, slow growth regions are examined. Prereq.: Econ. 821 or consent of instructor. 3 q.h.

969. *Seminar in Urban Economics.* Selected readings in the economic problems of urban areas. Among the topics discussed are: intraurban population migration, problems in the finance and provision of public goods in metropolitan areas, determinants of the demand for and supply of transportation facilities, central place theory, the urban housing market. Prereq.: Econ. 821 or consent of instructor. 3 q.h.

979. *Seminar in Development of Economic Ideas.* In-depth study of the development of economic ideas leading to doctrines reflected in modern economic theory, with particular emphasis on bibliography. 3 q.h.

981. *International Capital Flow.* Advanced study and analysis of long-term and short-term capital accounts in the balance of payments and their domestic and international implications, history and development of private and public international capital markets; the role of foreign aid as a substitute for the diminishing private capital markets; analysis of sources, causes and effects of capital flows both in matured economies and in developing economies. Prereq.: Econ. 920. 3 q.h.

985. *International Trade.* Analytical and empirical investigation of the Balance of Trade accounts of a nation. Included is an investigation of the theories of Ricardo, Meade, Heckscher, Ohlin, Samuelson, Vernon, Vanik, and Linder on the determinants of the commodity composition of trade. The effects of trade on community welfare. An examination of economic growth, neutral and biased technological change and their effects upon the terms of trade and the gains from trade. The theory of tariffs, explicit and implicit tariff structures, the welfare optimizing or revenue maximizing tariff; tariff wars and tariff cycles. The theory of customs unions as related to the Balance of Trade Accounts and to balance of payments. Prereq.: Econ. 910, 920. 3 q.h.

990. *Special Topics in Economics.* Special interest topics selected by the staff in the following areas: economic education, economic theory, and applied economics analysis. May be repeated up to a maximum of 9 hours toward a graduate degree. 1-5 q.h.

999. *Master's Thesis.* 3 + 3 + 3 q.h.

ELECTRICAL ENGINEERING

Raymond E. Kramer, *Chairperson of the Department*

289 Engineering Science Building

805R. Quantum Electronics. (4 q.h.)
807R. Pulse, Digital, and Switching Circuits. (4 q.h.)
808R. Electronic Circuits, Signals, and Systems. (4 q.h.)
812R. Molecular Engineering. (4 q.h.)
813R, 814R. Logic Circuit Theory I & II. (4 + 4 q.h.)
815R. Energy, Radiation, and Propagation. (4 q.h.)
817. Control Analysis II. (4 q.h.)
819R. Plasma Dynamics. (4 q.h.)
820. Modern Control Theory. (4 q.h.)
840. Electric Power Systems. (4 q.h.)
850. Communication Systems II. (4 q.h.)

901. *Control Systems I.* Analysis of linear systems, characteristics of linear systems, analogous systems, development and application of Laplace and other transform methods. Systems with feedback, systems with distributed parameters. 4 q.h.

902. *Control Systems II.* Linear feedback systems theory. Stability criterion. Synthesis in complex and time domain. Multivariable systems (multiple input-output) and multiple loop systems with emphasis on state variable and matrix techniques. Analysis and design of carrier systems. 4 q.h.

903. *Nonlinear Control Systems Analysis.* Introduction to basic nonlinear phenomena and methods. Stability concepts for feedback loops. Study of time-varying nonlinear feedback systems including free and forced responses. Circle criterion, Papov's criterion, O'Shea criterion, and other frequency domain stability criteria. Lyapunov stability theory. O'Shea's response bound theorems. 4 q.h.

911, 912. *Electromagnetic Fields I and II.* Solution of boundary value problems in general form. Laplace, Poisson, and diffusion and wave equations in orthogonal coordinate systems. 4 + 4 q.h.

921. *Quantum Electronic Devices I.* Electronic energy levels in quantum electron devices; application of energy transitions to semi-conductors, masers, and lasers. Analysis of energy of atomic gasses as applied to gas lasers. Crystal structure of solid-state maser and laser materials. 4 q.h.

925. *Physical Properties of Crystals.* The symmetry of crystals and its effect on physical properties, tensor analysis, dielectric and magnetic susceptibilities, elastic and piezoelectric properties, thermodynamics of crystals, transport properties, crystal optics, electromagnetic wave propagation in anisotropic media. 4 q.h.

931. *Digital Systems Engineering I.* Boolean algebra, logical mapping; combinational synthesis; analog and digital conversion; coding structures; hy-

brid numerical circuitry. Structures of combinatorial circuit synthesis; logical circuit methods of Quine, Huffman, Mealy, Moore; Boolean matrices, bilateral and cascade networks. 4 q.h.

932. *Digital Systems Engineering II.* Continuation of E.E. 931 with emphasis on sequential synthesis. Prereq.: E.E. 931 or permission of chairman. 4 q.h.

941. *Linear Electronic Circuits I.* Design of linear active circuits; amplifier analysis and synthesis; feedback amplifiers; stability; integrated circuits; transfer functions; synthesis methods; noise determination and reduction. 4 q.h.

951. *Network Analysis.* The analysis of time and frequency domain response of networks using transform and state variable techniques. Matrix methods, modeling, topological properties, and signal-flow analysis techniques. 4 q.h.

954. *Network Synthesis.* A study of realization procedures for driving point and transfer function synthesis of networks. Concepts of positive real functions, methods such as Foster, Caver, Brune, and Darlington. Approximation methods of Butterworth, Tchebyscheff. 4 q.h.

960. *Seminar.* May be repeated once. 4 q.h.

971. *Solar Energy Engineering.* Analysis of the utilization of solar energy. Systems concepts used in studying the technical aspects of collection, conversion, transmission, storage and consumption of solar energy as well as the interaction of it with other energy sources. Particular stress is placed on the total system performance and the impacts on the individual, society and the environment, both short- and long-term. 4 q.h.

972. *Advanced Topics in Solar Energy Engineering.* Continuation of E.E. 971 concentrating on advanced topics. Prereq.: E.E. 971 or equivalent. 4 q.h.

981. *Modern Approach to Power Systems.* Modern approach to the study of energy transmission, protection, and control. Fault studies, control of generation, load flow studies employing the computer, and protection of system components employing modern type devices are investigated. 4 q.h.

990. *Thesis.* 1-9 q.h.

ELEMENTARY EDUCATION

Clyde V. Vanaman, *Acting Chairperson of the Department*

132 School of Education Building

816. Diagnosis and Remediation of Elementary School Mathematics. (3 q.h.)

881. Corrective Techniques in Reading. (4 q.h.)

882. Developmental and Content Area Reading. (3 q.h.)

890. Elementary Education Workshop. (3 q.h.)

894. Audio-Visual Media. (4 q.h.)
895. Cataloging & Classification. (4 q.h.)
896. Reference. (4 q.h.)
897. Media Center Administration. (4 q.h.)
898. Preparation of Audio Visual Materials. (4 q.h.)

909. *Supervision of Practice Teachers—Elementary.* Basic counseling and supervisory techniques associated with the acceptance of responsibility for inducting the teaching neophyte into his first truly professional experiences. Actual work with student teachers. 3 q.h.

911. *Early Childhood Programs.* A study of the historical background of early childhood intervention and an analysis and evaluation of contemporary early childhood programs in America, including latest research findings relevant to these programs. 3 q.h.

912. *Curriculum and Methods in Early Childhood Education.* Preparation of diversified materials, planning and organizing experiences appropriate to the young child's psychological, social, and perceptual development. Prereq.: Educ. 916. 4 q.h.

913. *Pre-School Education.* Formal and informal approaches to language development, perceptual and motor skills in the pre-school age child. Attention given to the role of parents as teachers of cognitive skills. 3 q.h.

914. *Practicum in Early Childhood Education.* A course designed to provide clinical experience with pre-school children. Observation of children in day-care centers, nursery schools, and in community social agencies which provide services to the young child. Also, a study of management aspects of child care centers, standards and certification requirements. Prereq.: Educ. 911, 912, 913 and 929. 4 q.h.

916. *The Elementary School Curriculum.* Developing an understanding of the meaning of curriculum at the elementary level, evidence of need for curricular changes, influences of society on curriculums, exploration of current status and trends: the role of teacher and administrator in curriculum appraisal and development. 3 q.h.

917. *Elementary School Reading Programs.* A critical appraisal and discussion of current research and traditional programs in the elementary school: goals, content, and problems faced by elementary administrators and teachers in the reading field. 3 q.h.

918. *Elementary School Mathematics Programs.* An analysis of past and present programs of elementary school mathematics; evaluation of programs including a consideration of adequacy of content, recognition of mathematics as a system, provision of number experiences for the learner. 3 q.h.

919. *Social Studies Programs in the Elementary School.* Objectives of elementary school social studies programs in terms of current needs; adaptation of materials of instruction in terms of the social science skills; evaluation of student progress; critical analysis of methods of improving instruction in social studies. 3 q.h.

920. *Elementary School Science Programs.* Focus on the objectives for science education in the elementary school; the elementary school science curriculum; process and inquiry in the elementary school science curriculum; process and inquiry in the elementary school science program; teacher education, educational media, and the evaluation of science teaching. 3 q.h.

921. *Issues, Problems, and Developments in Elementary Education.* A study of recent trends in elementary school organization and instruction (nongraded units, team teaching, middle schools, etc.). 3 q.h.

923. *Review of Reading Research.* (Sec. Ed. 923) Appraisal of research methods and design in the area of reading. The aim of this course is to determine how research has been effective in influencing change in reading instructors. Prereq.: Ed. 904 and Ed. 710. 4 q.h.

924. *Diagnosis and Treatment of Reading Disability: Part I.* See Sec. Ed. 924. 4 q.h.

925. *Diagnosis and Treatment of Reading Disability: Part II.* See Sec. Ed. 925. 4 q.h.

927. *Practicum: Reading.* (Sec. Ed. 927) Supervised experience in reading correction in the area schools, clinics, and agencies. Prereq.: Ed. 857 or consent of instructor. 1-6 q.h.

929. *Language Arts in the Primary Grades.* An evaluation of the philosophy, principles, and practices of the language arts program in the primary grades. A special emphasis shall be placed in teaching language arts to disadvantaged children. Prereq.: Consent of instructor. 3 q.h.

930. *Supervision of Reading.* (Sec. Ed. 930) This course deals with the role of the supervisor of reading programs including the initiation and supervision of reading programs in the elementary and secondary schools. Emphasis will be placed on selection of reading teachers; selection of reading materials; and the different types of programs that can be developed. Prereq.: Consent of instructor. 4 q.h.

946. *The Supervision of Instruction.* See Sec. Ed. 946. 3 q.h.

947. *Basic Principles of Elementary School Administration.* Investigation and study of the general problems of administration in the elementary school. 3 q.h.

949. *School Law.* (Sec. Ed. 949) Principles of constitutional, statutory, case, and common law affecting Ohio schools as they apply to the political subdivision of the school district and the administrative, line, and staff personnel; legal provisions and principles relating to education at all levels. 3 q.h.

950. *School Business Management.* See Sec. Ed. 950. 3 q.h.

951. *Communications and the School Principal.* (Sec. Ed. 951) Techniques of communicating effectively with teachers, administrators, non-teaching personnel, pupils, and parents. Organizing the overall communications program within a school. Related problems. 3 q.h.

952. *School Finance.* See Sec. Ed. 952. 3 q.h.

954. *School Community Relations.* (Sec. Ed. 954) A course designed to develop competency in the techniques of planning, administering and evaluating effective programs of school-community relations. 3 q.h.

955. *Staff Personnel Administration.* See Sec. Ed. 955. 3 q.h.

956. *Educational Facilities.* See Sec. Ed. 956. 3 q.h.

990. *Independent Study.* (Guid.-Couns. 990, Sec. Ed. 990) Individual investigation of advanced topics under guidance of selected staff. Prereq.: Ed. 904. 1-4 q.h.

1021. *Field Experience for the Elementary Principalship.* (Sec. Ed. 1021) An administrative field experience required for an elementary principal's certificate. Open to advanced graduate students seeking an elementary principal's certificate. Prereq.: Educ. 916, 946, 947, 949, 951 and permission of advisor and instructor. 1-3 q.h.

1022. *Field Experiences for Supervisory Candidates.* (Sec. Ed. 1022, Spec. Ed. 1022) A supervisory field experience required for the supervisory certificate. Open to advanced graduate students seeking supervisor's certificate. Prereq.: Ed. 916, 931, 946, 949, 951 and permission of advisor and instructor. 1-3 q.h.

1023. *Field Experience for the Superintendency.* See Sec. Ed. 1023. 1-3 q.h.

1030. *Human Relations Training for School Personnel.* See Guid. Couns. 1030. 4 q.h.

ENGLISH

Barbara H. Brothers, *Chairperson of the Department*

306 Arts and Sciences Office Building

Topics in "Studies" courses will vary and will be announced each time the course is offered. Each "Studies" course number may be repeated once, though not the topic.

900. *Introduction to Literary Study and Research.* Basic concepts in literary criticism, analysis, and research. Required of all candidates for the M.A. 3 q.h.

902. *Studies in Literary Criticism and Literary Forms.* 3 q.h.

905. *Studies in the Teaching of English.* Analysis of research and underlying assumptions in the teaching of language, composition, and literature with implications for the teacher of English in the secondary school and introductory college levels. Prereq.: Teaching experience in English. 3 q.h.

908. *Literature for Children and/or Adolescents.* An analytic study of methods for evaluating and presenting literature to children, along with a

thorough examination of selected books, both classic and modern, which can be appreciated by children. Prereq.: Graduate standing. 3 q.h.

910. *Old English Language and Literature.* 4 q.h.

912. *Studies in Medieval Literature.* 4 q.h.

920. *Studies in Shakespeare.* 3 q.h.

922. *Studies in English Renaissance Literature.* 3 q.h.

932. *Studies in Restoration and 18th-Century Literature.* 3 q.h.

942. *Studies in Romantic and Victorian Literature.* 3 q.h.

952. *Studies in American Literature before the Civil War.* 3 q.h.

962. *Studies in American Literature from the Civil War to World War I.* 3 q.h.

972. *Studies in Recent British and American Literature.* May be repeated twice. 3 q.h.

980. ***Modern English Structure.*** An examination of contemporary English structure and of linguistic approaches to its study and analysis. (Only for students without credit in English 755 or its equivalent.) 3 q.h.

981. *History of the English Language.* An examination of the evolution of English linguistic structures from their origins to the present. (Only for students without credit in English 756 or its equivalent.) 3 q.h.

982. *Studies in Linguistics.* Prereq.: 755, 756, or 980, 981 or equivalent or consent of instructor. 3 q.h.

990. *Special Topics.* May be repeated once. 3 q.h.

Seminars: Each seminar may be repeated twice, though not the topic.

1001. *English Literature to 1660.* 4 q.h.

1002. *English Literature since 1660.* 4 q.h.

1003. *American Literature.* 4 q.h.

1004. *Linguistics.* Prereq.: 755, 756 or 980, 981 or equivalent or consent of instructor. 4 q.h.

FOREIGN LANGUAGES

Christine R. Dykema, *Chairperson of the Department*

312 Jones Hall

900. *Seminar.* Study of selected topics common to several, or all of the following languages: French, German, Italian, Spanish, Russian and Latin. The topic will be announced each time the course is offered. May be taken three times for credit if content is not repeated. Prereq.: Open only to graduate students proficient in at least one of the languages offered in the department. 3 q.h.

French

820. 18th Century French Literature. (4 q.h.)
830. 19th Century French Novel. (4 q.h.)
835. 19th and 20th Century French Theater. (4 q.h.)
845. 20th Century French Novel. (4 q.h.)
869. Applied French Phonetics. (4 q.h.)
873. Explication de Texte. (4 q.h.)
874. Advanced French Composition. (4 q.h.)
885. Special Topics. (2-4 q.h.)

German

815. Enlightenment Through Storm and Stress. (4 q.h.)
816. Goethe and Shiller. (4 q.h.)
825. German Romanticism. (4 q.h.)
835. German Realism and Naturalism. (4 q.h.)
845. Recent German Literature. (4 q.h.)
867, 868. Comparative Germanic Linguistics. (3 + 3 q.h.)
885. Special Topics. (2 — 4 q.h.)

Italian

801. Italian Literature of the 14th Century. (4 q.h.)
802. Italian Literature of the 16th Century. (4 q.h.)
830. Italian Literature of the 19th Century. (4 q.h.)
840. Italian Literature of the 20th Century. (4 q.h.)
885. Special Topics. (2 — 4 q.h.)

Spanish

805. The Prose of the Golden Age. (4 q.h.)
806. The Drama of the Golden Age. (4 q.h.)
816. 19th Century Spanish Prose. (4 q.h.)
825. 20th Century Spanish Prose. (4 q.h.)
826. 20th Century Spanish Drama. (4 q.h.)
828. Hispanic Poetry. (4 q.h.)
835. Modern Spanish-American Prose. (4 q.h.)
836. Modern Spanish-American Drama. (4 q.h.)
850. Problems in Spanish Syntax and Usage. (4 q.h.)
885. Special Topics. (2 — 4 q.h.)

FOUNDATIONS OF EDUCATION

Glorianne M. Leck, *Chairperson of the Department*

151 School of Education Building

870. Problems of the Classroom Teacher. (3 q.h.)
871. Pupil Problems. (3 q.h.)
872. Statistical Methods in Education. (3 q.h.)
873. Comparative Education. (3 q.h.)

875, 876, 877. Seminar in Foundations of Education. (1 – 4 q.h. each)
880. Inner-City Educational Workshop. (3 q.h.)

900. *Education in Western Culture.* A basic history of educational thought, practice, and purpose in Western culture with emphasis on those factors influencing the emerging pattern of American education. 3 q.h.

901. *Philosophical Foundations of Educational Theory and Practice.* An examination of the basic philosophical premises upon which functional educational systems have been based. 3 q.h.

902. *Sociological Aspects of Contemporary Education.* A study of the implications for education of recent sociological developments with emphasis on inner-city problems, culturally disadvantaged students, and trends in family organization. 3 q.h.

904. *Educational Research.* An introduction to the techniques of educational research and elementary statistical concepts. Preparation of a written prospectus for a research problem will be required. Stress will be placed on the use of the library in the collection of data. Experience in interpreting research data will be provided in order to enable the student to adequately interpret the findings of educational research. Prereq.: Education 872, an equivalent course, or consent of instructor. 3 q.h.

905. *A History of American Education.* The development of educational practice in the United States. An examination of progress towards educational goals. Implications of historical backgrounds for present problems. 3 q.h.

1000, 1001, 1002, 1003, 1004. *Seminar in Foundations of Education.* Study of selected issues and problems of current interest chosen on the basis of need; e.g.: community-environmental influences on the school, international education, demographic studies in re schools, and other selected topics. Prereq.: Graduate status and permission of instructor. 1-5 q.h., maximum total 15 q.h.

GEOGRAPHY

Michael Klasovsky, *Chairperson of the Department*

2033 Technical and Community College Building

800. European Area Study. (9 q.h.)

GEOLOGY

C.E. Harris, *Chairperson of the Department*

G13 Ward Beecher Science Hall

802. Stratigraphy and Sedimentation. (5 q.h.)
803. Optical Mineralogy. (6 q.h.)
805. Special Problems in Geology. (1-5 q.h.)
806. Introduction to X-Ray Diffraction. (3 q.h.)
807, 808, 809. Earth Science. (3 + 3 + 3 q.h.)

811. Environmental Geology. (4 q.h.)

901. *Geology of Ohio and Pennsylvania.* The geologic history and development of the rocks, structure, landforms and mineral resources of Ohio and Pennsylvania. Prereq.: Geology 802 or equivalent. 4 q.h.

GUIDANCE, COUNSELING, AND PUPIL PERSONNEL

Lawrence A. DiRusso, *Chairperson of the Department*

218 School of Education Building

821, 822. Guidance and Counseling Seminar. (1-4, 1-4 q.h.)

825. Group Processes in the School. (Psych. 825) (3 q.h.)

961. *Introduction to Pupil Personnel Services.* Introduction to purposes and practices of pupil-personnel services in elementary and secondary schools. History of pupil-personnel services and current developments. An analysis of the contribution of related disciplines, in particular psychology, sociology and economics. The relationship of the services to community mental health and social agencies. 3 q.h.

962. *Counseling: Principles, Theory, Practice.* Basic principles of counseling in an educational context. Development of procedural bases for counseling and educationally-oriented counseling theory. Ethics and limitations involved in counseling practices. 3 q.h.

963. *Occupational and Educational Information In Guidance.* Principles of career development and use of educational and occupational information resources in the guidance program. Lecture and discussion are used to explore occupational structure of the United States, sources of educational and occupational information including community resources; and the collecting, classifying, filing, and organization of educational and occupational information for use in the guidance program. 3 q.h.

964. *Measurement and Evaluative Techniques.* Study of the tools and techniques of measurement and evaluation and their application in the guidance process. 3 q.h.

965. *Applied Testing in Counseling.* Supervised experience in the administration, scoring and interpretation of tests typically used in guidance and counseling. Emphasis will be on test interpretation and practical application in the counseling process. Prereq.: Ed. 964. 3 q.h.

969. *Administration of Personnel and Guidance Services.* A comprehensive study of the dynamic qualities inherent in planning, management, functioning, and structuring of personnel and guidance services in public schools. 3 q.h.

970. *Guidance Services in Elementary, Junior High, and Middle Schools.* The study of guidance services provided in elementary, junior high, and middle schools. This includes individual and group testing methods, vocational guidance, counseling, counselor-parent relationships, referral pro-

cedures, guidance of the disadvantaged and exceptional child, and the development of elementary, junior high, and middle school guidance programs. 3 q.h.

972. *Vocational Guidance in the Junior High and High School.* Theories of vocational choice and the development of programs and procedures in the junior high and high school to assist students in career planning. Emphasis is on vocational counseling theory and procedures; assessments of vocational and personal traits, abilities, and aptitudes; use of occupational information; and vocational counseling and placement of the disadvantaged and exceptional child. 3 q.h.

973. *Group Guidance and Group Counseling.* A study of group dynamics and the interpersonal process through which students within the normal range of adjustment work within a peer group under the direction of a professional counselor. Study and practical application of group guidance and group counseling procedures for meeting individual needs in an educational setting. 3 q.h.

974. *Case Studies in School Guidance and Field Experience in Community Social Agencies.* Methods of collecting data, synthesis, and interpretation of data about a person and his relationship to his environment. Real and assumed situations of pupils over an extended period of time are presented for study and analysis. The course includes practical field experience with various community social agencies to acquaint the student with agency services and social case-work methods. Particular emphasis is placed on the disadvantaged and exceptional child. 3-6 q.h.

990. *Independent Study.* See El. Ed. 990. 1-4 q.h.

1005. *Internship in College Student Personnel Work.* Supervised experience in selected college or university settings with involvement in such areas as student development, counseling center, placement center, residence hall counseling, student advisement and student activities. Prereq.: Consent of instructor. 6-12 q.h.

1006. *Guidance in the Classroom.* Studies various factors important to a facilitative climate in the classroom and activities through which elementary counselors and teachers can provide these conditions. Considered are classroom management and discipline techniques based upon learning theory, implementation of democratic group structure for elementary school classrooms, and organized activities designed to promote the development of self understanding and understanding of others in the child's world. The course requires extensive reading and review of published materials designed for classroom guidance, in addition to observation of classrooms and role-playing experiences. 3 q.h.

1007. *Practicum for Visiting Teachers.* Visiting teacher practice under supervision; the final required course in the preparation of the visiting teacher, open to advanced students who are completing their work for the visiting teacher certificate. Internship experiences in neighboring elementary

and secondary schools. A review of community organizations; field experiences in social agencies; seminar work in case studies. Prereq.: Consent of instructor. 6-9 q.h.

1008. *Counseling Internship for Elementary School Counselors.* The final required course for elementary school counselors open to students who are completing this work for elementary school counselor certification. Supervised counseling internship for one (1) quarter in elementary school. Prereq.: Consent of instructor. 6-12 q.h.

1009. *Counseling Internship for Secondary School Counselors.* Counseling practice under supervision; the final required course in the preparation of the Secondary School Counselor. Open to advanced students who are completing their work for the school counselor certificate. Supervised counseling internship for one (1) quarter in secondary guidance. Prereq.: Consent of instructor. 6-12 q.h.

1010. *Counseling Internship.* Supervised experience in selected community agencies offering counseling and other guidance services. Prereq.: Consent of instructor. 6-12 q.h.

1011. *Counseling Laboratory Experience.* A study and application of counseling techniques in a laboratory setting that allows prospective counselors the opportunity to develop an individual style of counseling. Emphasis is on counselor self-awareness of the counselee and his needs. Prereq.: Ed. 962 and consent of instructor. 4 q.h.

1013, 1014, 1015. *Topical Seminar in Counseling.* The course is for practicing counselors and counselor trainees and will include a survey of literature in counseling, contemporary issues, individual and small group study of special problems chosen by staff, for example: research in counseling, counselor values and the counseling process, student values and drug abuse, team approach to counseling services, etc. May be repeated to a maximum of 16 q.h. Prereq.: Consent of instructor. 1-4 q.h.

1017. *Group Procedures in Counseling.* A laboratory course intended as an experiential introduction to dynamics of groups. Students will participate in community experiences involving the entire class as well as small group activities involving subdivisions of the class. Readings on group processes and involvement in relevant projects and reports are also included in the course. Prereq.: Consent of instructor. 3 q.h.

1026. *Career Guidance Workshop.* Workshop on selected topics of interest in the areas of career education and career guidance. 1-5 q.h., may be repeated once

1027. *Guidance and Counseling Workshop.* Workshop on selected topics of interest chosen by staff. 1-5 q.h., may be repeated once

1028. *Advanced Counseling Theory Seminar.* Research and discussion on selected counseling theories chosen by staff: *e.g.* Adler, Rogers, Ellis, Carkhuff, Berne. 3 q.h.

1030. *Human Relations Training for School Personnel.* (El. Ed. 1030, Sec. Ed. 1030) Designed to improve the interpersonal relationships of administrators, counselors, teachers and other professional staff. Objectives include examination of personal communication styles, the effect of the individual on task groups and increasing leadership potential. 4 q.h.

HEALTH AND PHYSICAL EDUCATION

Lewis B. Ringer, *Chairperson of the Department*

307 Beeghly Physical Education Center

901. *Sport in Society.* Sport studied as a social system interdependent with culture and society and as a social institution which is related to, or a part of, other basic institutions such as the family, education, religion, the economy, politics, and the mass media. Prereq.: HPE 850 or HPE 855. 4 q.h.

902. *Curriculum in Elementary School Physical Education.* Study of "movement" education as an approach to elementary school physical education. Emphasis on curriculum design to meet the needs of children. Prereq.: HPE 722 or equivalent. 4 q.h.

903. *Physical Education Curriculum.* Analysis and progressive development of the physical education curriculum for kindergarten through grade 12. Includes content and program planning. Prereq.: HPE 762 and HPE 765 or equivalent. 3 q.h.

905. *Current Literature in Physical Education.* A critical analysis of recent literature and research in physical education. Readings are organized around problems significant to present-day physical education. Prereq.: Ed. 904 or equivalent. 3 q.h.

910. *Teaching of Motor Skills.* Analysis of research on motor learning and its application to the acquisition, the teaching and the coaching of movement skills. Prereq.: HPE 795 or equivalent. 4 q.h.

920. *Mechanical Analysis of Motor Movements.* Scientific basis for teaching correct form for the exact execution of movement skills through the fundamental laws of physics pertaining to motion. Analysis of various motor activities in order to determine the proper mechanics for obtaining the most effective and efficient results. Prereq.: HPE 795 or equivalent. 4 q.h.

930. *Laboratory Instrumentation.* A laboratory course designed to provide instruction and practical experience in operating laboratory equipment for the measurement of physiological parameters in the human. 2 hours lecture and 2 hours laboratory per week. Prereq.: HPE 896 or equivalent. 3 q.h.

935. *Biodynamics and Human Performance.* The physiology of human exercise responses to various stress conditions such as environmental, psychosocial, disease and maximal performance. Prereq.: HPE 896 or equivalent. 3 q.h.

940. *Administration of Exercise Programs.* Designed to provide guidelines for graded exercise stress testings and exercise prescription programs. Included are behavioral objectives for physicians, program directors, exercise

leaders, and exercise technicians. Course guidelines for exercise programs are those established by the American College of Sports Medicine. Prereq.: HPE 896 or equivalent. 2 q.h.

990. *Independent Study.* Students with special interests conduct individual study projects under faculty supervision involving library work, research, tutorial work, and independent reading and writing. The course permits the student to personally design and seek out answers to problem areas in physical education. May be repeated to a maximum of 4 q.h. Prereq.: Consent of instructor and department chairperson. 1-4 q.h.

HISTORY

Lowell J. Satre, *Chairperson of the Department*

212 Arts and Sciences Office Building

901. *Historical Literature: American.* Readings in the standard works and monographic studies to meet the requirements of qualified graduate students who wish intensive concentration in specific areas of American history. (May be repeated with consent of instructor.) 4 q.h.

902. *Seminar in American Colonial History.* Selected problems of early American history. (May be repeated with consent of instructor.) 4 q.h.

903. *Seminar in 19th-Century America.* Selected problems of American history, 1800-1865. (May be repeated with consent of instructor.) 4 q,h.

904. *Seminar in 19th-Century America.* Selected problems of American history, 1865-1900. (May be repeated with consent of instructor.) 4 q.h.

905. *Seminar in 20th-Century America.* Selected problems of American history in the 20th Century. (May be repeated with consent of instructor.) 4 q.h.

906. *Historical Literature: European.* Readings in the standard works and monographic studies to meet the requirements of qualified graduate students who wish intensive concentration in European history. (May be repeated with consent of instructor.) 4 q.h.

912. *Seminar in Greek and Roman History.* The sources and problems of Greek and Roman history. (May be repeated with consent of instructor.) 4 q.h.

913. *Seminar in Medieval Culture and Society.* The main intellectual and social currents of the Middle Ages. (May be repeated with consent of instructor.) 4 q.h.

914. *Seminar in Renaissance and Reformation.* Trends and aspects of the Renaissance and Reformation. (May be repeated with consent of instructor.) 4 q.h.

915. *Seminar in 17th Century Europe.* Dutch Commercial Enterprise; the France of Louis XIV; Austria and the Empire; Emergence of Brandenburg-Prussia; Rise of Modern Science; the Age of Reason; the Development of the Baroque in Arts and Literature. 4 q.h.

916. *Seminar in 18th-Century Europe.* Selected areas of the Enlightenment, Old Regime, and the French Revolution. (May be repeated with consent of instructor.) 4 q.h.

917. *Seminar in 19th-Century Europe.* The Napoleonic and post-Napoleonic era and the rise of nationalism in Europe. (May be repeated with consent of instructor.) 4 q.h.

918. *Seminar in 20th-Century Europe.* Investigation of the causes of the great world wars, the rise of totalitarianism and the cold war. (May be repeated with consent of instructor.) 4 q.h.

919. *Seminar in Russian History.* Selected problems of Russian history. (May be repeated with consent of instructor.) 4 q.h.

920. *Historical Literature: Asian.* Readings in the standard works and monographic studies to meet the requirements of qualified graduate students who wish intensive concentration in Asian history. (May be repeated with consent of instructor.) 4 q.h.

921. *Seminar in Asian History.* Selected problems in the political, social, economic, diplomatic, and intellectual history of traditional or modern East Asia. (May be repeated with consent of instructor.) 4 q.h.

922. *Seminar in British Empire.* An examination of major problems confronting the British Empire after 1783. (May be repeated with consent of instructor.) 4 q.h.

923. *Seminar in Middle Eastern History.* This course will deal at various times with topics drawn from the Ancient Near East down to the contemporary clash of nationalisms in the Middle East. (May be repeated with consent of instructor.) 4 q.h.

925. *Seminar in English History.* An examination of selected problems in the political, social, economic, and intellectual history of England. (May be repeated with consent of instructor.) 4 q.h.

931. *Research.* 1-9 q.h.

932. *Studies in the Teaching of History.* Investigation and discussion of the research and some of the underlying assumptions in the teaching of history, with implications for the teacher of social studies in the secondary schools and for the prospective history professor. Required of all graduate assistants in history. 4 q.h.

935. *Special Topics in History.* Studies in selected topics in history. May be repeated. Degree students may receive credit for this course only once. 3 q.h.

940. *Historical Literature: Latin American.* Readings in the standard works and monographic studies to meet the requirements of qualified graduate students who wish intensive concentration in Latin American history. (May be repeated with consent of instructor.) 4 q.h.

941. *Seminar in Latin American History.* Selected problems in the

political, social, economic, diplomatic, religious, and cultural history of traditional or modern Latin America. (May be repeated with consent of instructor.) 4 q.h.

948. *Introduction to Historical Research.* Instruction in the basic tools and techniques of historical research and study. Required of all candidates for advanced degrees in history. 4 q.h.

949. *Historiography: American.* An introduction to the professional study of American history, including an examination of the sources and nature of historical knowledge, historical criticism, and synthesis. Required of all candidates for advanced degrees with concentration in the field of American history. 4 q.h.

950. *Historiography: European.* An introduction to the professional study of European history including an examination of the sources and nature of historical knowledge, historical criticism, and synthesis. Required of all candidates for advanced degrees with concentration in the field of European history. 4 q.h.

960. *Historical Literature: African.* Readings in the standard works and monographic studies to meet the requirements of qualified graduate students who wish intensive concentration in African history. (May be repeated with consent of instructor.) 4 q.h.

961. *Seminar in African History.* Selected problems in the political, social, economic and intellectual history of Africa. (May be repeated with consent of instructor.) 4 q.h.

970. *Oral History.* Lectures and laboratory in the methods of taking, processing, and utilizing oral depositions relating to history. The course will include assignments in the field. 4 q.h.

980. *Independent Study.* Individual study in concentrated areas of history under the supervision of a staff member. May be repeated to a maximum of 8 q.h. Prereq.: Consent of the instructor and the Graduate Director. 1-4 q.h.

HOME ECONOMICS

Aili J. Hakojarvi, *Chairperson of the Department*

3044 Technical and Community College Building

825. Current Nutrition Concepts. (4 q.h.)
862. Cultural and Nutritional Aspects of Food. (4 q.h.)
870. Home Economics Workshop. (2-4 q.h.)
872. Maternal and Child Nutrition. (4 q.h.)

INDUSTRIAL ENGINEERING

Robert J. Sorokach, *Chairperson of the Department*

238 Engineering Science Building

750. Introduction to Engineering Relations. (4 q.h.)
824. Engineering Economy. (4 q.h.)

825. Advanced Engineering Economy. (4 q.h.)
850. Introduction to Operations Research. (4 q.h.)
851. Linear Programming. (4 q.h.)

901. *Optimization Techniques.* A study of the analytical techniques used in operations research and industrial engineering with special emphasis on their application to problems in all engineering disciplines. Background in areas such as probability and statistical techniques, least square methods, correlation and regression analysis, interpolation, and iterative methods will be presented. Algorithms for linear programming, integer programming, parametric programming, and dynamic programming models will be developed. 4 q.h.

902. *Digital Simulation.* An introduction to methods of simulation using the digital computer. The generation of random numbers, Monte Carlo techniques, queueing models, and error analysis will be presented. The student will be provided the opportunity to simulate moderately complex physical systems on the digital computer. Primary emphasis will be on models of industrial operations. Prereq.: I.E. 901 and digital programming experience. 4 q.h.

903. *Analysis of Stochastic Systems.* Development and application of stochastic models of engineering systems. Elementary probability models applied to decision making under uncertainty. Development and use of theoretical probability distributions for describing stochastic systems. Models for point and confidence interval estimation and models for correlation analysis applied to engineering problems. 4 q.h.

MANAGEMENT

Rama Krishnan, *Chairperson of the Department*

513 Lincoln Project

804. Personnel Management. (4 q.h.)
850. Development of Executive Ability. (4 q.h.)
851. Problems in Industrial Management. (3 q.h.)
855. Business Ethics. (3 q.h.)
860. Comparative Management. (4 q.h.)

900. *The Foundation of Management.* A study of the fundamental concepts and functions of management. Each functional area is analyzed and the interrelationship of the functions emphasized. Topics such as organization design, authority-power relationships, control systems, group behavior, participative management, span of control, etc., will be covered. (Not applicable toward the M.B.A.) 3 q.h.

915. *Research Techniques.* Nature, methods and techniques of research and the use of research by management; the scientific method in business, sampling theory, variable analysis and research cases. 3 q.h.

916. *Quantitative Analysis for Business Decisions.* The use of classical mathematics in business decision-making; development of the concepts of total

and marginal value analysis. The use of decision criteria; analysis and application of the Bayes concept, Poisson process, and Markov process; constructing mathematical models for business, such as economic order quantity, queueing, etc.; simulation and matrix analysis. Prereq.: Math. 542, 550, Econ. 705. 4 q.h.

917. *Management Information Systems.* Present concepts required for the design, implementation, and utilization of management information systems. The primary emphasis of this course will be development of a total information system for executive level planning and decision-making. Will deal with modern systems concepts and tools; design and scheduling; computer application in integrated systems. Prereq.: Comp. Sci. 600. 4 q.h.

951. *Theory of Organization.* Building on the coverage of leadership and organization provided in the prerequisite courses, study here is directed to integrating frameworks which cover the whole organizational activity, as well as partial models dealing with growth, structure, purpose, and so forth. Theories which view the organization as a producing instrument (the machine model), as a network of relations (Barnard), and as a complex of resources, actions and relations (Bakke) make up one part of the course. The balance is devoted to more limited models dealing with group processes, leadership, communication, decisions, and to some considerations in theorizing such as the use of analogy, the normative instinct, and the application of theory in a business setting. 4 q.h.

952. *Management Theory and Thought.* An approach to modern management thought and theory by an analysis and study of the 19th and 20th century literature on the subject. An investigation of fundamental concepts of management and administration. 3 q.h.

961. *Behavioral Sciences in Management.* An introduction to the psychology of learning, perception, motivation and problem-solving. The course concentrates on dealing with individual effectiveness in organization. Examples of specific topics are: job satisfaction, supervision, planning and resistance to change. Two hours in laboratory and two hours of lecture. 4 q.h.

962. *Manpower Management.* Analysis of programs for manpower acquisition, maintenance and development. Emphasis on determination of organizational needs, and the development and effective utilization of available human skills and competencies. Prereq.: Management 804 or equivalent. 3 q.h.

963. *Industrial Relations.* Analysis of managerial and organizational aspects of employee relations arising out of relations with union, negotiation, and application of contracts, living with contracts, and pertinent legislative matters. 4 q.h.

965. *Business Policies.* 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. 3 q.h.

966. *Advanced Production Management.* Applies the system philoso-

phy to the organization of the production function. The primary emphasis is on costs and the tools available to control them. The attitude of the work is strongly profit oriented. The course covers those areas under the control of the production manager plus his relationship to engineering, industrial relations, data processing, the comptroller and sales. 3 q.h.

968. *Special Topics in Management.* Topics may vary from quarter to quarter and will be announced along with prerequisites and hours. Course may be repeated. 1-3 q.h.

969. *Advanced Management Seminar.* 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. 3 q.h.

996. *Research Problems Other Than Thesis.* Special projects undertaken by M.B.A. students under the direction of faculty members of professorial rank. The exact number to be used will be determined by the nature of the project. Credit will be determined in each case in the light of the nature and extent of the project. 1-6 q.h.

998. *Thesis.* 6 q.h.

MARKETING

Howard B. Cox, *Chairperson of the Department*

615 Lincoln Project

815. Marketing Research. (4 q.h.)
820. Sales Promotion. (3 q.h.)
825. Marketing Management. (3 q.h.)
845. International Marketing. (3 q.h.)

900. *Foundations of Marketing.* A basic examination of marketing as a business process by which products are matched with markets and through which transfers of ownership are effected. This course satisfies the appropriate prerequisite requirement for the M.B.A. degree. (Not applicable toward the M.B.A.) 3 q.h.

915. *Research Techniques.* Nature, methods and techniques of research and the use of research by management; the scientific method in business, sampling theory, variable analysis and research cases. 3 q.h.

941. *Marketing Theory.* A critical appraisal of emerging marketing concepts, their development, acceptance and expected future direction; focus on the role of marketing in the overall economy rather than within the firm. 3 q.h.

942. *Marketing Administration.* A managerial approach, emphasizing the integration of marketing, as an organic activity, with other activities of the

business firm. By case analysis and consideration of current marketing literature, students are provided the opportunity to develop marketing management abilities. 3 q.h.

943. *Physical Distribution Management.* Problems encountered in the movement of goods from the end of the production line to the ultimate consumer; consideration of total distribution and its application in the designs and reconstruction of distribution systems. The relationships between materials handling, warehousing, inventory carrying, and transportation costs are explored together with methods of analysis designed to disclose optimum combinations. 3 q.h.

944. *Product Management.* The search for new product ideas and their evaluation; the organizational structure necessary to the development and introduction of new products and the management of a product line; the commercial aspects of product design, packaging, labeling, and branding; considerations involved in making product deletion decisions. 3 q.h.

945. *Marketing Communications.* Consideration of behavioral science approaches to mass and interpersonal communication and audience behavior. Psychological and sociological data are introduced in relationship to the promotional strategy of marketing communication with emphasis on the dynamics of advertising and selling. 3 q.h.

946. *Consumer Behavior.* The analysis of behavior of consumers both in groups and as individuals in order to assist the marketing manager in such areas as selection of target segments, advertising and media selection, personal selling, product development, marketing research, pricing and distribution policies. In addition to business writings, relevant material from psychology, sociology, economics and anthropology will be utilized to familiarize the student with the behavior of the consumer in the market place. 4 q.h.

968. *Special Topics in Marketing.* Topics may vary from quarter to quarter and will be announced along with prerequisites and hours. Course may be repeated. 1-3 q.h.

996. *Research Problems Other Than Thesis.* Special projects undertaken by M.B.A. students under the direction of faculty members of professorial rank. The exact number to be used will be determined by the nature of the project. Credit will be determined in each case in the light of the nature and extent of the project. 1-6 q.h.

998. *Thesis.* 6 q.h.

MATERIALS SCIENCE

Tadeusz K. Slawecki, *Chairperson of the Department of Chemical Engineering and Materials Science*

256 Engineering Science Building

815, 816. Particle Interaction I, II. (3 + 3 q.h.)
817. Management of Nuclear By-Products. (1 q.h.)

830, 831, 835. Introduction to Nuclear Materials I, II, III. (3 + 3 + 3 q.h.)

851. Introduction to Polymer Science. (3 q.h.)

852, 853, 854. Advanced Engineering Materials (Non-metallic) I, II, III. (3 + 3 + 3 q.h.)

860. Mechanical Behavior of Materials. (3 q.h.)

861, 862. Applied X-Rays I, II. (3 + 3 q.h.)

863, 864. Thermodynamics of Materials I, II. (3 + 3 q.h.)

865. Advanced Science of Materials. (3 q.h.)

866. Special Topics. (3 q.h.)

871. Physical Metallurgy IV. (3 q.h.)

872. Refractory Metals and Alloys. (3 q.h.)

890. Metallurgy and Materials Colloquium. (1 q.h.)

901, 902. *Fundamentals of Materials Science I, II.* (Designed for students who are entering the Graduate School without a degree in metallurgical engineering.) Discussion of physics of solids, mechanical properties, phase diagrams, phase transformations, and alloys. (Generally, in addition to the general requirements of the program.) Prereq.: Consent of advisor. 4 + 4 q.h.

910. *Extractive and Process Metallurgy.* An advanced treatment of the physicochemical principles of extractive and process metallurgy. Prereq.: Met. Engr. 793 and 863 or consent of instructor. 4 q.h.

920, 921. *Advanced Physical Metallurgy I and II.* Theoretical treatment of various aspects of physical metallurgy. Prereq.: Met. Engr. 793 and Met. Engr. 863 or consent of instructor. 4 + 4 q.h.

922, 923. *Advanced Mechanical Properties of Materials I and II.* Discussion of the mechanical properties from theoretical viewpoints; theory of elasticity, theory of plasticity, and other theories. Applications of theories to practical problems. Prereq.: Met. Engr. 860 or consent of instructor. 4 + 4 q.h.

931. *Engineering Alloys.* Alloy steels, refractory alloys, special nonferrous alloys; their properties, heat treatment, and behavior under special conditions. Prereq.: Met. Engr. 732 and 793 or consent of instructor. 4 q.h.

932. *Industrial Metallurgy.* The application of physical metallurgy principles to the solution of problems concerning the causes of failure. Prereq.: Met. Engr. 793 or consent of advisor. 2 q.h.

933. *Chemical Metallurgy.* An advanced course on the application of electrochemical principles to metallurgical problems. Prereq.: Met. Engr. 793 and 863 or consent of advisor. 2 q.h.

951. *Introduction to Electron Microscopy and Field Ion Microscopy.* This course is designed to teach students how to use the microscopes to prepare specimens, to take photographs, and to analyze data. Laboratory work of about six hours a week. Prereq.: Met. Engr. 861. 2 q.h.

952. *Dislocations and Plastic Flow.* Properties of dislocations and their role in plastic flow of metals and alloys. Prereq.: Met. Engr. 860 or consent of instructor. 4 q.h.

953. *Thermodynamics of Solids.* Solutions and applications of statistical thermodynamics to the study of alloys. Prereq.: Met. Engr. 863 and 865 or consent of instructor. 4 q.h.

954. *Advanced Polymer Science.* Advanced discussion of the Polymer Science with particular emphasis on the engineering and fundamental aspects. Prereq.: Met. Engr. 851 or consent of instructor. 4 q.h.

955. *Advanced Refractory Material.* Discussion of refractory materials. Prereq.: Met. Engr. 852 or consent of instructor. 4 q.h.

956. *Advanced Nuclear Materials.* Advanced discussion of the nuclear material with particular emphasis on reaction kinetics and reaction technology. Prereq.: Met. Engr. 830 or consent of instructor. 4 q.h.

960. *Research Seminar.* Prereq.: Consent of instructor. 1 q.h.

990, 991. *Thesis I and II.* 3 + 3 q.h.

993, 994. *Solid State Structure and Reactions I, II.* Discussion of structures and properties of materials, electronic properties, mechanical properties, kinetics of phase changes, diffusion controlled and diffusionless transformation in materials. Limited to those having certification in secondary science teaching acceptable in the State of Ohio. Prereq.: Consent of instructor. 3, 3 q.h.

MATHEMATICS

Luke N. Zaccaro, *Chairperson of the Department*

1055 Technical and Community College Building

725. Matrix Theory and Linear Algebra. (4 q.h.)
726. Theory of Equations. (4 q.h.)
727, 728. Abstract Algebra I, II. (4 + 5 q.h.)
730. Foundations of Geometry. (4 q.h.)
732. Projective Geometry. (4 q.h.)
743, 744. Mathematical Statistics I, II. (4 + 4 q.h.)
760. Numerical Analysis. (4 q.h.)
842. Statistical Inference. (4 q.h.)
843, 844. Theory of Probability I, II. (4 + 4 q.h.)
845. Operations Research. (4 q.h.)
860. Mathematical Logic. (4 q.h.)
861. Advanced Numerical Analysis. (4 q.h.)
871, 872. Advanced Calculus I, II. (5 + 5 q.h.)
875. Introduction to Complex Variables. (4 q.h.)
880. Introduction to Topology. (4 q.h.)
890. Mathematics Seminar. (2 q.h.)
895. Selected Topics in Mathematics. May be repeated once. (2-5 q.h.)

901. *Topics in Analysis.* A course in analysis aimed at providing secondary school teachers with a broad understanding of the subject. Prereq.: Departmental permission. 5 q.h.

902. *Topics in Modern Algebra.* A course in modern algebra aimed at providing secondary school teachers with a broad understanding of the subject. Prereq.: Departmental permission. 5 q.h.

910, 911. *Advanced Engineering Mathematics I.* A presentation of methods in applied mathematics. Selected topics may include: differential equations, infinite series, linear spaces and operators, matrices and determinants, functions of a complex variable, special functions of mathematical physics, operational calculus, and partial differential equations. Emphasis is placed on applications to engineering. Prereq.: Math. 705 or consent of instructor. 4 + 4 q.h.

920, 921, 922. *Modern Algebra I, II, III.* A study of algebraic theories. Finite groups, field extensions and Galois theory, rings, modules, and multilinear algebra. Prereq.: Math. 728. 3 + 3 + 3 q.h.

925, 926. *Matrix Iterative Analysis I, II.* Symmetric matrices, eigenvalue, power series of matrices, norms and convergence, Perron-Frobenius theory for non-negative matrices, relaxation methods, applications to numerical analysis and related topics. Prereq.: Math. 725 or 728, 760, 872 or 875; or consent of instructor. A knowledge of Fortran programming is required. 4 + 4 q.h.

930. *Differential Geometry.* The classical differential geometry of curves and surfaces, with tensors. Prereq.: Math. 705, 872. 4 q.h.

945, 946, 947. *Stochastic Processes I, II, III.* A study of Markov chains, Poisson processes, Wiener processes, and renewal processes with applications to queueing and traffic, system reliability, epidemics, and inventory. Prereq.: Mathematics 844 and 875. 3 + 3 + 3 q.h.

948, 949. *Analysis of Variance I, II.* A study of linear statistical models of the relationship between analysis of variance and regression and of the assumptions underlying the analysis of variance. Prereq.: Math. 725 and 742 or consent of the instructor. 4 + 4 q.h.

950. *Infinite Series.* An extensive treatment of convergent and divergent series including a strong emphasis on summability methods of divergent series. Prereq.: Mathematics 871. 4 q.h.

952. *Advanced Differential Equations.* Theory of differential equations including a study of fundamental existence and uniqueness theorems for solutions. Further topics selected from: phase plane analysis, stability theory, boundary value problems, partial differential equations, integral equations, applications. Prereq.: Math. 705, Math. 725 and either Math. 872 or Math. 911, or consent of instructor. 4 q.h.

960. *Mathematical Logic II.* A study of the elements of recursive function theory and topics such as Godel's incompleteness theorem and decision problems for theories. Prereq.: Math. 860 or consent of instructor. 4 q.h.

965, 966. *Introduction to Real Analysis I, II.* Calculus in n-dimension-

al Euclidean spaces. Riemann and Lebesque integration and related topics. Prereq.: Math. 872. 3 + 3 q.h.

971, 972, 973. *Real and Abstract Analysis I, II, III.* Introduction to general measure theory and functional analysis. The radon-Nikodym theorem, the Fubini theorem, the Hahn-Banach theorem, the closed graph and open mapping theorems, weak topology. Prereq.: Math. 966. 3 + 3 + 3 q.h.

975, 976, 977. *Complex Analysis I, II, III.* A course in classical complex analysis. The Cauchy theorem, the Weierstrass, Mittag-Leffler, Picard, and Riemann theorems, Riemann surfaces, harmonic functions. Prereq.: Math. 872, 875, 880. 3 + 3 + 3 q.h.

980, 981, 982. *Topology I, II, III.* A further study of topological spaces. Separation, metrization, compactification. Additional topics will be selected from the following: point-set topology, algebraic topology, combinatorial topology, topological algebra. Prereq.: Math. 880. 3 + 3 + 3 q.h.

990. *Independent Study.* Study under the supervision of a staff member. May be repeated. Prereq.: Permission of the department chairperson. 1-5 q.h.

995. *Special Topics.* Special interest topics selected by the staff. May be repeated to a maximum of 12 q.h. Prereq.: Consent of instructor and department chairperson. 1-5 q.h.

999. *Research and Thesis.* 3-9 q.h.

Computer Science

810. Computer Graphics and Terminals. (4 q.h.)
820. Simulation and Artificial Intelligence. (5 q.h.)
840. Theory of Finite Automata. (4 q.h.)
845. Information Storage and Retrieval. (4 q.h.)
895. Special Topics. (2-5 q.h.)

MECHANICAL ENGINEERING

Frank A. D'Isa, *Chairperson of the Department*

201 Engineering Science Building

720. Heat Transfer I. (3 q.h.)
750. Strength of Materials III. (3 q.h.)
804. Applied Thermodynamics. (4 q.h.)
821. Heat Transfer II. (4 q.h.)
830. Fluid Mechanics. (4 q.h.)
851. Strength of Materials IV. (4 q.h.)
870. Mechanical Vibrations. (4 q.h.)
881. Engineering Analysis. (4 q.h.)
882. Mechanical Engineering Problems. (4 q.h.)
892. Control Theory. (Not for Electrical Engineering Majors.) (4 q.h.)

904. *Advanced Thermodynamics.* Laws of equilibrium thermodynamics; relations between properties and aspects of the Second-Law. Macroscopic and microscopic considerations for the prediction of properties. Microscopic description based on classical and quantum statistics. General stability criteria, statistical equilibrium, and trend toward equilibrium fluctuations. 4 q.h.

922. *Advanced Heat Transfer.* Selected topics in steady-state and transient conduction heat transfer emphasizing techniques used in the solution of practical engineering problems. The solutions of Bessel and Legendre equations. Prereq.: M.E. 720 or equivalent course. 4 q.h.

923. *Advanced Convective Heat Transfer.* Heat transfer with fluids flowing in ducts, including entrance length effects; laminar and turbulent thermal boundary layers; natural convection; Reynold's analogy; special topics in heat transfer drawn from areas of boiling, condensation, or compressible flows. Prereq.: M.E. 821 or equivalent course. 4 q.h.

931. *Gasdynamics.* The application of fluid mechanic and thermodynamic principles to compressible flows: wave motion, the hodograph method, the method of characteristics, potential flow. High velocity flow in ducts and impellers. Laboratory experiments. Prereq.: M.E. 830 or equivalent course. 4 q.h.

933. *Ideal Fluid Flows.* Kinematics of fluid flow and conservation laws. Vorticity, circulation, and vortex motion. Derivation of velocity potentials and stream functions. Inviscid flow, unsteady flows; conformal transformations; free streamline theory. Prereq.: M.E. 830 or equivalent course. 4 q.h.

934. *Viscous Fluid Flows.* Derivation of the Navier-Stokes equations. Exact solutions of Navier-Stokes equations and boundary layer analysis. General methods of solution, introduction to hydrodynamic stability and turbulence. Prereq.: M.E. 830 or equivalent course. 4 q.h.

935. *Lubrication.* Lubrication theory and bearing design. Dry friction, boundary and thin film lubrication. Theory and application of hydrodynamic and hydrostatic lubrication to journal and thrust bearings. Bearing metals and lubrication systems. Prereq.: M.E. 830 or equivalent course. 4 q.h.

943. *Advanced Dynamics I.* Three-dimensional vector statics; kinematics and kinetics of particles and rigid bodies; energy, momentum, stability; application of LaGrange's equations to machinery, vehicles, ballistics; gyroscope. 4 q.h.

944. *Advanced Dynamics II.* LaGrange's equations of motion for particles and rigid bodies; impulse; small oscillations; non-holomic and dissipative systems. Hamiltonian systems; applications to intricate engineering problems. Prereq.: M.E. 943. 4 q.h.

952. *Applied Elasticity.* Equations of equilibrium, compatibility and boundary conditions; their applications to plane stress and plane strain problems. Stress functions, strain energy methods, stress distribution in axially

symmetrical bodies; special problems in structures involving torsion and bending of prismatical bars. Prereq.: M.E. 750 or equivalent course; M.E. 986. 4 q.h.

955. *Applied Plasticity.* Equations for yield criteria and stress-strain relations; their application to elasto-plastic and fully plastic problems considering strain hardening. Introduction to limit analysis and creep. Prereq.: M.E. 952 Applied Elasticity. 4 q.h.

962. *Mechanical Design Analysis.* The study of analytical aspects and the application of engineering science topics to machine elements and machinery. Some case studies in mechanical design. 4 q.h.

963. *Experimental Stress Analysis.* Theory and engineering applications of the most recent techniques of experimental stress analysis: brittle coatings, photoelasticity, strain gages, photostress. Prereq.: M.E. 750 or equivalent course. 4 q.h.

982. *Advanced Engineering Analysis.* An integration of the fundamental laws and principles of basic science to obtain practical solutions of engineering problems. Formulation of mathematical models for complex physical situations and the organization of computational programs for their solutions. Examples of lumped and distributed parameter systems chosen from the areas of mechanics, thermodynamics, heat transfer, and electrical circuit theory. Prereq.: M.E. 881 or equivalent course. 4 q.h.

986. *Theory of Continuous Medium.* General discussion of Cartesian tensors. Application of tensor theory to elasticity, fluid flow, and dynamics. General analysis of continuous medium. 4 q.h.

990. *Thesis.* 2-9 q.h.

991. *Thesis.* 2-9 q.h.

992. *Graduate Projects.* Analysis, design, research, or other independent investigation on projects selected, with the advice and approval of the students' graduate committee. 4 q.h.

MUSIC

Donald W. Byo, *Director*

103 Dana School of Music

701, 702, 703. Performance Minor. (2 + 2 + 2 q.h.)
734, 735, 736. String Pedagogy. (1 + 1 + 1 q.h.)
741. Piano Literature. (4 q.h.)
753. Counterpoint I. (3 q.h.)
754. Counterpoint II. (3 q.h.)
790, 791, 792. Piano Duet- and Duo-Playing. (1 + 1 + 1 q.h.)
801, 802, 803. Performance Minor. (2 + 2 + 2 q.h.)
820, 821, 822. Composition. (2 + 2 + 2 q.h.)
830. Materials of Twentieth Century Music. (3 q.h.)
840. Instrumentation. (4 q.h.)

841. Music Workshop. May be repeated to a maximum of 8 q.h. for degree credit. (1-4 q.h.)
858, 859. Piano Pedagogy. (2 + 2 q.h.)
860. Piano Literature. (4 q.h.)
863. Choral Literature. (3 q.h.)
869. Organ Literature and Service Playing. (3 q.h.)
871. Baroque Music. (3 q.h.)
872. 18th Century and the Viennese Classical School. (3 q.h.)
874. 19th Century Romantic Period. (3 q.h.)
879. Vocal Literature. (3 q.h.)
880, 881. Vocal Pedagogy. (2 + 2 q.h.)
884. History and Literature of Brass Instruments. (3 q.h.)
885. Brass Pedagogy. (3 q.h.)
890, 891, 892. Chamber Music with Piano. (1 + 1 + 1 q.h.)

Music Performance

1) Assignments of students to teachers are made by the Co-ordinators of Keyboard, Voice, String, Woodwind, Brass, and Percussion Studies. Requests for change of teacher should be addressed to them.

2) Students registered for 6 q.h. courses receive 75 minutes of individual instruction weekly and practice three hours daily. Students registered for 4 q.h. courses receive 50 minutes of individual instruction weekly and practice two hours daily. Students registered for 2 q.h. courses receive 25 minutes of individual instruction weekly and practice one hour daily. Students registered for 6 q.h. and 4 q.h. courses are entitled to attend the weekly seminars held by their individual instructors.

3) Students in the performance major course (907-908-909) must present a one-hour public recital. The entire recital program must be performed for approval by the appropriate performance faculty between 15 and 30 days prior to the date of the recital. Recitals are not required in courses numbered 901 through 906.

4) Students who fail to meet the standards of the faculty in the area of their performance study may be required to reduce the number of credit hours for which they register in subsequent quarters, or they may be required to withdraw completely from the course sequence.

5) Students may transfer from major to concentration or minor courses according to the Performance Course Equivalency Table below, subject to approval by the appropriate performance faculty.

6) Examination and performance requirements are the responsibility of the appropriate performance faculty.

PERFORMANCE COURSE EQUIVALENCY TABLE

Q.H.	Course Number		
0		500	
2	501	504	
4	502		
6	503	505	
8	601		
10	602	506	
12	603		
14	701	604	607
16	702		
18	703	605	
20	801		608
22	802	606	
24	803		
26	901	704	609
28	902		
30	903	705	
32			707
34		706	
36			
38		804	708
40			
42		(805)	

Q.H.	Course Number		
42		805	(708)
44			709
46		806	
48			
50		904	807
52			
54		905	
56			808
58		906	
60			
62			809
64			
66			
68			907
70			
72			
74			908
76			
78			
80			909
82			
84			

MAJOR COURSES

KEYBOARD INSTRUMENTS

Piano

907-908-909. Advanced technical studies and etudes. Repertoire to include representative selections from the larger works of major eighteenth-, nineteenth-, or twentieth-century composers. One-hour recital. Prereq.: Piano 809 or equivalent. 6 + 6 + 6 q.h.

Harpsichord

907-908-909. Repertoire selected from larger works of all style periods with special emphasis on early and contemporary works. Continued study of style and freedom in continuo playing. One-hour recital. Prereq.: Harpsichord 809 or equivalent. 6 + 6 + 6 q.h.

Organ

907-908-909. Technical studies as required by instructor. Repertoire to include larger works by major composers from several style periods. One-hour recital. Prereq.: Organ 809 or equivalent. 6 + 6 + 6 q.h.

VOICE

907-908-909. Advanced vocal technique and literature; development of interpretation and characterization. Repertoire to include songs in Italian, French, German, and English; oratorio and opera arias; solo cantatas; and twentieth-century art songs, which must include works by American and English composers. One-hour recital. Prereq.: Voice 809 or equivalent. 6 + 6 + 6 q.h.

STRING INSTRUMENTS

Violin

907-908-909. Advanced etudes, such as those by Paganini. Bach, *Partitas* and *Sonatas.* Modern repertoire, such as Bartok, Hindemith, and Prokofiev. Concertos such as those by Brahms and Tchaikovsky. One-hour recital. Prereq.: Violin 809 or equivalent. 6 + 6 + 6 q.h.

Viola

907-908-909. Scales, arpeggios, and double-stops for the complete range of the instrument based on Flesch and Sevcik. Studies such as those by Garnier and Dolesje; sonatas such as those by Hindemith, Bach, and Beethoven; solos such as Bloch, *Rhapsodie;* concertos such as that by Haydn. One-hour recital. Prereq.: Viola 809 or equivalent. 6 + 6 + 6 q.h.

Violoncello

907-908-909. Scales and arpeggios in four octaves with varied bowings, and in thirds and sixths; etudes such as those by Popper and Duport; sonatas such as those by Schubert (*Arpeggione*), Debussy, and Prokofiev; concertos such as those by Schumann or Shostakovich. One-hour recital. Prereq.: Violoncello 809 or equivalent. 6 + 6 + 6 q.h.

String Bass

907-908-909. Studies such as those by Simandl, Hrabe, and Zimmerman; sonatas such as those by Marcello, Eccles, or Vivaldi; concertos such as those by Dittersdorf or Bottesini. One-hour recital. Prereq.: String Bass 809 or equivalent. 6 + 6 + 6 q.h.

WOODWIND INSTRUMENTS

Flute

907-908-909. Advanced technical studies and etudes. Repertoire to include representative solo and chamber works by composers from all periods with ad-

ditional emphasis on orchestral style. One-hour recital. Prereq.: Flute 809 or equivalent. 6 + 6 + 6 q.h.

Oboe

907-908-909. Advanced technical studies and etudes. Repertoire to include representative solo and chamber works by composers from all periods with additional emphasis on orchestral style. One-hour recital. Prereq.: Oboe 809 or equivalent. 6 + 6 + 6 q.h.

Clarinet

907-908-909. Advanced technical studies and etudes. Repertoire to include representative solo and chamber works by composers from all periods with additional emphasis on orchestral style. One-hour recital. Prereq.: Clarinet 809 or equivalent. 6 + 6 + 6 q.h.

Bassoon

907-908-909. Advanced technical studies and etudes. Repertoire to include representative solo and chamber works by composers from all periods with additional emphasis on orchestral style. One-hour recital. Prereq.: Bassoon 809 or equivalent. 6 + 6 + 6 q.h.

BRASS INSTRUMENTS

Trumpet

907-908-909. Extensive development in the study of transposition and orchestral excerpts. Advanced studies such as those by Charlier, Bozza, Brandt, Broiles, Tomasi, Pietzsch, and Bodet. Solo literature by Bozza, Purcell, Bach, Hummel, Giannini, Tomasi, and Jolivet. One-hour recital. Prereq.: Trumpet 809 or equivalent. 6 + 6 + 6 q.h.

French Horn

907-908-909. Advanced studies by Bitsch, Chaynes, Ceccarossi, Reynolds, Alphonse, and Schuller; demanding orchestral and ensemble passages; classical, romantic, and contemporary sonatas and concertos. One-hour recital. Prereq.: French Horn 809 or equivalent. 6 + 6 + 6 q.h.

Trombone

907-908-909. Studies by Lafosse, Kahila, Pederson, and Maxted; solos by Creston, Bloch, Stevens, Druckman, Albrechtsberger, and Bach (violoncello suites); orchestral excerpts. One-hour recital. Prereq.: Trombone 809 or equivalent. 6 + 6 + 6 q.h.

Tuba

907-908-909. Emphasis on solo and chamber performance. Solos by Kraft, Smith, Reck, Wuorinen, Woolfe, Reynolds; transcriptions of Bach violoncello suites. Chamber music by Schuller, Feldman, Smith, Zonn, Etler, Macero. One-hour recital. Prereq.: Tuba 809 or equivalent. 6 + 6 + 6 q.h.

PERCUSSION INSTRUMENTS

907-908-909. Advanced technical studies on snare drum, timpani, and mallet instruments. Repertoire to include demanding passages from symphonic and ensemble literature, contemporary works for percussion. One-hour recital. Prereq.: Percussion 809 or equivalent. 6 + 6 + 6 q.h.

CONCENTRATION COURSES

904-905-906. Equivalent to courses 807 and 808 in the applicable instrument or voice. No recital requirement. Prereq.: Applicable course 709 or equivalent. 4 + 4 + 4 q.h.

MINOR COURSES

901-902-903. Equivalent to course 609 in the applicable instrument or voice. No recital requirement. Prereq.: Applicable course 608 or equivalent. 2 + 2 + 2 q.h.

Music Theory and Composition

904, 905, 906. *Advanced Composition.* Individual instruction in the composition of larger forms for chorus, orchestra, or chamber ensembles. Prereq.: Consent of instructor. 4 + 4 + 4 q.h.

910, 911, 912. *Music Styles.* The study and application of 18th, 19th, and 20th century compositional techniques. 3 + 3 + 3 q.h.

913. *Pedagogy of Theory.* The study and critical analysis of methods for teaching harmony, sightsinging, and ear-training. 3 q.h.

916. *Fugue.* Analysis of the fugal style used in 17th century trio sonatas, and in both volumes of *The Well-Tempered Clavier* by J.S. Bach. Writing 3-4 voice fugues employing imitative and invertible counterpoint. Prereq.: Music 753 (Counterpoint I) or 754 (Counterpoint II). 3 q.h.

920, 921, 922. *Seminar in Materials of Music.* The study of techniques used in musical composition with emphasis in analyzing and writing. Course requirements will be determined by student's field of interest. Can be repeated for credit. Admission to course by permission of instructor. 3 + 3 + 3 q.h.

Music History and Literature

940. *Music in the Middle Ages.* The development of polyphonic music from early organum to c. 1450, with emphasis on techniques, styles, and forms. Seminar, with readings, reports, and musical illustrations. 3 q.h.

941. *Music in the Renaissance.* Musical developments from c. 1450-1600 dealing with the vocal music of this period, both sacred and secular, and the formulation of independent instrumental styles. Seminar, with readings, reports, and musical illustrations. 3 q.h.

942. *Introduction to Musicology.* Fundamental concepts and problems of musicology; sources, reference materials, methodology. 3 q.h.

943. *Seminar in Musicology.* An examination of select problems in musicology. (May be repeated with consent of instructor.) 3 q.h.

Music Education

970. *Foundations of Music Education.* An examination of basic principles and techniques of music instruction; contemporary trends viewed from historical perspective. 3 q.h.

971. *Administration and Supervision in Music Education.* The functions and techniques of music supervision and administration; improvement of instruction; problems of music consultants; organization of in-service programs; public and staff relations. 3 q.h.

972. *Seminar in Music Education.* Individual projects and discussion of fundamental issues in music education. Course may be repeated once with consent of instructor. 3 q.h.

973. *Research Methods and Materials in Music Education.* A study of research tools and techniques and their application to problems in music education; critique of research studies; research report required in non-thesis Music Education program. 3 q.h.

974. *Psychology of Music.* Factors in the development of musical skills; a survey of the experimental literature in the field. 3 q.h.

975. *Music and the Humanities.* Designed to aid in the development of interdisciplinary courses involving music and the humanities in the secondary school. 3 q.h.

976. *Directed Study in Conducting.* Study of significant works, vocal or instrumental; special problems in conducting. May be repeated for credit. 3 q.h.

977. *Comparative Music Education.* The study of music education practices in world cultures, including the contributions of Orff, Kodaly, and Suzuki. 3 q.h.

981. *Elementary School Music Practicum.* Field experiences, demonstrations, and lectures to acquaint the student with the many facets of elementary music instruction. Contemporary trends and innovative programs will be examined; students will be encouraged to introduce certain programs and approaches in their own teaching situations. Prereq.: Teaching experience or student teaching. 3 q.h.

982. *Secondary School Music Practicum.* An examination of the total secondary school music program through guided field experiences, demonstrations, and lectures. The development of curriculum in general music and instrumental and vocal music will be considered in the light of needs and abilities of the student. Prereq.: Teaching experience or student teaching. 3 q.h.

Music Research

990, 991. *Thesis I and II.* Individual research and writing culminating

in the preparation of a master's thesis. Prereq.: Completion of 30 q.h. course work and approval of thesis proposal by the Dana Graduate Committee.
3 + 3 q.h.

992. *Independent Projects in Music.* Individual research topics in music of a library, laboratory, or field-work nature. Prereq.: Approval of Dana Graduate Committee.
1-6 q.h.

Music Ensemble

995. *Graduate Ensemble.* Graduate students may register for participation in ensemble courses of the Dana School of Music for up to 3 q.h. credit, subject to approval by their faculty advisor.
1-3 q.h.

995A Concert Choir
995B Madrigal Singers
995C Chorus
995D Concert Band
995E Marching Band
995F Wind Ensemble
995G Orchestra
995H Percussion Ensemble
995J String Ensemble
995K Men's Chorus
995M Opera Workshop
995N Contemporary Music Ensemble
995P Jazz Ensemble
995S Woodwind Ensemble
995T Brass Ensemble
995U Horn Ensemble
995W Trombone Ensemble
995Y Tuba Ensemble
995Z Brass Chamber Ensemble

PHILOSOPHY AND RELIGIOUS STUDIES

Martin A. Greenman, *Chairperson of the Department*

100 Arts and Sciences Office Building

Philosophy

800. Theories of Knowledge. (4 q.h.)
810. Philosophical Classics. (4 q.h.)
811. Philosophy in America. (4 q.h.)
812. Contemporary Philosophy. (4 q.h.)
814. Analytic Philosophy. (4 q.h.)
815. Existentialism and Phenomenology. (4 q.h.)
820. Seminar: Contemporary Philosophical Problems. (1-3 q.h.)
821. Seminar: Areas of Philosophy. (1-3 q.h.)
860. Mathematical Logic. (4 q.h.)

Religious Studies

830. Religion in America. (4 q.h.)
850. Seminar in Religious Studies. (1-3 q.h.)

PHYSICS AND ASTRONOMY

Stephen Hanzely, *Chairperson of the Department*

101B Ward Beecher Science Hall

701, 702, 703. Intermediate Classical Mechanics. (3 + 3 + 3 q.h.)
704, 705. Introduction to Modern Physics. (3 + 3 q.h.)
704L, 705L. Modern Physics Lab. (1 + 1 q.h.)
710. Thermodynamics. (3 q.h.)
730, 731, 732. Intermediate Electricity and Magnetism. (3 + 3 + 3 q.h.)
730L, 731L, 732L. Intermediate Electricity and Magnetism Lab. (1 + 1 + 1 q.h.)
810. Introduction to Quantum Mechanics I. (3 q.h.)
811. Introduction to Quantum Mechanics II. (3 q.h.)
815. Thermodynamics and Statistical Mechanics I. (3 q.h.)
816. Thermodynamics and Statistical Mechanics II. (3 q.h.)
826. Elements of Nuclear Physics. (3 q.h.)
826L. Nuclear Physics Laboratory. (1 q.h.)
830. Solid State Physics. (4 q.h.)
835. Spectroscopy. (4 q.h.)

901, 902. *Classical Mechanics I, II.* Variational principles and Lagrangian equations. The two-body central force problem. Kinematics and dynamics of rigid bodies. Hamiltonian equation of motion; Hamilton-Jacobi theory. Prereq.: Physics 702 and Mathematics 705. 3 + 3 q.h.

910, 911. *Quantum Mechanics I, II.* Quantum phenomena in relation to classical physics. Schroedinger and Heisenberg picture; angular momentum and scattering theory. Hamiltonian theory of a particle in an electromagnetic field. Pauli principle; identical particles. Prereq.: Physics 702, 822, 705, and Mathematics 706. 3 + 3 q.h.

915, 916. *Space Science.* Geophysics; physics of the Earth's atmosphere and other planets. Physics of the sun and the solar system. Advances in the International Geophysical Year, 1957-1958; problems of man in space. Prereq.: Physics 510, 610, and Mathematics 705, 706. 3 + 3 q.h.

920, 921. *Electromagnetic Theory.* Electromagnetic fields in a vacuum; microscopic and macroscopic fields. Methods for calculation of potential problems. Maxwell's equations in the presence of metallic boundaries. Radiation from an accelerated charge. Lienard-Wiechert potentials. Prereq.: Physics 822 and Mathematics 706. 3 + 3 q.h.

930, 931. *Solid State Physics I, II.* The physics of solid state phenomena including crystal structure, diffraction, crystal binding, lattice vibrations and thermal properties of solids, theory of metals and semiconductors, su-

perconductivity, dielectric properties of solids, magnetism, and imperfections in solids. Prereq.: Physics 810 or equivalent background. Physics 930 is prereq. to 931. 3 + 3 q.h.

POLITICAL AND SOCIAL SCIENCE

Ivis Boyer, *Chairperson of the Department*

109 Arts and Sciences Office Building

800. Select Problems, American Government. (3 q.h.)
840. Select Problems, Comparative Government. (3 q.h.)
860. Select Problems, International Relations. (3 q.h.)
880. Select Problems, Political Theory. (3 q.h.)

PSYCHOLOGY

~~Sanford N. Hotchkiss~~, *Chairperson of the Department* JAMES MORRISON

219 Kilcawley Men's Residence Hall

802. Personality. (4 q.h.)
805. Interviewing Techniques. (4 q.h.)
806. Vocational Guidance. (4 q.h.)
807. Introduction to Counseling. (4 q.h.)
808. Psychology of Training and Supervision. (4 q.h.)
825. Group Processes in the School. (Guid.-Couns. 825) (3 q.h.)
828. Physiological Psychology. (4 q.h.)
836. Psychology of the Exceptional Child: (General). (3 q.h.)
837. Psychology of the Exceptional Child: (Retarded). (3 q.h.)
838. Psychology of the Exceptional Child: (Gifted). (3 q.h.)

903. *The Psychology of Learning.* Examination of experimentally determined facts concerning the learning process and their implication for use in school. 3 q.h.

906. *Human Growth and Development.* Expanded aspects of child and adolescent psychology. 3 q.h.

907. *Psychology of Adjustment.* Basic problems dealing with mental health, individual differences, motivation, and minor deviant behavior. 3 q.h.

920, 921. *Individual Intelligence Testing: Theory and Application I, II.* Intensive study of and supervised practice in the administration, scoring, and interpretation of selected measures of intellectual functioning, with emphasis upon the role of these measures in individual assessment and guidance. Course I will cover the Wechsler scales including the WISC and WAIS whereas Course II will cover the Stanford-Binet. Prereq.: 20 q.h. of psychology including Psych. 740 or equivalent, and consent of instructor. 3 + 3 q.h.

923. *Individual Intelligence Testing: Practicum.* Extensive supervised practice in the administration and interpretation of individual intelligence tests with emphasis upon the development of competence in writing reports tailored for various educational and psychological purposes and upon the interpretation

of results in the light of the particular racial, ethnic and socio-economic background of the subject being tested. Prereq.: Psych. 920 or 921. 3 q.h.

950. *Personality: Theory, Assessment and Research.* A consideration of current personality theory and of the methodological and theoretical problems and issues in personality research and assessment. Prereq.: 20 q.h. of psychology including Psych. 802 or equivalent, or consent of instructor. 3 q.h.

980. *Psychological Aspects of Mentally Retarded Children.* An intensive study of psychology and educational psychology in mental retardation; exploration and discussion of paradigm in child psychology, developmental psychology, and personality. 3 q.h.

981. *Advanced Seminar in Mental Retardation.* (Sp. Ed. 981) Exploration of general research and other theoretical studies concerning the mentally retarded, with particular emphasis on psychological variables in learning. 3 q.h.

990. *Seminar in Psychology.* Study of topics in psychology. Prereq.: Permission of instructor. 1-3 q.h. to be announced by topic. Repeatable to 9 q.h. with change in topic.

1010. *Counseling Internship.* (Guid.-Couns. 1010) Supervised experience in selected community agencies offering counseling and other guidance services. Prereq.: Consent of instructor. 6-12 q.h.

SECONDARY EDUCATION

Louis E. Hill, *Chairperson of the Department*

110 School of Education Building

883. Secondary School Reading. (4 q.h.)
891, 892, 893. Seminar in Secondary Education. (1-4 q.h.)
894. Audio-Visual Media. (4 q.h.)
895. Cataloguing and Classification. (4 q.h.)
896. Reference—School Library. (4 q.h.)
897. Media Center Administration. (4 q.h.)
898. Preparation of Audio-Visual Materials. (4 q.h.)

910. *Supervision in Secondary Schools.* Theory and strategies for those who have supervisory responsibilities in secondary schools. Emphasis will be on supervisory competencies and roles. Supervisory models including clinical supervision will be considered. 3 q.h.

923. *Review of Reading Research.* See El. Ed. 923. 4 q.h.

924. *Diagnosis and Treatment of Reading Disability: Part I.* (El. Ed. 924) Selection, administration, and scoring of various individual tests; techniques for evaluating the child with a reading disability. Prereq.: Consent of instructor and Ed. 882 and 883. 4 q.h.

925. *Diagnosis and Treatment of Reading Disabilities: Part II.* (El. Ed. 925) Instructional techniques and procedures for meeting specific needs of the

child with reading disabilities. Work with specialized materials, machines, and other equipment used in reading improvement. Prereq.: Ed. 856 or consent of the instructor. 4 q.h.

927. *Practicum: Reading.* See El. Ed. 927. 4 q.h.

930. *Supervision of Reading.* See El. Ed. 930. 4 q.h.

931. *The Secondary School Curriculum.* Historical development of the American secondary school curriculum, present nature, and recent developments. Study of reports, experiments, and typical programs. The roles of supervisors, administrators, teachers, pupils, and public in the development of curriculums. 3 q.h.

946. *The Supervision of Instruction.* (El. Ed. 946) A course dealing with the supervision of instruction and organization of a school designed for those aspiring to be principals or supervisors. Decision making, supervision, observation of supervisory experiences, direction in educational technology, the various subjects, staff relationships, school organization, pupil personnel, and extra-curricular activities are among the areas considered with emphasis upon elementary or secondary situations as appropriate. 3 q.h.

948. *Basic Principles of Secondary School Administration.* The role of the secondary school principal in general administrative techniques. 3 q.h.

949. *School Law.* See El. Ed. 949. 3 q.h.

950. *School Business Management.* (El. Ed. 950) The principal's responsibility for school management problems including activity fund accounting, purchasing, budgeting, building maintenance, pupil insurance and related areas. 3 q.h.

951. *Communications and the School Principal.* See El. Ed. 951. 3 q.h.

952. *School Finance.* (El. Ed. 952) A study of the fiscal setting of public school finance in the United States, with particular emphasis on the State of Ohio. It will analyze systematic approaches to local, state and federal financing of schools, including accounting, budgeting, purchasing, and funding for the operation of public schools. 3 q.h.

954. *School Community Relations.* See El. Ed. 954. 3 q.h.

955. *Staff Personnel Administration.* (El. Ed. 955) Policies and practices of personnel administration. Recruitment, selection, assignment, and supervision of teaching and non-teaching personnel. Salary schedules and other employee rewards. Policies for career development. Handling of grievances and negotiations. 3 q.h.

956. *Educational Facilities.* (El. Ed. 956) A course designed to familiarize the prospective administrator with the problems of new plant development and maintenance remodeling, rehabilitation of current plants, and the selection and maintenance of equipment. 3 q.h.

957. *Practicum in Language Arts.* Analysis and techniques for teaching the language arts through video-taped lessons of high school and middle school

teachers; examination of concepts of learning through various approaches, and in the context of research in the language arts. Practical approaches to the teaching of language, writing and literature. Prereq.: Consent of instructor. 3 q.h.

958. *Instructional Supervision for Non-School Personnel.* Strategies of teaching and supervision including the use of media, the evaluation of instruction and pupil performance, and related personnel issues will be covered. The course is designed for personnel in non-school settings who have teaching or supervisory responsibility in inservice programs. Permission of the instructor. 4 q.h.

990. *Independent Study.* See El. Ed. 990. 1 – 4 q.h.

1020. *Field Experience for the Secondary Principalship.* An administrative field experience required for a secondary principal's certificate. Open to advanced graduate students seeking a secondary principal's certificate. Prereq.: Educ. 931, 946, 948, 949, 951 and permission of advisor and instructor. 1 – 3 q.h.

1021. *Field Experiences for the Elementary Principalship.* See El. Ed. 1021. 1 – 3 q.h.

1022. *Field Experience for Supervisory Candidates.* See El. Ed. 1022. 1 – 3 q.h.

1023. *Field Experience for the Superintendency.* (El. Ed. 1023) An administrative field experience, required for the superintendent's certificate. Open to advanced graduate students seeking a superintendent's certificate. Prereq.: Eligible for a principal's or supervisory certificate, Educ. 949, 952, 956, permission of advisor and instructor. 1 – 3 q.h.

1024. *Seminar in Secondary Education.* Study of selected topics chosen by the secondary staff. May be repeated by non-degree students. Prereq.: Approval of instructor. 1 – 4 q.h.

1025. *Seminar in Secondary Education.* Study of selected topics chosen by the secondary education staff. May be repeated by non-degree students. Prereq.: Approval of instructor. 1 – 4 q.h.

1028. *Advanced Counseling Theory Seminar.* Research and discussion on selected counseling theories chosen by staff: *e.g.*, Adler, Rogers, Ellis, Carkhuff, Berne, etc. May be repeated once. Prereq.: Guid. 962. 3 q.h.

1030. *Human Relations Training for School Personnel.* See Guid.-Couns. 1030. 4 q.h.

SOCIOLOGY AND ANTHROPOLOGY

James W. Kiriazis, *Chairperson of the Department*

603 Lincoln Project

900. *Special Sociological Problems.* Advanced seminars focusing on independent study at the graduate level: Social Organization in a Changing World; Social Disorganization (or Deviance) and Social Controls; Social and

Cultural Factors in Personality Development; Minority Relationships; Sociology of Law; Social Change; Comparative Institutions. each 4 q.h.

901. *Social Case Work for School Guidance Personnel.* The field of social work. Emphasis will be on major institutions of social work important to school guidance personnel and on the values and method of social case-work. Specific topics include the use of relationship, social diagnosis, social work treatment, and social work advocacy. Major institutions surveyed are the juvenile court, mental health agencies and family and children's agencies. 3 q.h.

902. *Child and Society.* The socialization of the pre-school and elementary school child. Consideration of theories and research related to social development, social interation patterns, and cultural determinants. Primarily geared for graduate students in education. 4 q.h.

910. *Special Anthropological Problems.* Advanced seminars focusing on independent study at the graduate level: Archaeology, Its Methods and Functions; Human Origins and Differentiation; Anthropology of Religion; Cultural Change and Its Impact. each 4 q.h.

SPECIAL EDUCATION

M. Dean Hoops, *Chairperson of the Department*

244 School of Education Building

732. Education of Exceptional Children. (4 q.h.)

833. Teaching Educable Mentally Retarded (Slow Learners). (4 q.h.)

851. Principles and Practices in Curriculum Planning and Development for Slow Learners: Social Studies. (3 q.h.)

852. Curriculum Planning and Practices in Special Education—Language Arts. (3 q.h.)

853. Curriculum Planning and Practices in Special Education—Arithmetic. (3 q.h.)

854. Preparation, Selection and Adaptation of Instructional Materials in Special Education. (3 q.h.)

854L. Preparation, Selection and Adaptation of Instructional Materials for Special Education. (1 q.h., may be repeated up to 6 q.h.)

855. Occupational Orientation and Job Training for Slow Learners. (3 q.h.)

858. Education of Gifted or Superior Students. (3 q.h.)

861. Introduction to Learning Disabilities and Behavior Disorders. (3 q.h.)

862. Clinical Teaching of Children With Behavior Disorders. (3 q.h.)

863. The Child With Learning Disabilities. (3 q.h.)

864. Teacher-Parent Consultation. (3 q.h.)

865. Workshop in Special Education.
(1-6 q.h., may be repeated up to 12 q.h.)

867. Practicum in Learning Disability/Behavior Disorder.
(1-6 q.h., may be repeated up to 12 q.h.)

868. Independent Study in Special Education.
(1-6 q.h., may be repeated up to 12 q.h.)

976. *Academic Assessment and Remediation in Special Education.* Role of the clinical teacher in special education in diagnostic hypotheses, utilizing assessment techniques, developing strategies for remediation, skills in interpreting and reporting findings of assessment. Prereq.: Special Educ. 833 or 863. 3 q.h.

977. *Research and Problems in the Education of the Mentally Retarded.* Consideration of problems concerning practices in the education of the mentally retarded and the examination of pertinent psychological, educational, medical, and other relevant research in the determination of trends and practices regarding the mentally retarded. 3 q.h.

978. *Supervision of Special Education.* Consideration of the establishment and function of educational programs for the mentally retarded and the programs' relationship to the total educative process for teachers and supervisors in special education. 3 q.h.

979. *Assessment and Remediation of Language and Cognitive Process Dysfunctions in Special Education.* Theory and practice in remediation of basic cognitive processes, especially in areas of language and cognitive skills for the clinical teacher in special education. Prereq.: Special Educ. 833 or 863. 3 q.h.

981. *Advanced Seminar in Mental Retardation.* (Psych. 981) Exploration of general research and other theoretical studies concerning the mentally retarded, with particular emphasis on psychological variables in learning. 3 q.h.

982. *Administration of Special Education Programs.* An overview of the areas usually administered by a Director of Special Education including development of special education programs, present scope and status of special education, finance, curriculum development, staff recruitments, public relations, legislations, etc. Prereq.: Ed. 732 and Ed. 833. 3 q.h.

983. *Major Concepts in Special Education.* Introduces the teacher to clinical, developmental, and remedial concepts and practices in special education programming. Prereq.: Ed. 833 or 863. 3 q.h.

984. *Assessment and Remediation of Motor and Perceptual Process Dysfunctions in Special Education.* Theory and practice in remediation and preparation of developmental programs in basic learning processes, as related to the areas of motor and perceptual dysfunctions for the clinical teacher in special education. Prereq.: Ed. 833 or 863. 3 q.h.

985. *Practicum in Program Planning and Remediation in Special Education.* Development of skills in program planning and organization of delivery of services for clinical teachers in special education. Prereq.: Ed. 976, 979, and 984. 3 q.h.

986. *Advanced Practicum in Program Planning and Remediation in Special Education—Behavior Management Techniques.* Skills in managing behavior of pupils in special education programs; acquire skills of clinical teaching model, including teaching styles, communication processes, and classroom atmosphere in work with pupils in special education programs. Prereq.: Ed. 833 or 863. 1-6 q.h., may be repeated for credit up to a total of 12 q.h.

1022. *Field Experiences for Supervisory Candidates.* See El. Ed. 1022. 1-3 q.h.

SPEECH COMMUNICATION AND THEATRE

R. Donald Elser, *Chairperson of the Department*

328 Arts and Sciences Office Building

750. Speech Criticism. (4 q.h.)
754. Persuasive Speaking. (4 q.h.)
758. Oral Communication Theory. (4 q.h.)
783. Broadcasting Regulations. (4 q.h.)
851. Contemporary American Public Address. (4 q.h.)
852. Group Communication. (4 q.h.)
864. Advanced Directing. (4 q.h.)
898. Seminar in Public Address. (3 q.h.)

Graduate Faculty

Administrative Members

John J. Coffelt, Ed.D.	President
Earl E. Edgar, Ph.D.	Vice President for Academic Affairs
Karl E. Krill, Ph.D., P.E.	Vice President for Administrative Affairs
James A. Scriven, Ed.D.	Dean of Admissions and Records
M. Jean Charignon, Ph.D., P.E.	Dean of the William Rayen School of Engineering
Bernard J. Yozwiak, Ph.D.	Dean of the College of Arts and Sciences
Leon Rand, Ph.D.	Dean of Graduate Studies and Research
Robert L. Miller, M.B.A.	Dean of the School of Business Administration
Nicholas Paraska, Ph.D., P.E.	Dean of the Technical and Community College
Arnold J. Moore, Ph.D.	Dean of the School of Education
William R. McGraw, Ph.D.	Dean of the College of Fine and Performing Arts

Senior Members

Shaffiq Ahmed, Professor of Chemical Engineering and Materials Science: I. Sc., University of Calcutta, 1950; B.E. Met. Engr., University of Calcutta, 1954; M.S. Met. Engr., University of Illinois, 1958; Ph.D., Case Institute of Technology, 1965.

Charles K. Alexander, Associate Professor of Electrical Engineering: B.S.E.E., Ohio Northern University, 1965; M.S., Ohio University, 1967; Ph.D., Ohio University, 1971.

Domenico B. Aliberti, Associate Professor of Foreign Languages: Maturita Classica, Liceo "L. Valli", Barcellone PG (Italy), 1950; Laurea di Dottore in Lettere, University of Messina, Italy, 1959.

John E. Alleman, Associate Professor of Music: B.M., Michigan State University, 1951; M.M., Michigan State University, 1961; D.M.E., Indiana University, 1969.

George Lee Almond, Professor of Marketing: B.S., Ohio State University, 1951; M.A., Ohio State University, 1955; Ph.D., Ohio State University, 1963.

Robert A. Ameduri, Associate Professor of Education: B.S., Youngstown State University, 1943; M.S., Westminster College, 1962; M.S., Case Western Reserve University, 1963; Ph.D., Kent State University, 1971.

Lorrayne Y. Baird, Associate Professor of English: A.B., Catawba College, 1951; M.A., Appalachian State College, 1959; Ph.D., University of Kentucky, 1969.

Jack D. Bakos, Jr., P.E., Associate Professor of Civil Engineering: B.S.C.E., University of Akron, 1963; M.S.C.E., West Virginia University, 1965; Ph.D., West Virginia University, 1967.

Peter A. Baldino, Jr., Associate Professor of Education: B.S., University of Bridgeport, 1955; M.S., University of Bridgeport, 1956; Ph.D., University of Illinois, 1968.

Samuel Floyd Barger, Associate Professor of Mathematics: B.S., Clarion State College, 1958; M.S., University of Minnesota, 1961; Ph.D., University of Minnesota, 1970.

David M. Behen, Professor of History: Ph.B., University of Chicago, 1932; Ph.D., University of Chicago, 1953.

Paul X. Bellini, Associate Professor of Civil Engineering: B.S., University of Massachusetts, 1962; M.S., University of Massachusetts, 1964; Ph.D., University of Massachusetts, 1968.

Martin E. Berger, Assistant Professor of History: B.A., Columbia University, 1964; M.A., University of Pittsburgh, 1965; Ph.D., University of Pittsburgh, 1969.

Frederick J. Blue, Associate Professor of History: B.A., Yale University, 1958; M.S., University of Wisconsin, 1962; Ph.D., University of Wisconsin, 1966.

Violet F. Boggess, Assistant Professor of Business Education and Secretarial Studies: B.S. in Ed., Kent State University, 1957; M.A., Ohio State University, 1961; Ph.D., Ohio State University, 1970.

Margaret A. Braden, Professor of Education: B.S. in Ed., Youngstown State University, 1949; M.Ed., University of Pittsburgh, 1950; Ph.D., University of Akron, 1971.

Dean Raymond Brown, Associate Professor of Mathematics: B.S., Rose Polytechnic Institute, 1960; M.S., Rensselaer Polytechnic Institute, 1964; M.S., Ohio State University, 1966; Ph.D., Ohio State University, 1970.

John J. Buoni, Associate Professor of Mathematics: B.S., St. Joseph's College, 1965; M.S., University of Pittsburgh, 1968; Ph.D., University of Pittsburgh, 1970.

Richard Lee Burden, Assistant Professor of Mathematics: B.A., Albion College, 1966; M.S., Case Western Reserve University, 1968; Ph.D., Case Western Reserve University, 1971.

John N. Cernica, Professor of Civil Engineering: B.E., Youngstown State University, 1954; M.S., Carnegie-Mellon University, 1955; Ph.D., Carnegie-Mellon University, 1957; P.E.

Marvin W. Chrisp, Professor of Education: B.A., University of Akron, 1950; M.A., University of Akron, 1956; Ed.D., Case Western Reserve University, 1961.

Edgar M. Cobett, Associate Professor of Education: B.S., St. Joseph's College, 1952; M.S., Indiana University, 1957; EdD., Case Western Reserve University, 1969.

Irwin Cohen, Professor of Chemistry: A.B., Western Reserve University, 1944; M.S., Western Reserve University, 1948; Ph.D., Western Reserve University, 1950.

Howard B. Cox, Associate Professor of Marketing: B.A., University of Rhode Island, 1959; M.B.A., Harvard University, 1961; Ph.D., Ohio State University, 1970.

Ralph G. Crum, Associate Professor of Civil Engineering: B.S., Carnegie Institute of Technology, 1953; M.S., Carnegie Institute of Technology, 1954; Ph.D., Carnegie Institute of Technology, 1956.

Arthur Ranger Curran, Associate Professor of Management: B.S., Boston University, 1948; M.B.A., Air Force Institute of Technology, 1959; Ph.D., Georgia University, 1970.

Paul E. Dalbec, Associate Professor of Physics and Astronomy: B.S., Boston College, 1957; M.S., University of Notre Dame, 1959; Ph.D., Georgetown University, 1966.

James W. DeGarmo, Jr., Associate Professor of Criminal Justice: B.S. in B.A., University of Pittsburgh, 1943; J.D., Cleveland-Marshall Law School, 1955.

Janet E. Del Bene, Associate Professor of Chemistry: B.S., Youngstown University, 1963; A.B., Youngstown University, 1965; Ph.D., University of Cincinnati, 1968.

Theodosius L. Demen, Associate Professor of Mathematics: University of Innsbruck, Austria, 1948-51; M.S., Marquette University, 1954; Ph.D., St. Louis University, 1958.

Jack H. Devletian, Assistant Professor of Chemical Engineering and Materials Science: B.S., University of Massachusetts, 1963; M.S., University of Wisconsin, 1966; Ph.D., University of Wisconsin, 1972.

Robert A. DiGiulio, Professor of Education: B.S., Lewis College, 1957; M.S., Northern Illinois University, 1962; Ph.D., Purdue University, 1969.

Thaddeus M. Dillon, Professor of Mathematics: B.S., John Carroll University, 1950; M.S., John Carroll University, 1952; Ph.D., University of Pittsburgh, 1963.

Lawrence DiRusso, Professor of Education: A.B., Youngstown State University, 1954; M.A., Kent State University, 1960; Ed.D., Western Reserve University, 1966.

Thomas N. Dobbelstein, Associate Professor of Chemistry: B.S., Eastern Michigan University, 1964; M.S., Iowa State University, 1966; Ph.D., Iowa State University, 1967.

Guido A. Dobbert, Professor of Sociology and Anthropology: M.A., University of Chicago, 1957; Ph.D., University of Chicago, 1965.

Leslie S. Domonkos, Professor of History: A.B., Youngstown State University, 1959; M.A., University of Notre Dame, 1960; M.M.S., University of Notre Dame, 1963; D.S.M., University of Notre Dame, 1966.

James E. Douglass, Associate Professor of Education: B.E., Youngstown State University, 1960; M.S., Westminster College, 1965; Ed.D., University of Akron, 1970.

George M. Drew, Professor of Education: A.B., Colorado State College, 1957; Ph.D., State University of Iowa, 1962.

Paul Richard Ducey, Associate Professor of Sociology and Anthropology: A.B., Columbia University, 1950; Ph.D., Columbia University, 1956.

Jack D. Dunsing, Associate Professor of Education: B.S., University of Pittsburgh, 1954; M.S., University of Pittsburgh, 1957; Ph.D., University of Pittsburgh, 1959.

Hugh G. Earnhart, Associate Professor of History: A.B., Bowling Green State University, 1960; M.A., University of Maryland, 1963.

John Douglas Faires, Associate Professor of Mathematics: B.S., Youngstown State University, 1963; M.S., University of South Carolina, 1965; Ph.D., University of South Carolina, 1970.

Fred C. Feitler, Assistant Professor of Education: B.A., Earlham College, 1962; M.Ed., University of Pittsburgh, 1964; M.S., Syracuse University, 1967; Ph.D., Syracuse University, 1970.

Dale W. Fishbeck, Assistant Professor of Biological Sciences: B.A., Yankton College, 1957; M.A., University of South Dakota, 1959; Ph.D., University of Minnesota, 1968.

Elmer Foldvary, Associate Professor of Chemistry: B.S., Youngstown State University, 1958; M.S., Texas A. and M. University, 1961; Ph.D., Texas A. and M. University, 1964.

Randolph N. Foster, Jr., Coordinator of Institutional Studies, B.M., University of Texas, 1942; M.M., University of Texas, 1947; Ed.D., George Peabody College for Teachers, 1959.

Robert Hull Foulkes, Jr., Associate Professor of Electrical Engineering: B.S.E.E., Case Institute of Technology, 1966; M.S.E.E., University of Southern California, 1968; Ph.D., Case Western Reserve University, 1970.

Saul S. Friedman, Associate Professor of History: B.A., Kent State University, 1959; M.A., Ohio State University, 1962; Ph.D., Ohio State University, 1969.

Carol Gay, Associate Professor of English: B.A., Youngstown University, 1954; M.A., Ohio State University, 1957; Ph.D., Kent State University, 1972.

Charles G. Gebelein, Associate Professor of Chemistry: B.A., Temple University, 1955; M.A., Temple University, 1959; Ph.D., Temple University, 1967.

Ronald L. Gould, Professor of Music: B.M., North Central College, 1954; S.M.M., Union Theological Seminary, 1956; S.M.D., Union Theological Seminary, 1970.

Martin A. Greenman, Professor of Philosophy and Religious Studies: B.A., University of Chicago, 1942; Ph.D., University of Chicago, 1950.

Philip J. Hahn, Professor of Economics: B.S., Juniata College, 1938; M.B.A., Harvard Graduate School of Business Administration, 1940; Ph.D., Case Western Reserve University, 1965.

Lawrence J. Haims, Assistant Professor of Education: B.A., University of Michigan, 1956; M.Ed., University of Pittsburgh, 1970; Ph.D., University of Pittsburgh, 1972.

Clyde T. Hankey, Professor of English: B.A., University of Pittsburgh, 1949; M.A., University of Pittsburgh, 1950; University of Michigan, 1954; Ph.D., University of Michigan, 1960.

Stephen Hanzely, Associate Professor of Physics and Astronomy: B.S., Kent State University, 1962; M.S., Toledo University, 1964; M.S., New Mexico State University, 1967; Ph.D., New Mexico State University, 1968.

Mary V. Hare, Professor of English: A.B., Mount Holyoke College, 1940; M.A., University of Virginia, 1951; Ph.D., University of Virginia, 1960.

Martin Helling, Assistant Professor of Mathematics: B.Sc., Ohio State University, 1956; M.Sc., University of Chicago, 1958; Ph.D., University of California at Berkeley, 1966.

James Thomas Henke, Associate Professor of English: B.A., Washington University, 1964; M.A., University of Missouri, 1966; Ph.D., University of Washington, 1970.

Louis E. Hill, Associate Professor of Education: B.S., State University of New York at Oswego, 1950; M.S., Syracuse University, 1953; Ed.D., Syracuse University, 1969.

Robert Elliott Hopkins, Professor of Music: B.M., Eastman School of Music of the University of Rochester, 1953; M.M., Eastman School of Music, 1954; D.M.A., Eastman School of Music, 1959.

Sally M. Hotchkiss, Associate Professor of Psychology: A.B., Randolph-Macon Woman's College, 1949; M.A., University of Minnesota, 1950; Ph.D., University of Minnesota, 1959.

Sanford N. Hotchkiss, Professor of Psychology: B.A., University of Minnesota, 1949; M.A., University of Minnesota, 1950; Ph.D., University of Minnesota, 1959.

James A. Houck, Assistant Professor of English: B.A., St. John's College, 1964; Ph.D., Duquesne University, 1971.

Michael K. Householder, Associate Professor of Civil Engineering: B.S., Valparaiso University, 1963; M.S., Purdue University, 1965; Ph.D., Purdue University, 1968.

Donald Eugene Hovey, Professor of Management: B.A., University of California at Los Angeles, 1950; M.A., University of Colorado, 1958; Ph.D., University of Colorado, 1962.

Pei Huang, Associate Professor of History: B.A., National Taiwan University, 1956; M.A., National Taiwan University, 1959; Ph.D., Indiana University, 1963.

Raymond W. Hurd, Associate Professor of Mathematics: B.S.Ed., Ohio University, 1951; M.Ed., Ohio University, 1957; Ph.D., Ohio State University, 1967.

Ronald W. Jonas, Associate Professor of Mathematics, Director of Planning: B.A., The University of Texas, 1958; Ph.D., The University of Texas, 1968.

Richard W. Jones, Associate Professor of Chemical Engineering and Materials Science: B.S., University of Missouri at Rolla, 1959; M.S., Rensselaer Polytechnic Institute, 1963; Ph.D., Northwestern University, 1968.

Vern L. Kagarice, Assistant Professor of Music: B.M., Bethany College, 1964; M.M., Indiana University, 1966.

James G. Karas, Associate Professor of Biological Sciences: B.S., University of Illinois, 1956; M.S., Michigan State University, 1958; Ph.D., Michigan State University, 1962.

John L. Kearns, Associate Professor of Industrial Engineering: B.A., University of Toronto, 1945; Ph.D., Iowa State University, 1954.

Jean McClure Kelty, Associate Professor of English: A.B., Youngstown University, 1958; M.A., Western Reserve University, 1959; Ph.D., Case Western Reserve University, 1969.

Taghi T. Kermani, Professor of Economics: LL.B., University of Tehran, 1949; M.A., University of Nebraska, 1953; Ph.D., University of Nebraska, 1959.

James W. Kiriazis, Professor of Sociology and Anthropology: A.B., Youngstown State University, 1951; M.S.W., Louisiana State University, 1953; Ph.D., University of Pittsburgh, 1967.

Joseph Kirschner, Associate Professor of Education: B.S., Tulane University, 1953; M.A.T., Tulane University, 1960; Ed.D., Rutgers, The State University, 1965.

Albert J. Klein, Associate Professor of Mathematics: B.S., Ohio State University, 1966; M.S., Ohio State University, 1967; Ph.D., Ohio State University, 1969.

Mervin Kohn, Associate Professor of Management: A.B., University of Missouri, 1937; M.S. in C., St. Louis University, 1953; Ph.D., St. Louis University, 1957.

Fredrich W. Koknat, Associate Professor of Chemistry: Diplom-Chemiker-Vorprufung, University of Giessen, 1959; Diplom-Chemiker, University of Giessen, 1963; Doktor der Naturwissenschaften, University of Giessen, 1965.

Steven L. Kozarich, Assistant Professor of Mathematics: B.S., Youngstown University, 1964; M.S., Michigan State University, 1966; Ph.D., Colorado State University, 1971.

Richard D. Kreutzer, Associate Professor of Biological Sciences: B.S., University of Illinois, 1963; M.S., University of Illinois, 1965; Ph.D., University of Illinois, 1968.

Rama Krishnan, Associate Professor of Management: B.A., Panjab University (India), 1958; B.S. in B.A., The American University, 1964; M.B.A., The American University, 1965; Ph.D., The American University, 1967.

Edward J. Largent, Jr., Assistant Professor of Music: B.S., Ohio State University, 1960; B.M., Ohio State University, 1963; M.M., University of Illinois, 1964; Ph.D., Ohio State University, 1973.

Abdul B. Lateef, Assistant Professor of Criminal Justice: B.S., Punjab University Lahore, 1959; M.S., Punjab University Lahore, 1961; Ph.D., Newcastle University, 1966.

Glorianne M. Leck, Associate Professor of Education: B.S., University of Wisconsin, 1963; M.S., University of Wisconsin, 1966; Ph.D., University of Wisconsin, 1968.

George E. Letchworth, Assistant Professor of Psychology: A.B., Bucknell University, 1956; A.M., University of Pennsylvania, 1958; Ph.D., University of Pennsylvania, 1963.

Yih-wu Liu, Associate Professor of Economics: B.A., National Taiwan University, 1957; M.B.A., City College of New York, 1963; Ph.D., Southern Illinois University, 1968.

Lawrence E. Looby, Special Assistant to the President: B.A., Michigan State University, 1958; M.A., Michigan State University, 1962; Ph.D., University of Nebraska, 1967.

Charles M. Lovas, Associate Professor of Mechanical Engineering: B.S.M.E., University of Akron, 1961; M.S.M.E., University of Notre Dame, 1963; Ph.D., University of Notre Dame, 1968.

Joseph R. Lucas, Professor of Philosophy and Religious Studies: A.B., University of Scranton, 1938; M.A., S.T.B., S.T.L., University of Ottowa, 1943-7; M.A., Kent State University, 1950; J.C.B., J.C.L., J.C.D., Lateran University, Rome, 1958-62; J.D., Youngstown State University, 1957; S.T.D., Angelicum University of Rome, 1952; Ph.D., University of Ottowa, 1951.

Marvin Lukin, Associate Professor of Chemistry: B.S., Ohio University, 1949; M.S., Case Western Reserve University, 1954; Ph.D., Case Western Reserve University, 1956.

David B. MacLean, Assistant Professor of Biological Sciences: B.S., Heidelberg College, 1963; M.S., Purdue University, 1965; Ph.D., Purdue University, 1968.

Inally Mahadeviah, Professor of Chemistry: B.Sc. (Hons), University of Mysore, 1950; M.Sc., University of Mysore, 1954; Ph.D., University of Cincinnati, 1963.

Donald Henry Mathews, Jr., Associate Professor of Marketing: B.B.A., Baylor University, 1958; M.B.A., Southern Methodist University, 1960; Ph.D., Union Graduate School, 1973.

Gus Mavrigian, Professor of Mathematics: B.S., Carnegie Institute of Technology, 1950; M.S., Carnegie Institute of Technology, 1954; M.S., Carnegie Institute of Technology, 1970; Ph.D., University of Akron, 1974.

Hugh Thomas McCracken, Associate Professor of English: B.S., State University of New York, 1958; M.S., State University of New York, 1962; M.A., Middlebury College, 1965; Ph.D., University of Illinois, 1971.

Donald E. McLennan, Professor of Physics and Astronomy: B.A., University of Western Ontario, 1941; M.A., University of Toronto, 1948; Ph.D., University of Toronto, 1950.

Howard D. Mettee, Associate Professor of Chemistry: B.A., Middlebury College, 1961; Ph.D., University of Calgary, 1964.

Thelma S. Miner, Professor of English: B.A., Dickinson College, 1935; M.A., University of Pennsylvania, 1942; Ph.D., University of Pennsylvania, 1945.

Ward L. Miner, Professor of English: B.A., University of Colorado, 1938; M.A., University of Chicago, 1940; Ph.D., University of Pennsylvania, 1951.

William D. Moorhead, Jr., Associate Professor of Physics and Astronomy: B.A., Ohio Wesleyan University, 1958; Ph.D., Ohio State University, 1968.

Jon M. Naberezny, Professor of Art: B.S. in Ed., Youngstown State University, 1949; M.A., State University of Iowa, 1952.

Robert T. Nickelsburg, Associate Professor of Education: B.A., Valparaiso University, 1957; M.A., University of Denver, 1961; M.S., University of Denver, 1965; Ed.D., University of Northern California, 1970.

Pietro J. Pascale, Assistant Professor of Education: B.A., Seton Hall University, 1960; M.A., Seton Hall University, 1964; Ed.D., Rutgers University, 1971.

Edwin R. Pejack, Professor of Mechanical Engineering: B.M.E., Rensselaer Polytechnic Institute, 1961; M.S., Rensselaer Polytechnic Institute, 1962; Ph.D., Ohio State University, 1967.

Paul C. Peterson, Associate Professor of Biological Sciences: B.S., Gustavus Adolphus College, 1962; Ph.D., University of Nebraska, 1968.

Joan A. Philipp, Associate Professor of Health and Physical Education: B.S., Western Michigan University, 1952; M. of P.E., Macmurray College, 1953; Ph.D., University of Michigan, 1967.

Richard C. Phillips, Associate Professor of Chemistry: B.A., Oklahoma State University, 1959; M.S., Florida State University, 1962; Ph.D., University of Texas, 1966.

C. Wade Raridon, Associate Professor of Music: B.A. and M.A., Iowa University, 1953-57; D.M.A., University of Iowa, 1972.

James A. Reeder, Assistant Professor of Chemistry: B.S., University of Kansas, 1954; Ph.D., University of Colorado, 1959.

Charles Lloyd Reid, Associate Professor of Philosophy and Religious Studies: B.A., Bethel College, 1951; M.A., Duke University, 1954; Ph.D., Duke University, 1960.

Ronald James Richards, Associate Professor of Education: B.A., Southern Illinois University, 1962; M.S. Ed., Southern Illinois University, 1965; Ph.D., Southern Illinois University, 1970.

Victor A. Richley, Professor of Engineering Technology: B.E., Youngstown State University, 1956; M.S.E.E., University of Akron, 1961; Ph.D., University of Pittsburgh, 1967; P.E.

Lewis B. Ringer, Associate Professor of Health and Physical Education: B.S., Springfield College, 1956; M.S., West Virginia University, 1962; D.P.E., Springfield College, 1966.

Sidney I. Roberts, Professor of History: B.S.Ed., The City College of New York, 1952; M.A., Columbia University, 1953; Ph.D., Northwestern University, 1960.

Juanita G. Roderick, Associate Professor of Education: B.S. in Ed., Youngstown State University, 1960; M.S. in Ed., Westminster College, 1963; Ph.D., University of Akron, 1972.

James P. Ronda, Associate Professor of History: B.A., Hope College, 1965; M.A., University of Nebraska, 1967; Ph.D., University of Nebraska, 1969.

Lewis S. Rosenthal, Associate Professor of English: B.A., Colgate University, 1949; M.A., Auburn University, 1954; Ph.D., Louisiana State University, 1968.

Duane Foster Rost, Associate Professor of Electrical Engineering: B.S., Iowa State University, 1962; M.S., Iowa State University, 1967; Ph.D., Iowa State University, 1970.

Dean S. Roussos, Associate Professor of Marketing: B.Sc., State University of Iowa, 1958; M.S., State University of Iowa, 1960; Ph.D., State University of Iowa, 1970.

Duane Sample, Professor of Music: B.F.A., Carnegie-Mellon University, 1950; M.Ed., University of Pittsburgh, 1953; Ed.D., Columbia University, 1964.

Eugene S. Santos, Professor of Mathematics: B.S.M.E., Mapua Institute of Technology, 1961; M.Sc., University of the Philippines, 1963; Ph.D., The Ohio State University, 1965.

Lowell J. Satre, Associate Professor of History: B.A., Augustana College, 1964; M.A., Ph.D., University of South Carolina, 1968.

Steven M. Schildcrout, Associate Professor of Chemistry: B.S., University of Chicago, 1964; Ph.D., Northwestern University, 1967.

George H. Schoenhard, Professor of Education: A.B., Youngstown State University, 1936; Litt.M., University of Pittsburgh, 1939; Ed.D., University of Pittsburgh, 1957.

Lauren Schroeder, Associate Professor of Biological Sciences: B.S., St. Cloud State College, 1960; M.A., University of South Dakota, 1964; Ph.D., University of South Dakota, 1968.

Robert H. Secrist, Associate Professor of English: A.B., Harvard University, 1957; M.A., New York University, 1959; Ph.D., New York University, 1965.

Frank J. Seibold, Associate Professor of Advertising and Public Relations: B.A., Long Island University, 1956; M.S., Long Island University, 1960; Ph.D., Yeshiva University, 1969.

Henry P. Sheng, Associate Professor of Chemical Engineering and Materials Science: B.S., University of Maine, 1954; M.S., Purdue University, 1958; Ph.D., University of California, 1968.

Thomas A. Shipka, Associate Professor of Philosophy and Religious Studies: A.B., John Carroll University, 1966; Ph.D., Boston College, 1969.

Raymond J. Shuster, Associate Professor of Management: B.S. in B.A., Wayne State University, 1965; M.B.A., Wayne State University, 1967; Ph.D., Michigan State University, 1971.

Matthew Siman, Professor of Electrical Engineering: B.S. in E.E., Case Institute of Technology, 1949; M.S. in E.E., Case Institute of Technology, 1956; Ph.D., University of Pittsburgh, 1970.

Alvin W. Skardon, Jr., Professor of History: A.B., College of Charleston, 1933; M.A., University of Chicago, 1947; Ph.D., University of Chicago, 1960.

Morris Slavin, Professor of History: B.S. in Ed., Ohio State University, 1938; M.A., University of Pittsburgh, 1952; Ph.D., Western Reserve University, 1961.

Agnes M. Smith, Associate Professor of History: A.B., Hiram College, 1940; M.A., West Virginia University, 1945; Ph.D., Western Reserve University, 1966.

Charles L. Smith, Associate Professor of Education: B.S., University of Louisville, 1947; M.A., Ohio State University, 1950; Ed.D., Case Western Reserve University, 1968.

Francis W. Smith, Associate Professor of Chemistry: B.Sc., University of Capetown, 1952; B.Sc., Honours, University of Capetown, 1954; Ph.D., University of Capetown, 1967.

Robert K. Smith, Associate Professor of Chemistry: B.S., University of Massachusetts, 1950; M.S., University of Massachusetts, 1950; Ph.D., University of Wyoming, 1966.

Gerald E. Smolen, Associate Professor of Accounting and Finance: B.S., Ohio State University, 1963; M.S., University of Tennessee, 1971; Ph.D., University of Tennessee, 1971.

Stephen L. Sniderman, Associate Professor of English: B.A., Michigan State University, 1964; M.A., University of Michigan, 1965; Ph.D., University of Wisconsin, 1970.

Anthony E. Sobota, Associate Professor of Biological Sciences: B.S.Ed., Indiana University of Pa., 1960; M.S., University of Pittsburgh, 1963; Ph.D., University of Pittsburgh, 1966.

Marilyn Solak, Associate Professor of Education: A.B., Mount Union College, 1947; M.Ed., Kent State University, 1950; Ed.D., Case Western Reserve University, 1963.

Joseph Solimine, Jr., Associate Professor of English: B.A., Brown University, 1956; M.A., University of Rhode Island, 1959; Ph.D., University of Pennsylvania, 1964.

Leonard B. Spiegel, Professor of Chemistry: B.A., New York University, 1950; M.S., Florida State University, 1954; Ph.D., Florida State University, 1963.

Arthur G. Spiro, Associate Professor of Music: B.A., University of Minnesota, 1951; M.A., University of Minnesota, 1953; Ph.D., Boston University, 1961.

James D. Steele, Associate Professor of Education: B.S., Kent State University, 1949; M.E., Kent State University, 1952; Ph.D., Ohio University, 1967.

Elizabeth Sterenberg, Professor of Political Science: A.B., Knox College, 1929; A.M., Radcliffe College, 1932; Ph.D., University of Chicago, 1963.

Anthony H. Stocks, Professor of Economics: B.A., San Jose State College, 1953; M.A., Syracuse University, 1956; Ph.D., State University of New York at Buffalo, 1963.

B. Subramanian, Assistant Professor of Mathematics: B.A., Annamalai University (India), 1947; M.Sc., Andhra University (India), 1951; Ph.D., Lehigh University, 1968.

William O. Swan, Associate Professor of Education: B.S. in Ed., Youngstown State University, 1950; M.S. in Ed., Westminster College, 1952; Ph.D., University of Pittsburgh, 1965.

Calvin J. Swank, Associate Professor of Criminal Justice: A.A., Palm Beach Jr. College, 1968; B.S., Florida State University, 1970; M.S., Michigan State University, 1971; Ph.D., Michigan State University, 1972.

Christopher J. Sweeney, Professor of Psychology: A.B., Boston College, 1964; M.Ed., Northeastern University, 1966; Ph.D., University of Oklahoma, 1968.

Leslie V. Szirmay, Associate Professor of Chemical Engineering and Materials Science: M.S., University of Detroit, 1962; M.E., Iowa State University, 1967; Ph.D., Denver University, 1969.

Frank J. Tarantine, Professor of Mechanical Engineering: B.E., Youngstown State University, 1957; M.S., University of Akron, 1961; Ph.D., Carnegie-Mellon University, 1965; P.E.

Dumitru Teodorescu, Professor of Management: B.S., National College, 1928; M.L., Bucharest State University, 1931; Ph.D., Bucharest State University, 1940; M.L.S., Case Western Reserve University, 1957.

Sara T. Throop, Assistant Professor of Education: B.A., Case Institute of Technology, 1948; M.A., Westminster College, 1951; Ed.D., University of Akron, 1971.

James R. Toepfer, Associate Professor of Biological Sciences: B.A., Kent State University, 1963; M.A., Kent State University, 1965; Ph.D., Kent State University, 1968.

Clyde V. Vanaman, Professor of Education: B.S., Mt. Union College, 1942; M.Ed., Kent State University, 1950; B.A., Youngstown State University, 1953; Ed.D., Case Western Reserve University, 1962.

John D. Van Norman, Associate Professor of Chemistry: B.S., University of Rochester, 1955; Ph.D., Rensselear Polytechnic Institute, 1960.

Paul D. Van Zandt, Professor of Biological Sciences: A.B., Greenville College, 1952; M.S., University of Illinois, 1953; M.S.Ph., University of North Carolina, 1955; Ph.D., University of North Carolina, 1960.

Donald E. Vogel, Professor of Music: B.M., Indiana University, 1953; M.Mus., Indiana University, 1956; Ed.D., Columbia University, 1966.

Peter W. von Ostwalden, Associate Professor of Chemistry: Doctorandum University of Graz, Austria, 1950; M.A., Columbia University, 1954; Ph.D., Columbia University, 1958.

Mark F. Walker, Professor of Music: B.M., Butler University, 1940; M.Mus., Butler University, 1949; Ph.D., Indiana University, 1955.

Dwight G. Watkins, Associate Professor of Education: B.A., University of Cincinnati, 1949; M.A., University of Cincinnati, 1950; Ed.D., University of Cincinnati, 1966.

John J. Yemma, Associate Professor of Biological Sciences: B.S. in Ed., Youngstown State University, 1961; M.A., George Peabody College for Teachers, 1965; Ph.D., Pennsylvania State University, 1971.

Ralph E. Yingst, Associate Professor of Chemistry: A.B., University of Chicago, 1950; B.S., Lebanon Valley College, 1955; Ph.D., University of Pittsburgh, 1964.

Luke N. Zaccaro, Professor of Mathematics: B.A., University of Connecticut, 1949; M.S., University of Connecticut, 1950; Ph.D., Syracuse University, 1957.

By virtue of their position as the chairmen of departments which offer graduate programs, the following persons are also senior members of the Graduate Faculty:

Robert E. Arnold, Assistant Professor of Accounting and Finance: B.S., Miami University, 1968; M.A., Gannon College, 1971.

Barbara H. Brothers, Assistant Professor of English: B.A., Kent State University, 1958; M.A., Case Western Reserve University, 1962; Ph.D., Kent State University, 1973.

Donald W. Byo, Associate Professor of Music: B.M., Youngstown State University, 1954; M.Ed., Kent State University, 1959.

Frank A. D'Isa, Professor of Mechanical Engineering: B.S., Youngstown College, 1943; M.S., Carnegie Institute of Technology, 1947; Ph.D., University of Pittsburgh, 1960.

Erwin M. Evans, Associate Professor of Accounting and Finance: B.S. in B.A., Youngstown State University, 1953; M.B.A., Case Western Reserve University, 1960.

M. Dean Hoops, Associate Professor of Education: B.S.E., Kent State University, 1959; M.S., University of Michigan, 1961; Ph.D., University of Michigan, 1969.

Raymond Edward Kramer, Associate Professor of Electrical Engineering: B.S., Heidelberg College, 1943; M.S., Case Institute of Technology, 1950.

Emily Parker Mackall, Professor of Economics: B.A., Westminster College, 1934; M.A., Northwestern University, 1935.

Tadeusz K. Slawecki, Professor of Chemical Engineering and Materials Science: B.S., University of Illinois, 1943; M.S., University of Pennsylvania, 1948; Ph.D., University of Pennsylvania, 1952.

Associate Members

Joseph P. Altinger, Assistant Professor of Mathematics: B.S., University of Dayton, 1956; M.S., University of Pittsburgh, 1960; Ph.D., Case Western Reserve University, 1969.

Lawrence E. Amadi, Assistant Professor of History: B.A., Southwest Baptist College, 1967; M.A., University of Missouri, 1970; Ph.D., University of Missouri, 1972.

Donald R. Arnett, Assistant Professor of Mechanical Engineering: B.E., Youngstown State University, 1963; M.S., in M.E., University of Pittsburgh, 1967.

Joseph Babisch, Associate Professor of Art: B.S., Buffalo State University, 1956; M.A., Kent State University, 1963; M.E., Westminster College, 1964.

William Otto Barsch, Associate Professor of Mechanical Engineering Technology: B.S.M.E., Purdue University, 1965; M.S.M.E., Purdue University, 1966; Ph.D., Purdue University, 1970.

Josephine T. Beckett, Associate Professor of Education: B.S. in Ed., Youngstown State University, 1958; M.S. in Ed., Westminster College, 1962.

Paul E. Beckman, Professor of Psychology: A.B., Youngstown State University, 1950; M.A., Ohio State University, 1952; Ph.D., State University of Iowa, 1955.

Richard H. Bee, Assistant Professor of Economics: B.S. in B.A., Pennsylvania State University, 1964; M.A., Pennsylvania State University, 1967.

George D. Beelen, Assistant Professor of History: A.B., Youngstown State University, 1958; M.A., Western Reserve University, 1962; Ph.D., Kent State University, 1971.

Richard R. H. Bennett, Jr., Associate Professor of Criminal Justice: B.A., Randolph-Macon College, 1968; M.S., Florida State University, 1970.

Dennis D. Bensinger, Assistant Professor of Accounting and Finance: B.S. in B.A., Youngstown State University, 1967; M. Acc., Ohio State University, 1968.

William C. Binning, Assistant Professor of Political Science: B.A., St. Anselm's College, 1966; Ph.D., Notre Dame University, 1970.

Mary Alice Budge, Associate Professor of English: B.A., Drew University, 1962; Ph.D., State University of New York at Buffalo, 1970.

Jerome Bunnag, Assistant Professor of English: B.A., Abilene Christian College, 1960; M.A., University of Texas, 1965; Ph.D., University of Texas, 1967.

M. Don Carriker, Assistant Professor of Education: B.M.E., Wichita State University, 1957; M.A., Wichita State University, 1968; Ph.D., Kansas State University, 1972.

Frank A. Ciotola, Associate Professor of Mathematics: A.B., Youngstown State University, 1952; M.A., The Pennsylvania State University, 1957.

David W. Cliness, Assistant Professor of Education: A.B., University of Kentucky, 1961; M.A., University of Kentucky, 1965; Ph.D., Ohio State University, 1973.

Mikal R. Cohen, Instructor in Education: B.A., State University of New York at Buffalo, 1968; M.A., York University, 1970.

William R. Convery, Assistant Professor of Education: B.A., New Mexico Western College, 1962; M.A., Western New Mexico University, 1963; Ed.D., University of Wyoming, 1970.

Thomas Arthur Copeland, Assistant Professor of English: A.B., Oberlin College, 1966; M.A., Northwestern University, 1967; Ph.D., Northwestern University, 1971.

Anthony DeRosa, Instructor in Education: Ph.D., Duquesne University, 1967.

William J. Doll, Assistant Professor of Management: B.S. in B.A., Kent State University, 1966; M.B.A., Kent State University, 1968; D.B.A., Kent State University, 1973.

Wade C. Driscoll, Assistant Professor of Industrial Engineering: B.S., Pennsylvania State University, 1963; M.S., New York University, 1965; Ph.D., Case Western Reserve University, 1972.

Christine Rhoades Dykema, Professor of Foreign Languages: A.B., Barnard College, Columbia University, 1932; M.A., Western Reserve University, 1951.

Winston H. Eshleman, Associate Professor of Education: B.A., Stanford University, 1948; M.A., Stanford University, 1953; Ed.D., University of Arizona, 1967.

Don Feigenbaum, Assistant Professor of Criminal Justice: B.A., Western Reserve University, 1967; J.D., University of Toledo, 1970; LL.M., New York University, 1971.

Ilajean Feldmiller, Associate Professor of Home Economics: B.S., The Pennsylvania State University, 1945; M.S., The Ohio State University, 1952; Ph.D., The Ohio State University, 1970.

Dorothy A. Fischer, Assistant Professor of Education: B.S., Kent State University, 1965; M.Ed., Kent State University, 1968.

Robert E. Fleming, Associate Professor of Music: A.B., Marshall University, 1953; M.A., Marshall University, 1956.

Gary Frederic Fry, Assistant Professor of Sociology and Anthropology: B.A., University of Denver, 1965; M.A., University of Utah, 1968; Ph.D., University of Utah, 1970.

Alfonso L. Garcia, Associate Professor of Foreign Languages: A.B., Champagnat College, 1928; Doctor en Leyes, Universidad Nacional, 1944; Diplomado en Filologica Hispanica, 1951.

Stephen A. Graf, Assistant Professor of Psychology: A.B., Miami University, 1965; M.A., Ohio State University, 1968; Ph.D., Ohio State University, 1971.

Aili J. Hakojarvi, Associate Professor of Home Economics: B.Sc., The Ohio State University, 1941; M.Sc., Case Western Reserve University, 1950; Ed.D., Teachers College, Columbia University, 1969.

Wilbert M. Hammack, Associate Professor of Education: B.S. in Ed., Kent State University, 1939; M.Ed., University of Pittsburgh, 1950; Ph.D., University of Akron, 1971.

Ann G. Harris, Assistant Professor of Geology: B.S., Kent State University, 1956; M.S., Miami University, 1958.

C. Earl Harris, Jr., Associate Professor of Geology: B.S., Kent State University, 1957; M.S., Miami University, 1958.

Thomas C. Herndon, Assistant Professor of Engineering Technology: B.S., University of Kentucky, 1954; M.C.S., Texas A & M University, 1969; Ph.D., Texas A & M University, 1971.

Dorothy M. Hille, Assistant Professor of Business Education and Secretarial Studies: B.S. in B.A., Marquette University, 1937; M.B.A., Kent State University, 1971.

George M. Homer, Instructor in Chemistry: B.A., Ohio State University, 1948; M.S., University of Colorado, 1950; Ph.D., Ohio State University, 1958.

Lois M. Hopkins, Associate Professor of Music: B.M., Morningside College, 1948; M.M., Eastman School of Music, 1949.

Dorothy A. Hwopek, Assistant Professor of English: B.A., DePaul University, 1963; M.A., DePaul University, 1969; Ph.D., University of Illinois, 1971.

William D. Jenkins, Assistant Professor of History: B.S., Loyola College, 1963; M.A., Case Western Reserve University, 1964; Ph.D., Case Western Reserve University, 1969.

Assad Saied Kassees, Assistant Professor of Sociology and Anthropology: B.A., University of Delaware, 1962; M.S.W., University of North Carolina, 1965; Ph.D., Florida State University, 1970.

Ikram Ullah Khawaja, Associate Professor of Geology: B.S., University of Karachi (Pakistan), 1962; M.S., University of Karachi, 1963; M.S., Southern Illinois University, 1967; Ph.D., Indiana University, 1968.

Leland W. Kanuf, Assistant Professor of Mathematics: B.S. in Ed., Kent State University, 1956; M.Ed., Kent State University, 1957.

Joseph J. Koss, Assistant Professor of Economics: B.S., University of Pennsylvania, 1948; M.A., University of Pennsylvania, 1951.

George P. Kulchycky, Associate Professor of History: B.S., Kent State University, 1964; M.A., John Carroll University, 1966; Ph.D., Georgetown University, 1969.

Virgil Robert Lang, Associate Professor of Advertising and Public Relations: B.S., John Carroll University, 1950; M.A., Western Reserve University, 1963; Ph.D., St. John's University, 1968.

George Levitsky, Instructor in Education: A.B., Youngstown State University, 1954; M.S. in Ed., Youngstown State University, 1973.

Paul Earl Liber, Assistant Professor of Marketing: B.S. in B.A., Ohio State University, 1940; M.B.A., Kent State University, 1962.

Renee D. Linkhorn, Associate Professor of Foreign Languages: B.S., University of Liege, 1946; M.A., University of Connecticut, 1960; Docteur en Philosophic et Lettres, University of Liege, Belgium, 1972.

Gordon E. Longmuir, Assistant Professor of Health and Physical Education: B.S. in Ed., University of North Dakota, 1966; M.S., University of North Dakota, 1967; Ed.D., University of New Mexico, 1972.

Mary B. Loud, Assistant Professor of Foreign Languages: B.A., University of Wisconsin, 1964; M.A., University of North Carolina, 1967; Ph.D., University of Kentucky, 1970.

Russell Allen Maddick, Associate Professor of Art: B.A., Youngstown University, 1964; M.F.A., Ohio State University, 1966.

Richard M. Magner, Associate Professor of Accounting and Finance: B.S. in B.A., Indiana University of Pennsylvania, 1952; M.S. in Educ., Westminster College, 1957; C.P.A., 1970.

Joseph May, Assistant Professor of History: A.B., Wheaton College, 1957; M.A., Kent State University, 1966; Ph.D., Kent State University, 1969.

Walter Mayhall, Assistant Professor of Music: B.M., Cleveland Institute of Music, 1968.

Joseph D. McKay, Instructor in Education: B.S., Rio Grande College, 1958; M.Ed., Ohio University, 1962; Ph.D., University of Akron, 1974.

Jagdish C. Mehra, Associate Professor of Economics: B.A., Rajasthan University, 1955; M.A., Rajasthan University, 1957; Ph.D., State University of New York at Buffalo, 1969.

Margarita W. Metzger, Associate Professor of Foreign Languages: B.A., University of Mississippi, 1941; M.A., University of Mississippi, 1942; Licenciada en Letras, University of San Carlos (Guatemala), 1949.

Donald J. Milley, Assistant Professor of Economics: B.A., State University of New York at Buffalo, 1967; Ph.D., State University of New York at Buffalo, 1974.

Brendan P.J. Minogue, Assistant Professor of Education: B.A., Cathedral College, 1967; M.A., Ohio State University, 1970; Ph.D., Ohio State University, 1974.

Richard C. Mitchell, Associate Professor of Art: B.F.A., Illinois Wesleyan University, 1962; M.F.A., Ohio University, 1964.

Edward Mooney, Jr., Associate Professor of Physics and Astronomy: B.S., Youngstown State University, 1964; M.S., Cornell University, 1966; Ph.D., Virginia Polytechnic Institute, 1971.

Floyd E. Morris, Assistant Professor of Mechanical Engineering: B.S., Stanford University, 1959; M.S., University of Washington, 1964; Ph.D., Iowa State University, 1971.

Loyal B. Mould, Assistant Professor of Art: B.S., Youngstown State University, 1951; M.A., Kent State University, 1967.

Philip C. Munro, Assistant Professor of Electrical Engineering: B.S.E.E., Washington University, 1960; M.S., Washington University, 1964; Ph.D., Purdue University, 1973.

William J. Nichols, Associate Professor of Education: Th.B., Nazarene Theological Seminary; M.S., Indiana University, 1963; EdD., Ball State University, 1968.

Esther P. Niemi, Associate Professor of Economics: B.S. in B.A., Youngstown State University, 1956; M.A., Case Western Reserve University, 1958; Ph.D., Case Western Reserve University, 1969.

Esotto Pellegrini, Associate Professor of Music: Mus.B., Youngstown State University, 1950; M.A., Kent State University, 1966.

Lee T. Peterson, Assistant Professor of Education: B.S., Nebraska State Teachers College, 1960; M.Ed., University of Nebraska, 1966; Ed.D., University of Massachusetts, 1972.

John E. Petrek, Associate Professor of Mechanical Engineering: B.S.M.E., Oregon State University, 1945; M.S. in Engr., University of Akron, 1962.

Gary L. Pilcher, Assistant Professor of Criminal Justice: A.B. Youngstown State University, 1970; J.D. Rutgers Law School, 1973.

Peggy O. Potts, Instructor in Business Education and Secretarial Studies: B.S. in Ed., Youngstown State University, 1961; M.S. in Ed., Youngstown State University, 1972.

Samuel Purdy, Instructor in Chemical Engineering and Materials Science: B.S. in E., Lehigh University, 1948.

Arthur E. Rappoport, Instructor in Chemistry: B.S., New York University, 1932; M.D., Hamburg University, 1936.

Francis S. Redburn, Assistant Professor of Political Science: B.A., Pennsylvania State University, 1966; Ph.D., University of North Carolina, 1970.

John F. Ritter, Assistant Professor of Civil Engineering: B.E., Youngstown State University, 1962; M.S., Carnegie-Mellon University, 1964.

Hassan A. Ronaghy, Associate Professor of Economics: B.S., University of Shiraz, 1958; M.S., Southern Illinois University, 1962; Ph.D., University of Wisconsin, 1969.

Eugene Edward Schneider, Assistant Professor of Accounting and Finance: B.S. in B.A., Youngstown College, 1948; M.B.A., Kent State University, 1966.

Dorothy M. Scott, Assistant Professor of Education: A.B., Webster College, 1951; M.Ed., St. Louis University, 1967; Ph.D., St. Louis University, 1970.

Terrence J. Shidel, Instructor in Criminal Justice: A.B., Youngstown State University, 1971; M.A., Washington State University, 1972.

Charles R. Singler, Associate Professor of Geology: B.S., City College of New York, 1963; M.S., University of Nebraska, 1965; Ph.D., University of Nebraska, 1969.

Samuel J. Skarote, Associate Professor of Electrical Engineering: B.E.E., Ohio State University, 1960; M.S.E.E., Ohio State University, 1965.

William B. Slocum, Associate Professor of Music: B.F.A., University of New Mexico, 1959; M.M., University of New Mexico, 1965.

John W. Smythe, Assistant Professor of Economics: B.A., Youngstown State University, 1960; M.A. Northwestern University, 1965; Ph.D., University of Nebraska, 1973.

Robert J. Sorokach, Assistant Professor of Industrial Engineering: B.E., Youngstown State University, 1961; M.S.E., University of Akron, 1964.

Robert J. Stanko, Assistant Professor of Criminal Justice: B.A., Youngstown State University, 1963; M.A., University of Akron, 1970.

David E. Starkey, Assistant Professor of Music: B.M., Indiana University, 1957; M.M., Indiana University, 1958.

John A. Stevens, Associate Professor of Chemical Engineering and Materials Science: B.S., Providence College, 1943; M.S., University of Cincinnati, 1948; Ph.D., University of Cincinnati, 1951.

H.E.W. Nicholas Sturm, Assistant Professor of Biological Sciences: B.S., West Virginia Wesleyan College, 1952; M.S., Purdue University, 1954.

Robert F. Tamburro, Instructor in Biological Sciences: B.S., Youngstown State University, 1956; M.S., Columbia University, 1958.

Gloria D. Tribble, Assistant Professor of Education: B.S. in Ed., Youngstown State University, 1958; M.Ed., Kent State University, 1964; Ph.D., University of Akron, 1973.

Larry K. Truzzi, Instructor in Guidance, Counseling and Pupil Personnel: B.S.Ed., Kent State University, 1960; M.Ed., Kent State University, 1962.

John R. Turk, Assistant Professor of Music: B.M.E., Baldwin-Wallace College, 1967; M.M., Indiana University, 1971.

L. Allen Viehmeyer, Assistant Professor of Foreign Languages: B.S. in Ed., Western Illinois University, 1964; A.M., University of Illinois, 1967; Ph.D., University of Illinois, 1971.

Elizabeth M. Watkins, Assistant Professor of Psychology: B.A., University of Cincinnati, 1947; M.A., University of Cincinnati, 1948; B.Ed., University of Cincinnati, 1949; Ed.D., University of Cincinnati, 1966.

John R. White, Assistant Professor of Sociology and Anthropology: A.A., City College of San Francisco; B.A., San Francisco State College, 1963; M.A., University of Oregon, 1969; Ph.D., University of Oregon, 1974.

Leonard Anthony Whitney, Assistant Professor of Health and Physical Education: B.S. in Ed., Youngstown University, 1962; M.S. in P.E., Springfield College, 1963; Ph.D., Ohio State University, 1970.

John Wilkinson, Assistant Professor of English: B.A., University of Hull, England, 1964; Ph.D., State University of New York at Buffalo, 1970.

Barbara L. Wright, Assistant Professor of Health and Physical Education: B.S., Kent State University, 1967; M.Ed., Kent State University, 1969.

Jerome E. Zetts, Assistant Professor of Accounting and Finance: B.S. in B.A., Youngstown State University, 1965; M.B.A., Wayne State University, 1966.

Robert L. Zorn, Instructor in Education: B.S. in Ed., Kent State University, 1959; M.Ed., Westminster College, 1964; Ph.D., University of Pittsburgh, 1970.

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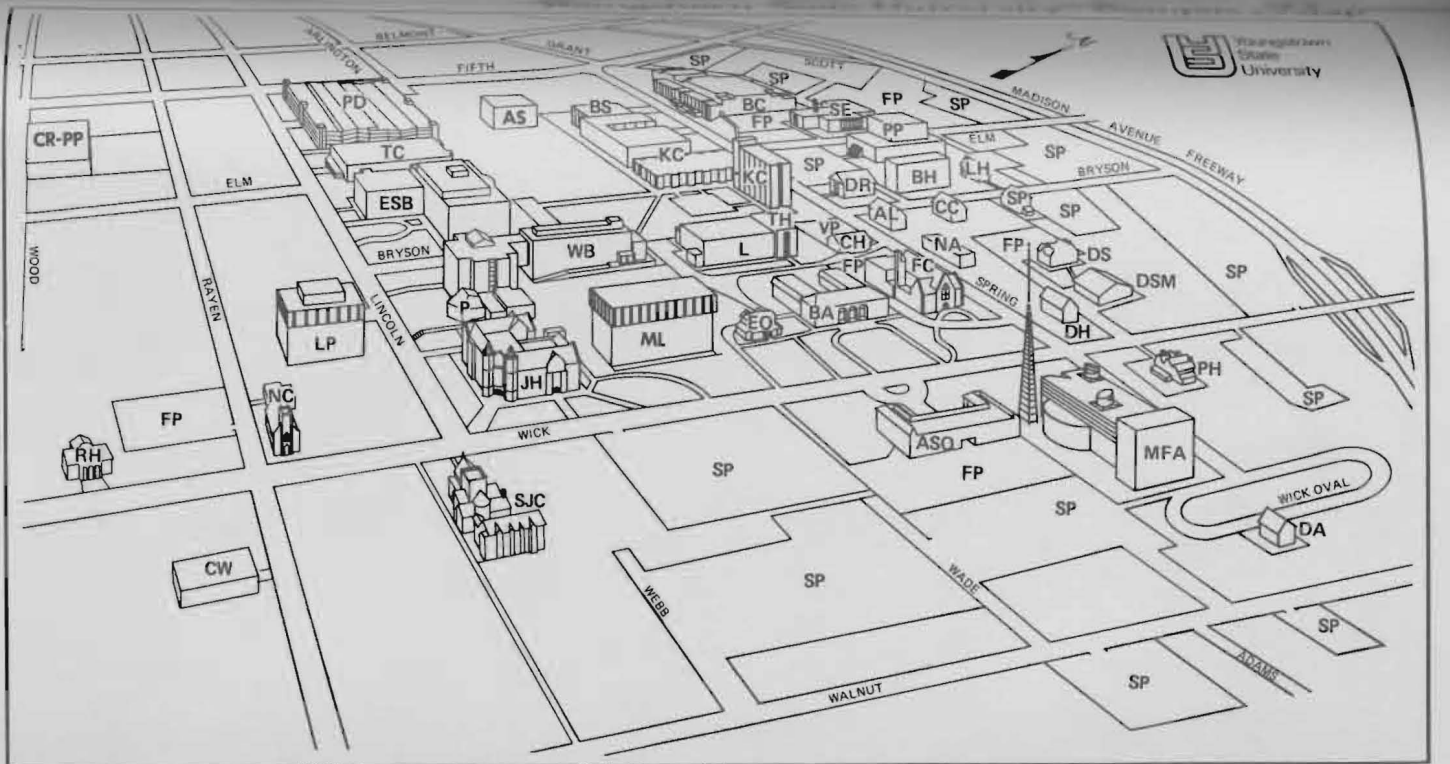

LEGEND

AL – Animal Laboratory
AS – Arts & Sciences Classroom Bldg.
ASO – Arts & Sciences Offices

BA – Butler Art Institute
BC – Beeghley Phys. Ed. Center
BH – Buechner Hall

CC – Counseling Center
CH – Central Hall
CR-PP – Central Receiving-Phys. Plant
CW – Clingan-Waddell Hall

DA – Dana Annex
DH – Disciple House
DR – Dana Recital Hall
DS – Dana Studio
DSM – Dana School of Music

ESB – Engineering Science Bldg.

FC – First Christian Church

JH – Jones Hall

KC – Kilcawley Center

L – University Library
LH – Linder House
LP – Lincoln Project

MFA – Music & Fine Arts Bldg.

NA – North Annex
NC – Newman Center

P – Planetarium
PH – Pollock House
PP – Power Plant

RH – Rayen Hall

SE – School of Education
SJC – St. John's Episcopal Church

TC – Technical & Community College
TH – Tod Hall

WB – Ward Beecher Science Hall

Parking
FP – Faculty Parking
PD – Parking Deck
SP – Student Parking