YOUNGSTOWN
STATE
UNIVERSITY
BULLETIN

GRADUATE
CATALOG ISSUE
1968-69

Effective October 3, 1968
Youngstown, Ohio

Cover: *Professor Jon M. Naberezny*
Chairman, YSU Art Dept.
"Collage in Red"

GRADUATE CATALOG
ISSUE
EFFECTIVE OCTOBER 3, 1968
YOUNGSTOWN, OHIO

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The School of Education
　　Joseph F. Swartz, Ph.D., Dean
The William Rayen School of Engineering
　　M. Jean Charignon, Ph.D., Dean
The Dana School of Music
　　Charles H. Aurand, Jr., Mus.M., Dean
The Technical and Community College
　　Nicholas Paraska, Ph.D., Dean

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The Graduate Council

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Policy

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Mark F. Walker, Music

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The Academic Calendar

FALL QUARTER 1968

Sept. 17–20		Registration
Oct. 3	Thurs. 8 A.M.	Classes Begin
Oct. 10	Thurs. 8:30 P.M.	Last day to enroll in a class
Oct. 31	Thurs. 8:30 P.M.	Last day for withdrawing with a W.P.
Nov. 27	Wed. 10 P.M.	Thanksgiving Vacation Begins
Dec. 2	Mon. 8 A.M.	Thanksgiving Vacation Ends
Dec. 2	Mon. 5 P.M.	Last day to apply for admission for Winter Quarter
Dec. 16	Mon. 8 A.M.	Final Exams Begin
Dec. 21	Sat. 1:30 P.M.	Final Exams End

WINTER QUARTER 1969

Date to be announced		Registration
Jan. 2	Thurs. 8 A.M.	Classes Begin
Jan. 9	Thurs. 8:30 P.M.	Last day to enroll in a class
Jan. 30	Thurs. 8:30 P.M.	Last day for withdrawing with a W.P.
Feb. 26	Wed. 5 P.M.	Last day to apply for admission for Spring Quarter
Mar. 13	Thurs. 8 A.M.	Final Exams Begin
Mar. 19	Wed. 10 P.M.	Final Exams End

SPRING QUARTER 1969

Date to be announced		Registration
Mar. 26	Wed. 8 A.M.	Classes Begin
Apr. 2	Wed. 8:30 P.M.	Last day to enroll in a class
Apr. 23	Wed. 8:30 P.M.	Last day for withdrawing with a W.P.
May 16	Fri. 5 P.M.	Last day to apply for admission for Summer Quarter
May 30	Fri.	Legal Holiday — No Classes
June 4	Wed. 8 A.M.	Final Exams Begin
June 10	Tues. 10 P.M.	Final Exams End
June 12	Thurs.	Spring Commencement

SUMMER QUARTER 1969

Date to be announced		Registration
June 16	Mon. 8 A.M.	Classes Begin — Summer Quarter and First Term
June 18	Wed. 8:30 P.M.	Last day to enroll in a class — First Term
June 23	Mon. 8:30 P.M.	Last day to enroll in a class — Summer Quarter
June 28	Sat. 12 noon	Last day for withdrawing with a W.P. — First Term
July 4	Fri.	Legal Holiday — No Classes
July 12	Sat. 12 noon	Last day for withdrawing with a W.P. — Summer Quarter
July 23	Wed. 10 P.M.	First Term Ends (Final Exams during periods)
July 24	Thurs. 8 A.M.	Second Term Begins
July 26	Sat. 12 noon	Last day to enroll in a class — Second Term
Aug. 7	Thurs. 8:30 P.M.	Last day for withdrawing with a W.P. — Second Term
Aug. 25	Mon. 8 A.M.	Final Exams Begin — Summer Quarter
Aug. 29	Fri. 10 P.M.	Final Exams End — Summer Quarter
Aug. 29	Fri. 10 P.M.	Second Term Ends (Final Exams during periods)
		Last day to apply for admission for Fall Quarter
Aug. 30	Sat.	Summer Commencement

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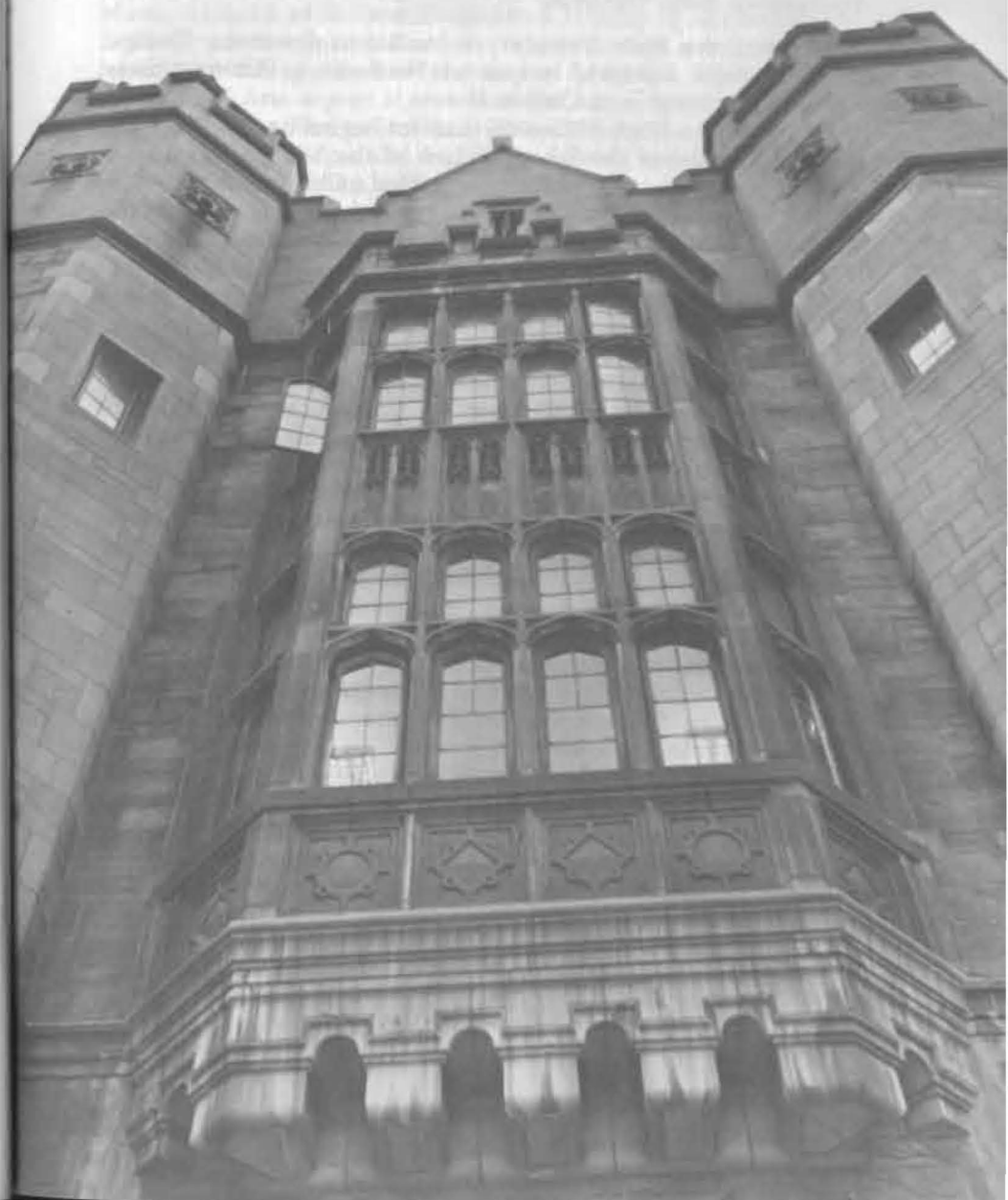
General Information

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 of 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 for the first time liberal arts classes were offered in the evening.

In 1926, 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.

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 re-chartered 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 also is responsible to the Ohio Board of Regents.

From 1931 to 1966, Dr. Howard W. Jones, now president emeritus, 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 inaugurated in November 1966, as the University's second president.

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 Music, Bachelor of 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 Associate of Arts degree is offered in the new Technical and Community College. The institution is accredited by the North Central Association of Colleges and Secondary Schools and by appropriate professional accrediting bodies. A co-educational University, 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 over 13,000 in the fall of 1967.

The Campus

During its earlier years the institution had a number of homes. Starting in the old Central YMCA Building, it occupied various sites on Wick Avenue until the completion of the present Main Building in 1931, renamed Jones Hall in 1966. 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. In 1952 and 1953, the Library and the adjoining John Tod Hall were built; in 1959, the Science Building was completed.

In addition to the 19 major buildings already in use on the campus, the University is currently engaged in an eight-year $35-million campus development program. The 84-acre campus will include such structures as a health and physical education building, a music and fine arts building, a technical and community college building, several liberal arts classroom buildings, residence halls, and other related structures.

The first major step in the development program was the completion in 1966 of the $1.8-million Kilcawley Student Center. 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.

In 1967, the $1.7-million Ward Beecher Science Hall was com-

pleted. Started in December of 1965, the building contains laboratories, classrooms and offices for chemistry, biology, physics, natural science, geology, and astronomy. It also features four large lecture halls and a planetarium classroom. The planetarium, in seating capacity, is the largest in Ohio and ranked 18th in size in the country at the time of its completion.

The University opened its $5-million Engineering Science Building in January of 1968. This building houses the William Rayen School of Engineering and the mathematics department. There are 48 laboratories, 30 classrooms, eight research and development laboratories, office space for six department chairmen, plus 48 faculty and staff members, and an auditorium seating 288. The air-conditioned and mechanically-ventilated structure contains an incompressible-flow type laboratory that extends two stories, a chemical engineering chamber that extends three floors and contains absorption and distillation equipment, a lead-lined radiation laboratory for students studying nuclear activity, and a "floating floor" in the computer room to eliminate vibration from the heavy machines and any outside source.

Ground will be broken before the end of 1968 for the erection of a $3.5-million health and physical education building to be named the Beeghly Physical Education Center. Housing the physical education department, the building will have a gymnasium with a seating capacity of nearly 6,000. There will be 17 classrooms, including laboratories for health research and kinesiology. Separate gymnasiums will be provided for wrestling, weight lifting, gymnastics, and physical education for the handicapped. Other facilities include six handball and squash courts, a rifle range, office space for the physical education and athletic faculty members, and an Olympic-sized swimming pool with seating for 800 spectators and making available instruction in swimming, lifesaving, first aid, water polo, canoeing, and water skiing.

FACILITIES AND SERVICES

The Library

The Youngstown State University Library is in the center of the campus, and all departments are served in this centralized facility. At present it contains 174,410 books and 1,812 periodical

subscriptions, as well as microfilms, microcards and recordings. The library has open stacks with study carrels alternating with each row of book stacks, which permit the student to study in the area of the subject being pursued. Built-in display cases in the halls provide places for exhibitions of various kinds, and the Purnell Room on the third floor is a browsing and smoking room. Coin-operated book copying machines are on each floor, and there are booths for typewriters and adding machines.

The main building of the Public Library of Youngstown and Mahoning County, with 196,000 books and 475 periodicals, is on Wick Avenue at Rayen Avenue, close to all parts of the University campus.

The Computer Center

Another centralized facility, located in the Engineering Science Building and servicing the entire University, is the Computer Center, which consists of an IBM 360-40, an IBM 360-30 and an IBM 1620. The IBM 360-40 consists of a high speed computer and printer. For special research projects, the graduate student will have direct access to the computer. In general, he will be able to use the computer-center services with his course work either by card access or by one of the ten remote stations located in the Engineering Science Building. Where direct access to an individual computer is desirable for on-console training or for special projects, the IBM 1620 computer will be available. The IBM 1620 has card-input-output access and also typewriter-input-output access. Computer usage is administered at the Computer Center under the direct supervision of the Director, Dr. Ronald Jonas.

The Bookstore

The Youngstown State University Bookstore, in Central Hall Annex, sells textbooks and other required supplies. Other stores in the Youngstown area do not stock most University textbooks and are not authorized to issue books or materials on Veteran Administration book orders except for certain items. On the other hand, the Bookstore does not attempt to compete with other stores in the area and carries only a few items beyond those prescribed for courses. It does, however, stock in limited quantities a wide selection of standard works in inexpensive editions, because of

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their value as collateral reading. The Bookstore will order any book on specific request and a suitable down payment.

Health Service

Registered nurses are on duty in the Health Clinic, located on the second floor of Central Hall. Outpatient services are provided for faculty and students from 8 a.m. to 10 p.m. Monday through Friday, and on Saturday from 8 a.m. until noon. The Medical Director, Dr. John Hyland, is available at all times for consultation in any Health Service matters. Group insurance to cover hospital and/or surgical care is available to all students at the time of registration, at a semiannual fee payable in advance. Foreign graduate students are required to subscribe to this insurance; otherwise the plans are voluntary. They are community sponsored and nonprofit, with no occupational restrictions, and membership may be retained after leaving the University. There is an anti-tuberculosis program for all faculty and students.

Placement Service

With the cooperation of the Ohio State Employment Service, a full-time Placement Office is maintained, the services of which are free to all students enrolled in the University and alumni for either permanent employment, including teaching positions, or part-time work. The Placement Office is located in West Hall. Music students also have available to them the assistance of the placement services of the Dana School of Music.

Housing

The University provides a list of approved off-campus housing for men. These establishments have been inspected and have met the minimum University standards. In accord with the basic principles of the University concerning human rights, no off-campus housing will be recommended to students that discriminates on the basis of race, color, or creed. The University does not place students in off-campus houses and, therefore, personal arrangements must be made for these facilities. For further information, contact the Office of the Director of Housing Services.

There are several privately operated residence hall facilities in the immediate University area which have been approved for

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women student occupancy. Information concerning these and other off-campus housing is available by contacting the Dean of Women's Office.

The University has limited Residence Hall facilities and the present accommodations are for men only. For information, write to the Director of the Housing Services.

International Student Office

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 Adviser, Mrs. Edna McDonald, immediately upon arrival in Youngstown.

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 as well as many faculty members. Presently there are 26 countries represented on campus. Meetings are held every Friday night.

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 its meeting of 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 specific graduate degree programs (see below). 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 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 which offers graduate programs, and four faculty members-at-large elected by the Graduate Faculty. Standing committees of the Graduate Council are Committees on Curriculum, Policy, Graduate Faculty Membership, and Scholarships, Assistantships, and Awards.

MASTER'S DEGREES

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

Master of Arts (English, History)
Master of Science (Chemistry, Mathematics)
Master of Music (Applied Music; Woodwind or Brass Speciali-

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zation; Sacred Music; Music Education; Theory and Composition; Musicology)

Master of Science in Engineering (Civil, Electrical, Mechanical, Metallurgical)

Master of Science in Education (Master Teacher Program for Elementary and Secondary School Teachers; Principalship Program, Elementary and Secondary Schools; School Counseling and Guidance; and Special Education for Slow Learning Children).

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. If admitted, the student receives an Authorization to Register card.

The complete application for admission, including all supporting materials, must 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.

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

It is anticipated that, in the first year during which the graduate program at Youngstown State University will be offered, provision will usually be made only for part-time study. The student who wishes to enroll as a full-time graduate student should discuss this possibility with the faculty member in charge of the program in which he wishes to enroll before making 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 44503.

1. Complete the application form and return it to the Dean of the Graduate School.

2. An application fee of $15.00 is charged each student making application to the Graduate School whether or not the student has paid this fee at the undergraduate level. This fee is not refundable. Make check payable to The Youngstown State University, label the check "Graduate Application Fee," and include it with the application.

3. Return the two reply cards, properly addressed, with your application. These cards will help us keep you informed on the status of your application.

4. Request the Registrar of each college or university you have attended, *except* The 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.

Applications for admission cannot be reviewed until the official transcripts of all previous college or university work, and the application fee of $15.00, are received. It is imperative, therefore, that the applicant see that these reach the Graduate School at the very 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, etc.

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 2.5 (on a 4.0 scale) or above.

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.

Classification of Graduate Students

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

Students will be admitted with regular status 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, and 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.

Non-Degree Students

Students may take graduate courses without planning to become candidates for a degree. Such students must, however, first be admitted to the Graduate School on the same basis as those entering a degree program. If non-degree students decide later to work toward a degree, they must request approval from the Dean of the Graduate School for a change of status. The decision on acceptance of the credit earned while in non-degree status toward a master's degree will be made by the department in which the student wishes to earn a degree.

Transient Students

A student may be admitted as a transient graduate 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. 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.

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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 Admission Test for Graduate Study in Business may be secured from the Testing Office, Ford Hall, 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.

Transfer Credits

Up to 9 quarter hours (6 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.

Foreign Student Admissions

A graduate of a foreign university must submit with his application:

1. Official certification 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, including grades received, that are 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. Scores on the aptitude section of the Graduate Record Examination administered by the Educational Testing Service, Princeton, N. J.

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

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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. At the time evidence of proficiency is required, 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 may, upon recommendation of the department in which he is to carry on his graduate study, be required to take another test in English after arriving at Youngstown State University, to help determine the necessity for remedial work in English and the reduction in the credit hour load of graduate course work resulting therefrom.

All foreign students while doing graduate work at Youngstown State University, must enroll in the plan of group insurance to cover hospital and/or surgical care that is available to students at Youngstown State.

REGISTRATION

Advisement

Before registration, the student should consult with the faculty member in charge of the program to which he has been admitted, or to an advisor to whom he is assigned, for advice in developing a program of study leading to the desired degree.

Registration

Every student registers in person for the work of each session on or before a final registration date. Only under exceptional circumstances may a student register after that date, and one who does is charged a fee. One who has begun his registration before the deadline may complete it late, but must likewise pay a fee. There is no reduction of tuition or other fees because of late entrance

into courses.

No student may enter a course after the first meeting of the second week of the quarter or after the fifth calendar day of a summer term.

Change of Registration

A student wishing to alter his schedule after registration must fill out a change of registration form, have it signed by the teacher or teachers concerned and by his advisor, and present it to the Business Office for approval and acceptance. A mark of WF (withdrawal with failing grade) is recorded for a course dropped without this procedure, since such withdrawal is not official.

Anyone changing his registration after the registration period pays a fee, unless the administration has requested the change.

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 automatically retired from the active files of the Graduate School. Reapplication for admission under regulations in force at the time of reapplication will be required for reactivation of the student's records.

Graduate Courses

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

1. 900-level courses that 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-series.

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2. Upper-division undergraduate courses (700- or 800-series courses) in which the student may enroll for graduate credit only with the approval of his advisor.

Academic Standards

A quality point average of at least a B will be required for graduation. No grade less than C will be accepted, although all grades will be counted in computing the student's quality point average.

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 reserves the right to reduce the class load of employed students. Normally the student employed full time will not be allowed to enroll for more than six quarter hours of graduate course work.

Graduate Credit for Undergraduates

An undergraduate student with senior standing, with a cumulative grade point average of 2.7 or above, and who does not require a full schedule to complete his baccalaureate degree requirements at Youngstown State University, may enroll in 900-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 the 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 carries on his graduate work. The amount of such credit that will be acceptable at Youngstown State University is 15 hours.

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 temporary grade of E may be given to a student who has been doing satisfactory work in a course but who, for reasons beyond his control and deemed justifiable by the instructor, has not completed all requirements for a course when grades are submitted. The E grade must be replaced by one of the other quality grades within 60 days, unless formal request for further delay has been made by the instructor and approved by the chairman of the department; otherwise the E automatically becomes an F. The instructor is notified before such an F is recorded.

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 satisfactory enough manner to be 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.

Aud signifies that the student has attended 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 four weeks of a regular quarter or two weeks of a summer session have elapsed.

WP (withdrawal with passing status) represents official withdrawal from a course before the end of the fourth week of a quarter or before the end of the second week of either split summer session.

WF (withdrawal with failing status) is given to all students withdrawing after the end of the fourth week of a quarter or after the end of the second week of either split summer session.

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WP and WF are determined and recorded by the Recorder, not by the instructor. A student who has received a WF may petition for a WP by submitting a written form to the Dean of the Graduate School setting forth the justification for withdrawal after the period for official withdrawal from class.

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 course as an auditor, subject to the approval of the instructor. An auditor is not held responsible for the regular classwork and preparation of assignments and receives no credit for the course. However, he pays the regular fees for the course, as well as any other applicable fees. A student who has registered for a course for credit may not change his status to that of auditor after four weeks of a regular quarter or two weeks of a summer session have elapsed. Audited courses are not counted as part of the student's official load.

Foreign Language Proficiency Examinations

The Department of Foreign Languages administers proficiency examinations in the following languages: French, German, Greek, Hebrew, Italian, Latin, Russian, and Spanish. The graduate student will confer with his major department which will inform him of the specific requirement. These examinations are offered only in foreign languages currently taught at this institution.

The *advanced* proficiency examination tests the student's ability to read scholarly material in his general field through translation. The passage to be translated with the aid of a dictionary is chosen by the major department in consultation with the Department of Foreign Languages. The examination will be 60 minutes in duration. The *advanced* proficiency examination will be administered on the first Mondays in December and May only.

The time and place of all proficiency examinations will be announced in advance by the Department of Foreign Languages and the Office of the Dean of the Graduate School.

Students planning to take a proficiency examination must register with the Department of Foreign Languages in Jones Hall, Room 312 no later than two weeks prior to its administration.

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 the University nor the Department of Foreign Languages to tutor students for these examinations nor to recommend tutors.

Commencement

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

There are two graduation ceremonies each year: Spring Commencement, in May or June, at the end of the third quarter of the academic year; and Summer Commencement, in August, at the end of the summer session. A student who completes the requirements for a degree at the end of the first or second quarter receives his degree in June and is present, if at all possible, at Spring Commencement. If it is not possible to be present, 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 student or a part-time student, and upon his legal residency.

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Per Quarter

FOR FULL-TIME STUDENTS
(12–17 credit hours)

Instructional Fee:	$120.00
Student Services Fee (Comprehensive)	30.00
Non-Resident Tuition Surcharge:	100.00
Charges per Credit Hour above 17 hours:	
Instructional Fee:	12.00
Non-Resident Tuition Surcharge:	13.00

FOR PART-TIME STUDENTS
(Below 12 credit hours)

Instructional Fee per Credit Hour:	12.00
Student Services Fee (Comprehensive)	10.00
Non-Resident Tuition Surcharge per Credit Hour:	13.00

FOR STUDENTS (FULL-TIME) IN THE DANA SCHOOL OF MUSIC
(12–17 credit hours)

Instructional Fee:	$120.00
Student Services Fee (Comprehensive)	30.00
Music Fee:	75.00
Non-Resident Tuition Surcharge:	100.00
Charges per Credit Hour above 17 hours:	
Instructional Fee:	12.00
Non-Resident Tuition Surcharge:	13.00

FOR STUDENTS (PART-TIME) IN THE DANA SCHOOL OF MUSIC
(Below 12 credit hours)

Instructional Fee per Credit Hour:	12.00
Student Services Fee (Comprehensive)	10.00
Applied Music Fee per Credit Hour:	40.00
Non-Resident Tuition Surcharge per Credit Hour:	13.00

The University reserves the right to change any fee without notice.

GUIDELINES TO DETERMINE LEGAL RESIDENCE

The responsibility of indicating proper residence at the time of registration is placed upon the student. If there should be any question on the part of the student regarding residence, he should bring the case to the attention of the Dean of the Graduate School, who may refer the matter to the Residence Classification Board for

appropriate review. Any student who registers improperly with respect to legal residence under the rules will be required to pay the non-resident fee. Retroactive refunds or charges may be made to any student improperly classified.

In making a determination of Ohio residency, the following standards shall be observed: (These standards may be changed by appropriate authorities at any time and will supersede those listed in this catalog.)

1. An adult student, 21 years of age or older, is considered to be an Ohio resident if he has resided in the state for a minimum of twelve consecutive months preceding the date of enrollment, or if he is gainfully employed in the State of Ohio and is pursuing a part-time program of instruction and there is reason to believe that he did not enter the state from another state for the sole purpose of enrolling in an Ohio public institution of higher education. Teachers in Ohio schools and colleges shall be considered residents of the state as of the effective date of their contract of professional service.

2. A minor student under 21 years of age is considered to be an Ohio resident if his parents or his legal guardian have resided in Ohio for a minimum of twelve consecutive months preceding enrollment, or if the parents or legal guardian have established residence in Ohio, and if at least one parent or guardian is employed in Ohio.

3. An emancipated minor under 21 years of age may be considered as an adult student in determining residency, provided such minor presents satisfactory evidence that his parents, if living, do not contribute to his support and do not claim him as a dependent for federal government income tax purposes.

4. The residency of a married woman is determined by the rule which would apply to her husband if he were to seek enrollment; except that a woman who would have been classified as an Ohio resident immediately prior to her marriage may continue to be classified as an Ohio resident if she continues to live in the state.

5. A student classfied as a non-resident of Ohio shall not be classified as a resident during his continued period of enrollment unless he satisfies the conditions of items 1 or 2 above.

6. A minor student classified as a resident of Ohio shall be considered to have lost his status after his parents or legal guardian move their residence to another state or accept employment in another state.

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7. Persons in military service who entered such service as residents of Ohio and their dependents shall be considered residents if they provide proof of continued Ohio domicile or of continuous voting in Ohio.

8. Persons in military service and their dependents shall be considered to be Ohio residents during the period when the actual duty assignment is in Ohio and they actually reside in Ohio.

9. Aliens holding immigrant visas may establish Ohio residency in the same manner as citizens of the United States. Alien students admitted to the United States on student visas shall be classified as non-resident students.

Special Fees

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. (Note: The late payment fee will also be assessed to those students receiving financial aid who have not returned their payment notice by the due date indicating that they plan to attend.)

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.

Change of Registration Fee. A fee of $2.00 is charged anyone changing his registration unless he does so at the request of the administration, or completely withdraws from the University. Appeals will be subject to the supervision of the Finance Committee. (Note: 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 a $5.00 late fee.)

Registration Withdrawal Fee. A fee of $5.00 is charged when a student withdraws from all his courses, and the terms under Withdrawals and Refunds (further on in this section) are waived by the Business Office.

Reinstatement Fee. A fee of $5.00 is charged anyone re-admitted to classes after suspension for financial reasons.

Special Check-Handling 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 or comprehensive fees will, in addition to the returned check fee, draw a late registration fee. If these penalties are not paid within four days of notice to the student, he shall be suspended from classes.

Fee for Credit by Examination. Fees are charged at the student's regular rate for each hour of credit honored for graduation when such credit is given as the result of examination or equivalency evaluation without the student's having attended the regular classes for the course of instruction. The credit by examination may be granted under special circumstances to students who can demonstrate proficiency in certain subjects. The subjects in which such examinations may be given and the nature of the examinations are to be determined by the departments and divisions concerned and must be approved by the Dean of the Graduate School.

Fee for Proficiency Examination. When a student is given permission to take an examination to demonstrate proficiency in a subject (in a foreign language, for example), he is charged a fee of $10.00 except when he elects to pay the fee for Credit by examination and receive course credit for the work covered by the examination.

Fee for Irregular Examination. 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 at the discretion of the Dean, except in the case of illness, when the student must present a letter from his physician.

Graduation Fee. A fee of $20.00 is charged anyone who is to receive a degree or title. The fee, which includes cap and gown rental, diploma, and which helps to defray the general expense attendant to the commencement exercises, must be paid at the time the official application for graduation is submitted to the Recorder. 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 or title granted (unless hon-

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orary), 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).

Transcript of Credits Fee. A fee of $1.00 is charged for each transcript.

Comprehensive Fee. This fee helps defray the cost of student services and activities such as health services, library, counseling and a portion of parking lot maintenance which is not covered by the parking fee. It also aids in the support of student associations, student government, lecturers, entertainment and extracurricular activities. *After the first day of classes there can be no reduction or pro-ration of this fee.* This fee is not refundable except for administrative reasons.

Vehicle Registration Fee. Each student, faculty, administration and staff members is required to register his automobile and purchase a parking permit at the beginning of each academic year. Only one parking sticker will be issued to each individual; however, it is transferable from one vehicle to another, when necessary.

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 Business Office. Failure to attend class, or merely notifying the teacher, the Registrar, 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 5½ 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.

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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, or a 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 valid evidence. The amount refunded depends on the date he last attended classes or when his status changed, whichever is more reasonable. All requests for this action must be handled by mail. Correspondence should be addressed to Youngstown State University Finance Committee Chairman.

NON-RESIDENT STATUS

A student who does not qualify as a resident of the State of Ohio is required to pay a non-resident fee in addition to other University fees. The burden of registering under proper residence is placed upon the student. Questions as to residency should be brought to the attention of the Residence Classification Board and passed upon prior to original enrollment.

The residency status of a student will be based upon his original enrollment at Youngstown State University. In general, this status will remain the same throughout his attendance at the University. A petition to change that status must be presented to the Residence Board.
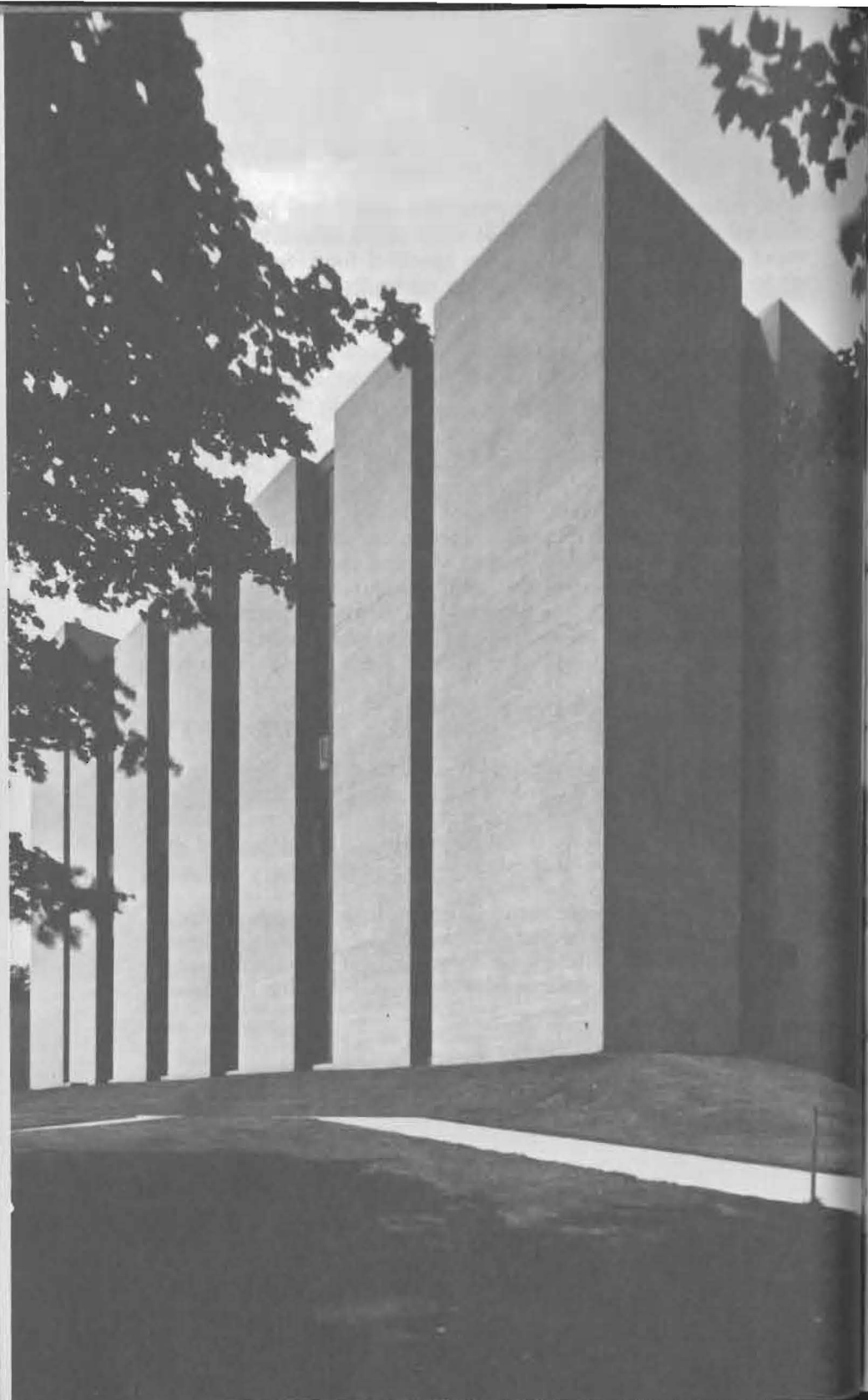
Graduate Programs

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

ENGLISH

Ward L. Miner

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

Admission Requirements

The student should have an undergraduate English major or equivalent and/or a satisfactory score on the Graduate Record Examination. All entering students should submit to the department their aptitude and English scores on the Graduate Record Examination.

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 751, 752, 753 (History of the English Language) or its equivalent must make up the deficiency. 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) within seven years of admission to the Youngstown State

University Graduate School; or by successful achievement on a standardized 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. A written comprehensive 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 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

HISTORY

Leslie S. Domonkos

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

Admission Requirements

The student must have a grade point average in undergraduate study of 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 total number of credit hours for the Master of Arts degree with a major in history is a minimum of 45 quarter hours. Twenty-four quarter hours of the total requirement must be earned in his-

tory, including History 900 (Historiography). Fifteen quarter hours shall be in the field of concentration. If the candidate is inadequately prepared for the required graduate courses, either in the major or minor subjects, additional courses must be taken to supplement the undergraduate work.

A thesis is required of all candidates for the degree. 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.

A foreign language is required of all candidates for the degree. This requirement can be met by demonstrating a reading knowledge of a foreign language. The following languages are approved for the M.A. requirement: German, French, Russian, Spanish, Greek, Italian, Hebrew, and Latin. Another language may be substituted if it is pertinent to the person's special field of study.

Candidates for the Master of Arts with a major in history must pass an oral and written examination in his major field. The primary purpose of this examination 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.

A written examination is also required for the minor field.

MASTER OF MUSIC

Donald W. Byo

Acting Dean
Dana School of Music

The following programs of study lead to the degree of Master of Music: Applied Music; Woodwind or Brass Specialization; Sacred Music; Music Education; Theory and Composition; and Musicology.

Admission Requirements

Applicants for admission to graduate study for the Master of Music degree should present a baccalaureate degree in music from an accredited college or university. Admission will require an

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undergraduate grade point average of at least 2.5 (based upon a 4.0 scale). All applicants for the degree shall pass entrance examinations in music theory, music history and literature, and piano proficiency before or during the first quarter of study. Completion of two years undergraduate study in piano may be accepted in lieu of the piano proficiency examination.

Applicants for the degree Master of Music in the field of Applied Music must pass an entrance audition performed before the appropriate Applied Music faculty plus one or more representatives from the Graduate Committee. The audition, in the form of a half-hour recital, should be performed prior to enrolling for graduate study or, if that is impossible, early in the first quarter of graduate study.

Applicants for the degree Master of Music in the field of Woodwind or Brass Specialization must present a baccalaureate degree with a major in music education (instrumental) or applied music (woodwind or brass instrument), show outstanding ability on the major instrument, and unmistakable adaptability to other woodwind or brass instruments, and pass an entrance audition on the major instrument and one minor instrument, prior to and during the first quarter of study. Qualified applicants who fail to meet preliminary requirements may be admitted provisionally and shall be eligible to be accepted for the degree program when these requirements have been fulfilled.

Requirements for the Degree

Candidates for the Master of Music degree must earn 48 credits acceptable for graduate study and must complete all requirements outlined in their respective courses of study, including participation in choral or instrumental ensembles and such collateral courses as may be deemed desirable by the Graduate Committee. (See Chart)

Candidates must meet whatever undergraduate foreign language requirements are appropriate to their major area of music study. Applied voice majors are expected to have completed one year each of French, German and Italian. Musicology majors are expected to have a reading knowledge of at least one foreign language, preferably French or German.

In music education, students may select Plan A (with thesis) or Plan B (without thesis). In applied music, public recital will be

REQUIREMENTS FOR COURSES OF STUDY FOR THE MASTER OF MUSIC DEGREE

	Applied Music	Woodwind or Brass Specialization	Sacred Music	Music Education Plan A Thesis	B No Thesis	Theory & Composition	Musicology
Applied Music (c)	9	15	9	6	6	6	6
Major		(9)					
Minor		(6)					
Music Theory	6	6	6	6	6	9 or 12(a)	6
Music Literature	6	6	6	6	6	6	12
Recital (b)	6	6	–	–	–	–	–
Chamber Music	3	–	–	–	–	–	–
Ensemble	3	3	3	3	3	3	3
Electives	15(d)	12(g)	9(g)	6(g)	6(g)	6(e)	15(f)
Advanced Choral Conducting	–	–	3	3	3	–	–
Seminar in Sacred Music	–	–	3	–	–	–	–
Church Music Administration	–	–	3	–	–	–	–
Foundations of Music Education	–	–	–	3	3	–	–
Administration & Supervision in Music Education	–	–	–	3	3	–	–
Seminar—Music Education	–	–	–	3	3	–	–
Thesis	–	–	–	6	–	6	6
Research Methods & Materials—Music Education	–	–	–	3	3	–	–
Psychology of Music	–	–	–	–	3	–	–
Music & the Humanities	–	–	–	–	3	–	–
Composition	–	–	–	–	–	9 or 12(a)	–
Total Quarter Hours	48	48	48	48	48	48	48

(a) Hours in theory and composition must total 21.

(b) In lieu of thesis requirement.

(c) For all degrees except woodwind or brass specialization the requirement in applied music may be met in the student's major and/or minor applied area upon the recommendation of the advisor.

(d) 9 hours of electives to be selected from ensemble, pedagogy and literature courses for the principal instrument or voice.

(e) Theory electives must be selected from the theory area.

(f) Musicology electives must be selected from the music history and literature area.

(g) Electives may include cognate fields related to the student's research.

presented in lieu of a thesis. In composition, an original composition satisfies the thesis requirement. A thesis will be required of students whose major is theory or musicology, and sacred music.

Academic Standards

To receive the degree Master of Music it will be necessary to achieve a cumulative average of at least a B or 3.0 grade point average on a 4.0 basis. The thesis, research, and recital requirements must each meet at least the B standard of achievement. Grades received in courses taken for collateral credit or in ensemble courses are not used in determining the academic average of the student. A student who fails to meet the standards set by the School may, on recommendation of the Graduate Committee, be required to withdraw at the end of the quarter.

Applied Music

Graduate students are expected to advance their competence in performance by continued study in their major applied area. (In some cases a minor applied area may be substituted for the major area.) Students other than those majoring in applied music are required to undergo a jury examination at the conclusion of the period of study, or at the end of the third quarter of study. Jury examinations and other performance responsibilities for applied majors are established by the appropriate applied music faculty.

Final Certifying Examination

The final certifying examination may not be taken prior to the quarter in which all required course work, including the thesis, if such is required, will be completed. The examination may be written and/or oral. The examining committee shall be composed of members of the music faculty representative of music education (when the major is music education), applied music, theory/ composition, and music history and literature. No attempt will be made to have represented on the examining committee only those instructors who taught the classes in which the candidate was enrolled; however, the professor representing his major field will be one of the examiners. The membership of the examining com-

mittee will be recommended by the student's academic advisor and approved by the Graduate Committee. The student will be examined on his thesis, his graduate studies, and general music subjects. In case of failure the examination may be repeated once after a suitable interval in which the student will have been expected to strengthen the deficiencies noted. The examination will be rescheduled at the discretion of the Graduate Committee. (The student is expected to be acquainted with the works covered by the bulletin entitled "Recommended Reading for Master's Candidates in Music" issued by the Dana School of Music.)

MASTER OF SCIENCE

CHEMISTRY

Leon Rand

Chairman of the Department
324 Ward Beecher

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. The prior work must be essentially equivalent to that required by the Department of Chemistry for a Bachelor of Science, professional degree, as delineated in the *Bulletin* of the College of Arts and Sciences, Youngstown State University.

In those cases where undergraduate preparation is deficient or inadequate, the applicant may be admitted to the University, with provisional status, with the approval of the Dean of the Graduate School and the Chairman of the Department of Chemistry. Courses in which the applicant is deficient must be resolved without graduate credit.

A written examination covering analytical, inorganic, organic and physical chemistry, required of all applicants, will be given during the week preceding registration. The purpose of this examination is to assist the student and his advisor to formulate a program of studies, and does not become a part of his official University record.

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Degree Requirements

The candidate for the M.S. degree in chemistry will be expected to complete satisfactorily the following courses: Chem. 911, 931, 932, 941, 942, 951, and 952, plus 14 hours of electives. Chem. 998 will be taken each quarter for non-repeating credit. The electives may include six hours of 800-level chemistry courses and up to 9 hours outside of the chemistry department, in both cases with the consent of the Chairman of the chemistry department. Biochemistry majors will choose Chem. 842 and 843 in lieu of 931 and 932.

By the time the basic graduate courses listed above are completed, each candidate will have selected a thesis advisor in his field of specialization. A total of 9 hours of Chem. 990 (Thesis), culminating in the completion of an acceptable thesis, is required.

MATHEMATICS

Bernard J. Yozwiak

Chairman of the Department
224 Engineering Science Building

Admission Requirements

To be admitted without undergraduate deficiency, an applicant must have a cumulative grade point average of at least 2.7 in all undergraduate mathematics courses, and an undergraduate mathematics major approximating that required of undergraduate mathematics majors at Youngstown State University. This involves a minimum of 28 quarter hours of courses on the 700– and 800–level including at least a one-quarter course in advanced calculus and a one-quarter course in abstract algebra. Additional course work in these areas is strongly recommended as preparation for the graduate courses.

Degree Requirements

A minimum of 45 quarter hours of credit with a cumulative quality point average of 3.0 is required for the M.S. degree. At

least 30 of these hours must be taken from 900-level courses. Certain courses from the 700 or 800 level may be included in the student's program if prior approval is given by the student's adviser. Normally, these would be courses not included in the student's undergraduate preparation that would be most helpful in pursuing his graduate program. The graduate advisor will assist the student in planning a program such that his combined undergraduate and graduate work will include study in modern algebra, real analysis, complex analysis, topology, and applied mathematics.

A thesis for the M.S. degree is optional. A student who elects this option and has the approval of a faculty supervisor will register for Mathematics 990 and will receive credit up to 9 quarter hours upon successful completion of the thesis. 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.

In addition to the course work, the passing of a comprehensive examination is required. This may be written and/or oral, at the discretion of the department.

Members and students of the department will conduct formal and informal seminars on a wide range of topics, and it is expected that the students enrolled in the graduate program will be active participants.

MASTER OF SCIENCE IN EDUCATION

Clyde V. Vanaman

In Charge of Graduate Studies in Education
2nd Floor, School of Education

Programs

There are four programs leading to the degree Master of Science in Education:
1. Master Teacher—Elementary and Secondary
2. Principalship—Elementary and Secondary
3. School Guidance and Counseling
4. Special Education—Slow Learning Children

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Admission Requirements

A. For All Programs:
   1) A bachelor's degree from an accredited college or university.
   2) Possession of a qualifying teaching certificate (Ohio Provisional or equivalent).
   3) An undergraduate cumulative grade point average of 2.5.
   4) Satisfactory preparation for the graduate program in which the student wishes to enroll, as specified by the department of the major.
   5) For all students with less than a 3.0 grade point average in undergraduate work, a satisfactory score on the Aptitude Test of the Graduate Record Examination.
B. For Principal and Counselor Programs: Two years teaching experience. State requires 27 months for certification.

Programs of Study

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

A comprehensive examination at the close of the Foundation's portion of the work will be required as a basis for becoming a degree candidate.

Foundations of Education

Students in all programs are required to take 12 quarter hours in Foundations of Education:

Ed. 900	Education in Western Culture	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.

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The Master Teacher Program

1. Six credit hours required of students in both elementary and secondary programs:

   Psych. 903 Psychology of Learning   3 q.h.
   Ed.   909 The Supervision of Practice Teachers—   3 q.h.
              Elementary, or
   Ed.   910 The Supervision of Practice Teachers—   3 q.h.
              Secondary

2. Elementary Teachers:
   1) 12 to 18 quarter hours selected from the following education courses:

      Ed. 856 Diagnosis of Reading Problems   3 q.h.
      Ed. 857 Development of Remedial Reading   3 q.h.
              Techniques
      Ed. 917 Elementary School Reading Programs   3 q.h.
      Ed. 918 Elementary School Mathematics Programs   3 q.h.
      Ed. 919 Social Studies in the Elementary School   3 q.h.
      Ed. 920 Elementary School Science Programs   3 q.h.
      Ed. 921 Issues, Problems and Developments in   3 q.h.
              Elementary Education

   2) 12 to 18 quarter hours of electives from humanities, sciences, and other disciplines.

3. Secondary Teachers:
   1) 24 quarter hours in courses in appropriate teaching areas
   2) Six quarter hours of electives in education or teaching areas

   Students in the Master Teacher Program (Secondary Education) will have, in addition to an education advisor, an advisor appointed from the teaching area to consult on the choice of courses in that area.

The Principalship Program

1. 27 quarter hours in school administration courses:

   Ed. 946 The Supervision of Instruction   3 q.h.
   Ed. 947 Basic Principles of Elementary School   3 q.h.
           Administration, or
   Ed. 948 Basic Principles of Secondary School   3 q.h.
           Administration
   Ed. 949 School Law   3 q.h.
   Ed. 950 School Business Management   3 q.h.

Ed. 951	The School Principal's Communication Relationships	3 q.h.
Ed. 916	The Elementary School Curriculum, *or*	3 q.h.
Ed. 931	The Secondary School Curriculum	3 q.h.
Ed. 961	Foundations of Guidance	3 q.h.
Ed. 953	Practicum in Administration for School Principals	3 q.h.

2. Nine quarter hours of:
   1) Electives in special education   3 q.h.
   2) Interdisciplinary electives   6 q.h.

Guidance and Counseling Program

1. 27 quarter hours in guidance and related psychology courses:

Psych. 903	The Psychology of Learning	3 q.h.
Psych. 906	Human Growth and Development	3 q.h.
Psych. 907	Psychology of Adjustment	3 q.h.
Ed. 961	Foundations of Guidance	3 q.h.
Ed. 962	Counseling: Principles, Theory, Practice	3 q.h.
Ed. 963	Occupational and Educational Information in Guidance	3 q.h.
Ed. 964	Measurement and Evaluative Techniques	3 q.h.
Ed. 968	Counseling Practicum	6 q.h.

2. Nine quarter hours of:
   1) Elective in special education   3 q.h.
   2) Interdisciplinary electives   6 q.h.

Program in Special Education for Slow Learning Children

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.

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Psych. (Sp. Ed.) 981 Advanced Seminar in Mental   3 q.h.
    Retardation
2.   Twelve quarter hours of electives in the general areas of supervision, administration, diagnosis of reading problems, psychology, and counseling. (Tentatively 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 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 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 require at least 45 quarter hours for the master's degree. These hours will be divided in the following manner:
1.   Mathematics: 9 quarter hours, usually Mathematics 910, 911: Advanced Engineering Mathematics I and II (5, 4 q.h.)
2.   Interdepartmental Courses: 12 quarter hours from:
    M.E. 982: Engineering Analysis (4 q.h.)

Met. Engr. 901, 902: Fundamentals of Material 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.)
C.E. 910: Advanced Strength of Materials (4 q.h.)
C.E. 941: Structural Mechanics (4 q.h.)
3. Departmental Courses: 24 quarter hours

CIVIL ENGINEERING

John N. Cernica

Chairman of the Department
267 Engineering Science Building

This program offers opportunities for advanced study in Fluid
and Structural Mechanics. A choice is offered between thesis and
non-thesis options. In the non-thesis option, 27 credit hours in the
primary area are required; in the thesis option, 18 credit hours in
the primary area and an acceptable thesis are required. C.E. 945
(Civil Engineering Analysis) is required of all Civil Engineering
students.

ELECTRICAL ENGINEERING

Victor A. Richley

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

Courses in this department may be grouped into two areas of
specialization: Electromagnetic Fields and Quantum Electronics;
and Control Systems and Computers.

For the 45 hours required for the degree, 21 quarter hours are
applied toward the general advanced courses in mathematics and
other engineering disciplines. The remaining quarter hours are
devoted to specialized courses in electrical engineering. E.E. 901
(Control Systems I) and 911 (Electromagnetic Fields I) are re-
quired of all electrical engineering students.

In addition, the student undertakes a program of independent
research work. 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 upon recommendation of the departmental advisory committee. In the non-thesis program, the student will be required to take at least 6 hours of course work beyond the 45 hours required for the degree.

MECHANICAL ENGINEERING

Frank A. D'Isa

Chairman of the Department
203 Engineering Science Building

Two general areas of specialization will be offered: Mechanics of Rigid and Deformable Solids; and Heat and Fluid Flow.

After completing 13 credit hours, including Mathematics 910 (Advanced Engineering Mathematics I) and M.E. 982 (Engineering Analysis I), the student will be assigned to a graduate committee of three faculty members who will plan his remaining course work and decide if he is to undertake a thesis, which may be for a minimum of four or a maximum of eight hours credit. The student will omit departmental courses for thesis credit. M.E. 982 and 983 (Engineering Analysis I and II) are required of all mechanical engineering students.

METALLURGICAL ENGINEERING

Shaffiq Ahmed

Chairman of the Department
231 Engineering Science Building

For admission to the program in metallurgical engineering, the candidate normally must have a bachelor's degree in engineering or in 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 any credit for such courses toward his graduate degree except with the permission of the departmental advisory committee.

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The minimum quarter hours required for the degree are 46 hours, of which 21 quarter hours are applied towards the general advanced courses in other engineering disciplines. The remaining quarter hours are devoted to the specialized courses in metallurgical engineering. 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

Electives are to be chosen from the courses shown below as the student chooses either the research or industrial option.

OPTION A

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

OPTION B

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

In addition, the student undertakes a program of independent research under both options. 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 an additional 6 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.
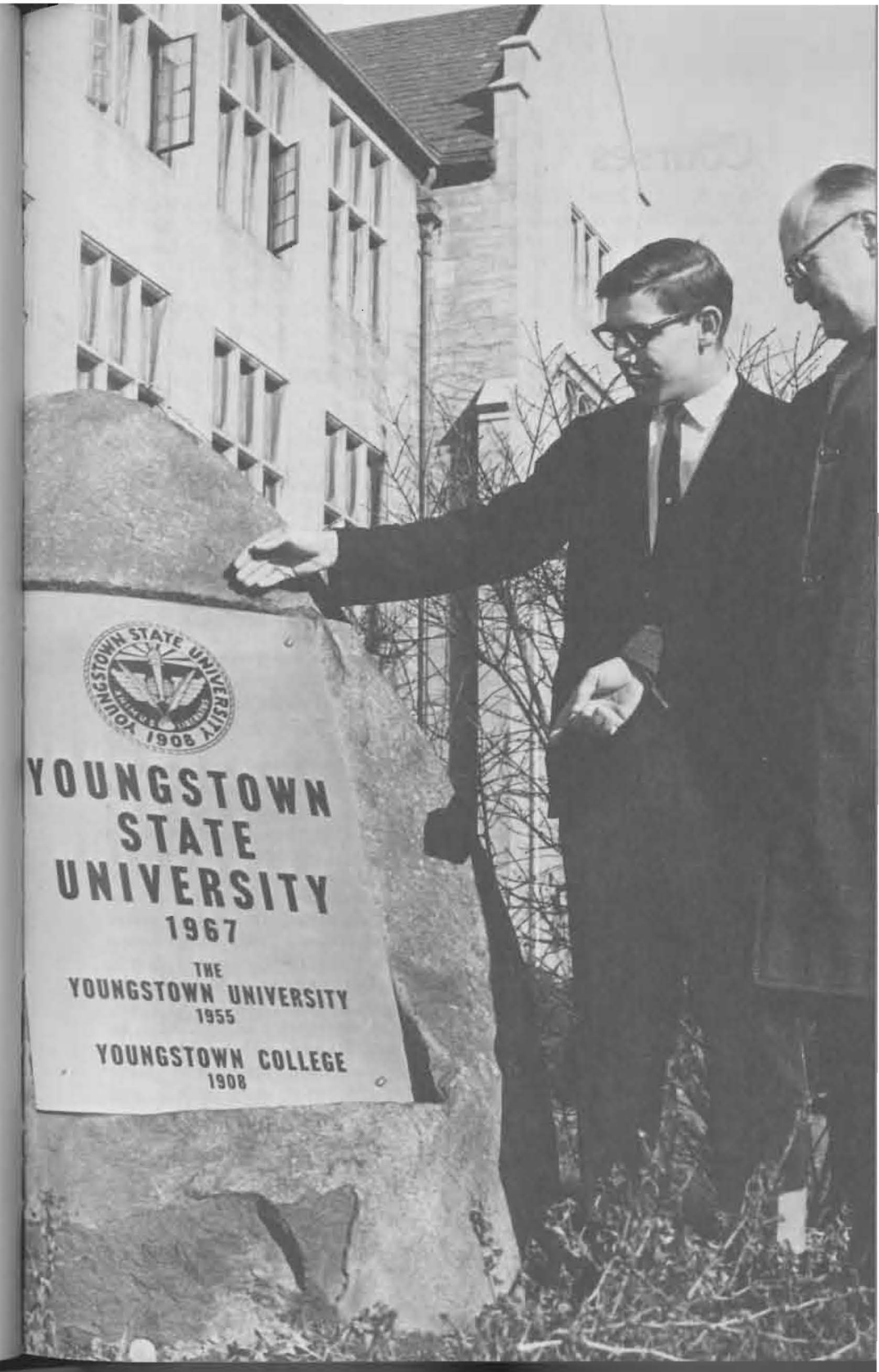
50

YOUNGSTOWN
STATE
UNIVERSITY
1967

THE
YOUNGSTOWN UNIVERSITY
1955

YOUNGSTOWN COLLEGE
1908

Courses

ART

Jon M. Naberezny, *Chairman of the Department*
11 Clingan-Waddell Hall

701. Seminar. (1 q.h.)
801. Seminar. (1 q.h.)
803, 804, 805. Advanced Painting. (3 + 3 + 3 q.h.)
806. Indian Art. (3 q.h.)
807. Chinese/Japanese Art. (3 q.h.)
810, 811. Advanced Ceramics. (3 q.h.)
812. Advanced Sculpture. (3–5 q.h.)
814. 20th-Century Art to 1925. (3 q.h.)
815. 20th-Century Art from 1925. (3 q.h.)
822. Arts and Crafts II. (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.

BIOLOGY

George W. Kelley, *Chairman of the Department*
409 Ward Beecher Science Hall

802.	Ecology.	(5 q.h.)
803.	Aquatic Biology.	(5 q.h.)
821.	Plant Anatomy.	(5 q.h.)
822.	Plant Physiology.	(5 q.h.)
831.	Biological Seminar.	(2 q.h.)
832.	Cytology.	(5 q.h.)
840.	Biological Techniques.	(2 q.h.)
850.	Problems in Biology.	(4 q.h.)
851.	Immunobiology.	(5 q.h.)

CHEMISTRY

Leon Rand, *Chairman of the Department*
324 Ward Beecher Hall

803, 804.　Quantitative Analysis (Instrumental).　(4 + 4 q.h.)
805.　Applied Spectroscopy.　(3 q.h.)
813.　Thermodynamics.　(4 q.h.)
821.　Intermediate Organic Chemistry.　(3 q.h.)
829, 830.　Inorganic Chemistry II, III.　(3 + 3 q.h.)
831.　Inorganic Chemistry Laboratory.　(2 q.h.)
836.　Chemical Bonding and Structure.　(3 q.h.)
841, 842, 843.　Principles of Biological Chemistry I, II, III.
　　　　　　　　　　　　　　　　　　　(3 + 3+ 3 q.h.)
845, 846.　Biochemical Technique.　(2 + 2 q.h.)
　　911.　*Advanced Analytical Chemistry.*　The theoretical foundations
of inorganic analysis with emphasis on the concept of chemical equi-
librium, recent analytical developments, and the current literature.
Prereq.: Chemistry 741 or equivalent.　　　　　　　　　　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 coordi-

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nation chemistry. Prereq.: Chemistry 829.   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 741.   3 + 2 q.h.

941, 942. *Advanced Organic Chemistry I, II.* Reaction mechanisms and physical organic chemistry. Prereq.: 1 Year Organic Chemistry.   3 + 3 q.h.

945, 946. *Polymer Chemistry I, II.* A study of the polymerization process and the relationship between structure and properties of polymers. Prereq.: Chemistry 623 and 741.   3 + 3 q.h.

951, 952. *Advanced Physical Chemistry I, II.* Essentials of quantum mechanics and applications of quantum mechanics to molecular structure, spectroscopy, and diffraction phenomena. Prereq.: Chemistry 741.   3 + 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.   4 q.h.

961, 962, 963. *Physical Chemistry.* Organized for high school teachers. Principles of chemical equilibrium, kinetics, and thermodynamics; atomic and molecular structure; and the necessary elements of calculus. This course affords students sufficient background for other 800- and 900-level chemistry courses. Prereq.: A general background in chemistry and consent of student's committee.   3 + 3 + 3 q.h.

967, 968. *Organic Chemistry.* Organized for high school teachers. An intensive review and an extension into more recent concepts. Prereq.: A general background in chemistry and consent of student's committee.

969. *Laboratory Problems.* Organized for high school teachers. A laboratory course which stresses individual effort in solving chemical problems. May be repeated up to 6 q.h. Prereq.: Work in chemistry involving laboratory.   3 q.h.

990. *Thesis.* Hours arranged.

991, 992, 993, 994, 995. *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. Each may be repeated for credit. 2 or 3 q.h. as scheduled.

998. *Seminar.*   1 q.h.

CIVIL ENGINEERING

John N. Cernica, *Chairman of the Department*
267 Engineering Science Building

910. *Advanced Strength of Materials.* The basic methods of structural mechanics, such as conditions of equilibrium and compati-

bility, 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.

918. *Water Resources Engineering.* Examples of fluid flow; dimensional analysis and similarity; laminar and turbulent flow through pipes; boundary layers; nonuniform flow; hydraulic structures. 4 q.h.

930. *Advanced Hydrology.* Hydrologic measurements; principles of the hydrologic cycle; precipitation; hydrographs; unit graphs; drainage basin characteristics; infiltration; ground water hydraulics, runoff; flood and drought magnitude and probability; flood routing. 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 constrain 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, Castigilanio's theorems, theorems, Maxwell-Mohr method, reciprocal deflections and influence lines, slope deflection, moment 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 cohensionless 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.

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

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ECONOMICS

Emily P. Mackall, *Chairman of the Department*
Arts and Sciences Office Building

701. Money and Banking. (3 q.h.)
702. Public Finance. (3 q.h.)
703. Monetary and Fiscal Policy. (3 q.h.)
707. Economics of American Industry. (3 q.h.) (For M.S. in Education students only)
710, 711. Intermediate Micro-economics Theory I, II.
(3 + 3 q.h.)
712, 713. Intermediate Macro-economics I, II. (3 + 3 q.h.)
802. Comparative Economics Systems. (3 q.h.)
803. Business and Government. (3 q.h.)
805. Business Cycles and Economic Growth. (3 q.h.)
809. Economics for Teachers. (3 q.h.)
810. Business Economics. (3 q.h.)
811, 812, 813. Theory of International Trade and Development I, II, III. (3 + 3 + 3 q.h.)
831. Labor Markets. (4 q.h.)
833. Collective Bargaining and Arbitration. (4 q.h.)
835. Labor Legislation. (4 q.h.)

ELECTRICAL ENGINEERING

Matthew Siman, *Acting Chairman of the Department*
288 Engineering Science Building

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.
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-

COURSES

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.

931. *Digital Systems Engineering I.* Boolean algebra, logical mapping; combination and sequential synthesis; analog and digital conversion; coding structures; hybrid numerical circuitry. Structures of combinatorial and sequential circuit synthesis; logical circuit methods of Quine, Huffman, Mealy, Moore; Boolean Matrices; Bilateral and Cascade networks. 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.

990, 991. *Thesis.* 4 + 4 q.h.

ELEMENTARY EDUCATION

Marvin W. Chrisp, *Chairman of the Department*
School of Education

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.

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 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.

946. *The Supervision of Instruction.* (Sec. 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 extracurricular activities are among the areas considered, with emphasis upon elementary or secondary situations as appropriate. 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.

951. *The School Principal's Communication Relationships.* (Sec. Ed. 951.) Techniques of public relations; needs and methods for effective internal communication; administration of staff and pupil personnel. 3 q.h.

ENGLISH

Margaret I. Pfau, *Chairman of the Department*
Arts and Sciences Office Building

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.* (May be repeated once.) 3 q.h.

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

912. *Studies in Medieval Literature.* (May be repeated once.) 3 q.h.

920. *Studies in Shakespeare.* (May be repeated once.) 3 q.h.

922. *Studies in English Renaissance Literature.* (May be repeated once.) 3 q.h.

932. *Studies in Restoration and 18th-Century Literature.* (May be repeated once.) 3 q.h.

942. *Studies in Romantic and Victorian Literature.* (May be repeated once.) 3 q.h.

952. *Studies in American Literature before the Civil War.* (May be repeated once.)   3 q.h.

962. *Studies in American Literature from the Civil War to World War I.* (May be repeated once.)   3 q.h.

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

982. *Studies in Linguistics.* (May be repeated once.)   3 q.h.

Seminars: (Topics in seminars will vary and will be announced each time the seminar is offered. Each seminar may be repeated twice.)

1001. *English Literature to 1660.*   4 q.h.
1002. *English Literature since 1660.*   4 q.h.
1003. *American Literature.*   4 q.h.
1004. *Linguistics.*   4 q.h.

FOREIGN LANGUAGES AND LITERATURES

Robert E. Ward, *Chairman of the Department*
401 Jones Hall

German

800. Early German Literature.   (3 q.h.)
811, 812. 18th Century German Literature.   (3, 3 q.h.)
820. Goethe's *Faust.*   (5 q.h.)
821, 822, 823. 19th Century German Literature.   (3, 3, 3 q.h.)
831, 832, 833. Recent German Literature.   (3, 3, 3 q.h.)
866. History of the German Language.   (3 q.h.)
867–868. Germanic Linguistics. $(3 + 3$ q.h.)
870, 871, 872. Special Reading and Research.

(1–5, 1–5, 1–5 q.h.)

873, 874, 875. Seminar in German Language or Literature.

(3, 3, 3 q.h.)

French

801. Rabelais, Montaigne, Baroque Period of 17th-Century Literature.   (3 q.h.)
802. Corneille, Age of Louis XIV, I.   (3 q.h.)
803. Age of Louis XIV, II.   (3 q.h.)
811. Montesquieu and Other Writers of First Half of Century Excluding Voltaire and Rousseau.   (3 q.h.)
812. Voltaire and Rousseau.   (3 q.h.)
813. Diderot and other Writers of Second Half of Century.

(3 q.h.)

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821. Precursors of Romanticism and Romanticism. (3 q.h.)
822. Realism: Post-Romantic Poets Through Baudelaire. (3 q.h.)
823. Naturalism: Parnasse: Symbolism. (3 q.h.)
831. France: Proust: 20th-Century Poetry. (3 q.h.)
832. 20th-Century Novels After Proust. (3 q.h.)
833. 20th-Century Theatre. (3 q.h.)
862. History of the French Language. (3 q.h.)
865–866. Comparative Romance Linguistics. (3 + 3 q.h.)
870, 871, 872. Special Reading and Research.
(1–5, 1–5, 1–5, q.h.)
873, 874, 875. Seminar in French Language or Literature.
(3, 3, 3 q.h.)

Spanish

801, 802, 803. Classical Spanish Literature.
(3, 3, 3 q.h.)
811, 812, 813. 19th Century Spanish Literature.
(3, 3, 3 q.h.)
821, 822, 823. 20th Century Spanish Literature.
(3, 3, 3 q.h.)
831, 832, 833. Modern Spanish-American Literature.
(3, 3, 3 q.h.)
841, 842. Medieval Spanish Literature. (3, 3 q.h.)
843. Pre-Lope De Vega Drama. (3 q.h.)
864. History of the Spanish Language. (3 q.h.)
865–866. Comparative Romance Linguistics. (3 + 3 q.h.)
870, 871, 872. Special Reading and Research.
(1–5, 1–5, 1–5 q.h.)
873, 874, 875. Seminar in Spanish Language or Literature.
(3, 3, 3 q.h.)

Italian

801. Italian Literature of the 14th Century. (3 q.h.)
802. Italian Renaissance. (3 q.h.)
803. Italian Neoclassicism. (3 q.h.)
811. Italian Romanticism. (3 q.h.)
812. The Italian Novel of the 19th Century. (3 q.h.)
813. Literature of New Italy. (3 q.h.)
821. Italian Literature of the First 40 Years of the 20th Century.
(3 q.h.)
822. Regional Italian Literature. (3 q.h.)
823. Recent Italian Literature. (3 q.h.)

864. History of the Italian Language. (3 q.h.)
865–866. Comparative Romance Linguistics. (3 + 3 q.h.)
870, 871, 872. Special Reading and Research.

(1–5, 1–5, 1–5 q.h.)
873, 874, 875. Seminar in Italian Language or Literature.

(3, 3, 3 q.h.)

FOUNDATIONS OF EDUCATION

William Swan, *Chairman of the Department*
School of Education

870. Problems of the Classroom Teacher. (3 q.h.)
871. Pupil Problems. (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.
3 q.h.

961. *Foundations of Guidance.* A basic course to introduce students to purposes and practices of pupil-personnel work in elementary schools, secondary schools, and higher education. Lecture and discussion are used to explore the philosophy and scope of guidance; history of guidance and important current developments; planning, organizing, administering, and evaluating guidance programs; and the contributions of psychology, sociology, economics, and other disciplines related to guidance. 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.

968. *Counseling Practicum.* Counseling practice under supervision; the final required course in the preparation of the school counselor, open to advanced students who are completing their work for the school counselor certificate. Supervised practical counseling experience on campus and in neighboring elementary and secondary schools emphasized. Actual counseling of elementary and high school students; test administration, scoring, and interpretation for students being counseled; group counseling practice; and role playing as related to the counseling procedure. 6 q.h.

GEOGRAPHY

Michael Klasovsky, *Chairman of the Department*
School of Education

    800. European Area Study. (9 q.h.)
    801. Resource Appraisal and Utilization. (5 q.h.)
    802. Historical Geography of Anglo-America. (3 q.h.)
    803. Urban Geography. (3 q.h.)
    804. Political Geography. (3 q.h.)

HEALTH AND PHYSICAL EDUCATION

William B. Carson, *Chairman of the Department*
314 Jones Hall

    709M. Intramural Sports: Organization and Administration
(3 q.h.)
    803M. Health and Physical Education: Organization and Administration. (5 q.h.)
    804C. Playgrounds: Organization and Administration. (5 q.h.)
    805C. Recreational Activities: Organization and Administration.
(5 q.h.)
    817C. Kinesiology and Applied Anatomy. (3 q.h.)

818M & 818W. Remedial and Corrective Physical Education.
(3 q.h.)

825C. Seminar in Physical Education. (3 q.h.)

HISTORY

Hugh G. Earnhart, *Acting Chairman of the Department*
Arts and Sciences Office Building

701. Colonial America. (3 q.h.)
702. The Revolution and the Constitution. (3 q.h.)
704. The Federal Period of American History. (3 q.h.)
706. The Middle Period of American History. (3 q.h.)
708. The Civil War and Reconstruction. (3 q.h.)
710. The Emergence of Modern America. (3 q.h.)
712. Recent America. (3 q.h.)
714, 715, 716. Economic History of the United States I, II, III.
(3 + 3 + 3 q.h.)
717, 718, 719. Constitutional History of the United States I, II,
III. (3 + 3 + 3 q.h.)
720, 721, 722. Social and Cultural History of the United States
I, II, III. (3 + 3 + 3 q.h.)
723, 724. The History of Ideas in America I, II. (3 + 3 q.h.)
732, 733. The West in American History I, II. (3 + 3 q.h.)
735. Urban History. (3 q.h.)
736. Urban History of the United States. (3 q.h.)
738, 739. The South in American History I, II. (3 + 3 q.h.)
741, 742. Diplomatic History of the United States, I, II.
(3 + 3 q.h.)
744. The History of American Business. (3 q.h.)
745. Readings in American History to 1865. (3 q.h.)
746. Readings in American History from 1865 to the Present.
(3 q.h.)
747. History of the United States and Pennsylvania. (3 q.h.)
748. Readings in American History. (3 q.h.)
751. Byzantine History. (3 q.h.)
752. History of Ancient Greece. (3 q.h.)
753. History of Rome. (3 q.h.)
754. Early Middle Ages. (3 q.h.)
755. Late Middle Ages. (3 q.h.)
758. Renaissance Europe. (3 q.h.)
759. The Reformation Era. (3 q.h.)
760. From Westphalia (1648) to the French Revolution (1789).
(3 q.h.)
761. French Revolution and Napoleon. (3 q.h.)

765. Europe from the Congress of Vienna to the Franco-Prussian War. (3 q.h.)

766. Europe from the Franco-Prussian War to World War I.
(3 q.h.)

767. Europe from World War I to the Present. (3 q.h.)

771. History of China to 1912. (3 q.h.)

773. History of Japan & Korea to 1895. (3 q.h.)

774. History of the Far East in Modern Times. (3 q.h.)

775. History of the South and Southeast Asia in the 19th & 20th Century. (3 q.h.)

777, 778, 779. History of Russia I, II, III.
(3 + 3 + 3 q.h.)

780, 781. History of Eastern Europe I, II. (3 + 3 q.h.)

782. History of the Balkans. (3 q.h.)

783, 784, 785. Economic History of Europe I, II, III.
(3 + 3 + 3 q.h.)

786. Expansion of Europe to 1815. (3 q.h.)

787, 788. History of Population Movements I, II. (3 + 3 q.h.)

789, 790, 791. English History I, II, III. (3 + 3 + 3 q.h.)

792, 793. British Empire and Commonwealth I, II.
(3 + 3 q.h.)

795. Historical Origins of Spanish Culture. (3 q.h.)

900. *Historiography: Techniques of Historical Research and Writing.* An introduction to the professional study of history, including an examination of the sources and nature of historical knowledge, historical criticism and synthesis. Required of all candidates for advanced degrees in history. 3 q.h.

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. 3 q.h.

902. *Seminar in American Colonial History.* Selected problems of early American history. 3 q.h.

903. *Seminar in 19th-Century America.* Selected problems of American history, 1800–1865. 3 q.h.

904. *Seminar in 19th-Century America.* Selected problems of American history, 1865–1900. 3 q.h.

905. *Seminar in 20th-Century America.* Selected problems of American history in the 20th Century. 3 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. 3 q.h.

912. *Seminar in Greek and Roman History.* The sources and problems of Greek and Roman history. 3 q.h.

913. *Seminar in Medieval Culture and Society.* The main intellectual and social currents of the Middle Ages. 3 q.h.

914. *Seminar in Renaissance and Reformation.* Trends and aspects of the Renaissance and Reformation. 3 q.h.

915. *Seminar in 17th-Century Europe.* The rise of France and England to dominant force in world politics. 3 q.h.

916. *Seminar in 18th-Century Europe.* Selected areas of the Enlightenment, Old Regime, and the French Revolution. 3 q.h.

917. *Seminar in 19-Century Europe.* The Napoleonic and post-Napoleonic era and the rise of nationalism in Europe. 3 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. 3 q.h.

919. *Seminar in Russian History.* Selected problems of Russian history. 3 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. 3 q.h.

930. *The Teaching of History in Institutions of Higher Learning.* Investigation and discussion of professional teaching of history at the college level; course construction, presentation of subject matter, testing, instructional aids, evaluation of instruction. Required of all graduate assistants. 1 q.h.

931. *Research* 1–9 q.h.

INDUSTRIAL ENGINEERING

Robert Sorokach, *Chairman of the Department*
238 Engineering Science Building

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.

MATHEMATICS

Bernard J. Yozwiak, *Chairman of the Department*
224 Engineering Science Building

709. Ordinary Differential Equations. (3 q.h.)
710, 711. Higher Mathematics for Engineers and Physicists I, II.
(3, 3 q.h.)
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.)
731. Modern Geometry. (4 q.h.)
740, 741, 742. Mathematical Statistics I, II, III. (3, 3, 3 q.h.)
750. History of Mathematics. (4 q.h.)
760. Numerical Analysis. (4 q.h.)
842. Statistical Inference. (4 q.h.)
845. Operations Research. (4 q.h.)
846, 847, 848. Theory of Probability I, II, III. (3, 3, 3 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.)
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 Alegbra.* A course in modern algebra
aimed at providing secondary school teachers with a broad understand-
ing of the subject. Prereq.: Departmental permission. 5 q.h.
910, 911. *Advanced Engineering Mathematics I, II.* An ad-
vanced course in applied mathematics covering special topics. A review
and continuation of the study of differential equations including the
Frobenius technique, special functions, Fourier series and integrals,
partial differential equations, matrices and determinants, vector analysis,
functions of a complex variable with applications in operational calculus.
Prereq.: Mathematics 711 or departmental permission. 5 + 4 q.h.
920, 921. *Modern Algebra I, II.* The course will include the
following topics: review of set theory, including product sets, mappings,
transfinite induction; group theory, including basic definitions, structures,
transformations; rings and ideals, integral domains, fields; embeddings
and extensions of rings, fields, etc.; factorizations; groups with operators;
modules. Additional topics may include categories, algebras, Galois
theory, etc. Prereq.: Mathematics 723. 5 + 5 q.h.
946, 947. *Stochastic Processes I, II.* A study of Markov chains,

Poisson processes, Wiener processes, and renewal processes with applications to queuing and traffic, system reliability, epidemics, and inventory. Prereq.: Mathematics 848 and 875. 5 + 5 q.h.

948. *Analysis of Variance.* 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.: Mathematics 725 and 742. 5 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. 5 q.h.

970, 971. *Real Analysis I, II.* A course designed to introduce the student to (1) the classical theory of Lebesgue measure and integration, (2) abstract measure and integration, (3) a development of the integral without measure, and (4) deeper properties of real-valued functions. Specific topics include: set theory, topology of the real line, Lebesgue measure, Lebesgue integral, general theory of measure and integration, Daniell integral. Optional topics include L^p-spaces, Lebesgue-Stieltjes integral. Prereq.: Mathematics 871. Mathematics 880 desirable. 5 + 5 q.h.

972, 973. *Complex Analysis I, II.* A course in the classical theory of functions of a complex variable. Specific topics include: complex numbers, topology of the plane, complex functions—limits, continuity, differentiability, analytic functions, Cauchy-Riemann equations, infinite series, infinite products, the contour integral, Laurent expansions, special functions, the residue theorem, Riemann surfaces. Prereq.: Mathematics 871, Mathematics 875 highly desirable. 5 + 5 q.h.

980, 981. *Topology I, II.* The course will include the following topics: topological spaces, special cases (Euclidean metric and function spaces), continuous mappings, various degrees of separability, compactness, connectedness, metrizability, notions of homology theory. Other topics may include dimension theory, notions of algebraic topology and topological algebra. Prereq.: Mathematics 880. 5 + 5 q.h.

990. *Research and Thesis* 3 to 9 q.h.

MECHANICAL ENGINEERING

Frank A. D'Isa, *Chairman of the Department*
209 Engineering Science Building

904. *Advanced Thermodynamics.* Laws of equilibrium thermodynamics; relations between properties and aspects of the Second-Law. Macroscopic and microscopic considerations for the prediction of prop-

erties. 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. Convection and evaluation of boundary conditions. Prereq.: M.E. 982. 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, the shock tube, and airfoil theory. High velocity flow in ducts and impellers. Laboratory experiments.
4 q.h.

932. *Heat and Momentum Transport.* The flow of viscous fluids with and without heat transfer. Navier-Stokes equations, hydrodynamics and thermal boundary layers in laminar and turbulent flow, free convection, and Reynold's analogy. 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; M.E. 982. 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. 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. 4 q.h.

982. *Engineering Analysis I.* 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 chosen from mechanics, thermodynamics, heat transfer, and electrical circuit theory. 4 q.h.

983. *Engineering Analysis II.* Extension of M. E. 982 to engineering problems involving distributed systems, especially in the fields

of thermal conduction and mechanical vibrations. Application to Sturm-Liouville problems. The formulation and solution of engineering problems using partial differential equations and numerical techniques. Prereq.: Mathematics 910, M. E. 982. 4 q.h.

990, 991. *Thesis.* 4 + 4 q.h.

METALLURGICAL ENGINEERING

Shaffiq Ahmed, *Chairman of the Department*
231 Engineering Science Building

901, 902. *Fundamentals of Material Science I, II.* (This course is designed for students who are entering the graduate school without a degree in metallurgical engineering.) Discussion of physics and solids, mechanical properties, phase diagrams, phase transformations and alloys. (Generally, in addition to the general requirements of the program.)
4 + 4 q.h.

910. *Extractive and Process Metallurgy.* An advanced treatment of the physicochemical principles of extractive and process metallurgy. Prereq.: B. E. in Met. Engr. or consent of advisor. 4 q.h.

920, 921. *Advanced Physical Metallurgy I and II.* Theoretical treatment of various aspects of physical metallurgy. Prereq.: Physical metallurgy in undergraduate division or equivalent. 4 + 4 q.h.

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

931. *Engineering Alloys.* Alloy steels, refractory alloys, special nonferrous alloys; their properties, heat treatment, and behavior under special conditions. Prereq.: B. E. in Met. Engr. or consent of advisor. 4 q.h.

932. *Industrial Metallurgy.* The application of physical metallurgy principles to the solution of problems concerning the causes of failure. Prereq.: B. E. in Met. Engr. or consent of advisor. 2 q.h.

933. *Chemical Metallurgy.* An advanced course on the application of electrochemical principles to metallurgical problems. Prereq.: 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. 803. 2 q.h.

952. *Dislocations and Plastic Flow.* Properties of dislocations and their role in plastic flow of metals and alloys. Prereq.: B. E. in Met. Engr. or consent of advisor. 4 q.h.

953. *Thermodynamics of Solids.* Solutions and applications of statistical thermodynamics to the study of alloys. Prereq.: Thermodynamics and Physics of Solids. 4 q.h.

960. *Research Seminar.* Prereq.: Consent of advisor. 1 q.h.

990, 991. *Thesis.* I and II. 3 + 3 q.h.

MUSIC

Donald W. Byo, *Acting Dean*
103 Dana School of Music

719. Advanced Choral Conducting. (3 q.h.)
720. Advanced Instrumental Conducting. (3 q.h.)
740. Piano Literature. (3 q.h.)
753. Counterpoint I. (3 q.h.)
754. Counterpoint II. (2 q.h.)
761. Hymnology. (3 q.h.)
762. Gregorian Chant. (3 q.h.)
763. Junior and Senior Choir Methods. (3 q.h.)
807. Orchestration. (3 q.h.)
808. Band Arranging. (3 q.h.)
827–828. Symphonic Literature. (3 + 3 q.h.)
861. History of Sacred Music. (3 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.)
873. Beethoven and His Influence in the Musical World. (3 q.h.)
874. 19th Century Romantic Period. (3 q.h.)
875. Contemporary Music. (3 q.h.)
879. Vocal Literature. (3 q.h.)

APPLIED MUSIC

Piano

Major Course

K907–K908–K909. Bach, *Chromatic Fantasy and Fugue;* Beethoven, late works; Schumann and Brahms, larger works; Prokofiev,

Sonatas; advanced technical studies and etudes. Preparation of recital.
$$(3 + 3 + 3 \text{ q.h.})$$

Major Course for Music Education

K904–K905–K906. *See,* Piano K907–K908–K909.
$$2 + 2 + 2 \text{ q.h.}$$

Minor Course

K901–K902–K903. Materials adapted to pupil's needs.
$$1 + 1 + 1 \text{ q.h.}$$

Organ

Major Courses

I907–I908–I909. Bach, *Trio Sonata No. 5, Toccata and Fugue in F;* Mozart, *Fantasies;* Reubke, *Sonata on the 94th Psalm;* Dupre, *Variations on a Noel;* Hindemith, *Sonatas.* Preparation of recital.
$$(3 + 3 + 3 \text{ q.h.})$$

Major Course for Music Education

I904–I905–I906. *See,* Organ I907–I908–I909.
$$2 + 2 + 2 \text{ q.h.}$$

Minor Course

I901–I902–I903. Materials adapted to pupil's needs.
$$1 + 1 + 1 \text{ q.h.}$$

Voice

Major Course

R907–R908–R909. Advanced vocal technique and literature; development of interpretation and characterization. Repertoire for each quarter centered around the ability to sing nine new songs accurately, two chosen from the modern French repertoire and two from British and American art songs, with six of these memorized. The graduate voice major should have extensive experience in songs in Italian, German, French and English; oratorio and opera arias, solo cantatas and contemporary solos. Preparation of recital. $3 + 3 + 3 \text{ q.h.}$

Major Course for Music Education

R904–R905–R906. *See,* Voice R907–R908–R909.
$$2 + 2 + 2 \text{ q.h.}$$

Minor Course

R901–R902–R903. Materials adapted to pupil's needs.

$$1 + 1 + 1 \text{ q.h.}$$

Violin

Major Course

Q907–Q908–Q909. Advanced concert etudes by Paganini, Bach, *Partitas* and *Sonatas*. Modern repertoire from Bartok, Hindemith, and Prokofiev. Concertos by Brahms and Tchaikovsky. Preparation of recital.

$$3 + 3 + 3 \text{ q.h.}$$

Major Course for Music Education

Q904–Q905–Q906. *See,* Violin Q907–Q908–Q909.

$$2 + 2 + 2 \text{ q.h.}$$

Minor Course

Q901–Q902–Q903. Materials adapted to pupil's needs.

$$1 + 1 + 1 \text{ q.h.}$$

Viola

Major Course

P907–P908–P909. Studies by Garnies and Dolesje; sonatas by Hindemith, Bach, and Beethoven; concerto by Haydn; solos such as Bloch, *Rapsodie;* scales, arpeggios, and double-stops for the complete range of the instrument based on Flesch and Sevcik. Preparation of recital.

$$3 + 3 + 3 \text{ q.h.}$$

Major Course for Music Education

P904–P905–P906. *See,* Viola P907–P908–P909.

$$2 + 2 + 2 \text{ q.h.}$$

Minor Course

P901–P902–P903. Materials adapted to pupil's needs.

$$1 + 1 + 1 \text{ q.h.}$$

Cello

Major Course

C907–C908–C909. Scales and arpeggios in four octaves with varied bowings, and in thirds and sixths; Popper, *Etudes*, Op. 73; Duport, *21 Etudes*; Schubert, *Arpeggione Sonata;* Debussy, *Sonata;* Prokofiev, *Sonata*, Op. 119; concertos by Schumann or Shostakovich. Preparation of recital.

$$3 + 3 + 3 \text{ q.h.}$$

Major Course for Music Education

C904–C905–C906. *See,* Violoncello C907–C908–C909.

$2 + 2 + 2$ q.h.

Major Course

C901–C902–C903. Materials adapted to pupil's needs.

$1 + 1 + 1$ q.h.

String Bass

Major Course

L907–L908–L909. Simandl, *30 Etudes;* Hrabe, *Studies;* Zimmerman, *Orchestral Studies;* sonatas by Marcello, Eccles, or Vivaldi; concertos by Dittersdorf or Bottesini. Preparation of recital.

$(3 + 3 + 3$ q.h.$)$

Major Course for Music Education

L904–L905–L906. *See,* String Bass L907–L908–L909.

$2 + 2 + 2$ q.h.

Minor Course

L901–L902–L903. Materials adapted to pupil's needs.

$1 + 1 + 1$ q.h.

Flute

Major Course

E907–E908–E909. Studies such as Andersen, Op. 60; Bitsch, *12 Etudes;* Bozza, *14 Etudes arabesques;* sonatas by Duquis, Felt, Casterede, Houdy, Prokofiev; solos such as Jolivet, *Chant de Linos* and Messiaen, *Le Merle nuir.* Preparation of recital. $3 + 3 + 3$ q.h.

Major Course for Music Education

E904–E905–E906. *See,* Flute E907–E908–E909.

$2 + 2 + 2$ q.h.

Minor Course

E901–E902–E903. Materials adapted to pupil's needs.

$1 + 1 + 1$ q.h.

Oboe

Major Course

H907–H908–H909. Studies such as Ferling, *48 Studies;* Andraud, *Vade-Mecum;* sonatas by Dutilleux and Schuller; concerti by Mozart, Vaughan Williams, and Milhaud. Preparation of recital. $3 + 3 + 3$ q.h.

73

Major Course for Music Education

H904–H905–H906. *See,* Oboe H907–H908–H909.

$2 + 2 + 2$ q.h.

Minor Course

H901–H902–H903. Materials adapted to pupil's needs.

$1 + 1 + 1$ q.h.

Clarinet

Major Course

D907–D908–D909. Studies such as Bozza, *15 Difficult Etudes;* Polatschek, *28 Advanced Studies;* Paganini, *15 Etudes;* concerti by Bozza, Nielsen, Poulenc, and Copland; Berg, *Four Pieces for Clarinet;* orchestral studies and Paris Conservatory solos. Preparation of recital.

$3 + 3 + 3$ q.h.

Major Course for Music Education

D904–D905–D906. *See,* Clarinet D907–D908–D909.

$2 + 2 + 2$ q.h.

Minor Course

D901–D902–D903. Materials adapted to pupil's needs.

$1 + 1 + 1$ q.h.

Bassoon

Major Course

B907–B908–B909. Studies such as Milde, Op. 26, Vol. 2; Gambaro, *18 Studies;* Bozza, *Concertino,* Op. 46; concerti by Jacob, Weber, and Bruns; Pierne, *Theme and Variations.* Preparation of recital.

$3 + 3 + 3$ q.h.

Major Course for Music Education

B904–B905–B906. *See,* Bassoon B907–B908–B909.

$2 + 2 + 2$ q.h.

Minor Course

B901–B902–B903. Materials adapted to pupil's needs.

$1 + 1 + 1$ q.h.

Trumpet

Major Course

N907–N908–N909. Orchestral studies. Extensive development in the study of transposition; advanced studies by Charlier, Bozza, Brandt, Bodet, Broiles, Perrin, and Tomasi; solos by Bozza, Bitsch, Giannini, Beversdorf, Hummel, and Purcell. Preparation of rectial. $3 + 3 + 3$ q.h.

Major Course for Music Education

N904–N905–N906. *See*, Trumpet N907–N908–N909.

$2 + 2 + 2$ q.h.

Minor Course

N901–N902–N903. Materials adapted to pupil's needs.

$1 + 1 + 1$ q.h.

French Horn

Major Course

F907–F908–F909. Advanced studies by Bitsch, Chaynes, Ceccarossi, Reynolds, Alphonse, and Schuller; demanding orchestral and ensemble passages; classical, romantic, and contemporary sonatas and concerti. Preparation of recital. $3 + 3 + 3$ q.h.

Major Course for Music Education

F904–F905–F906. *See*, French horn F907–F908–F909.

$2 + 2 + 2$ q.h.

Minor Course

F901–F902–F903. Materials adapted to pupil's needs.

$1 + 1 + 1$ q.h.

Trombone

Major Course

M907–M908–M909. Studies by Lafosse, Kahila, Ostrander, and Delguidice; solos by Creston, Bloch; transcriptions of Bach *Cello Suites* and C.P.E. Bach; orchsetral excerpts by Stoneberg and Brown. Preparation of recital. $3 + 3 + 3$ q.h.

Major Course for Music Education

M904–M905–M906. *See*, Trombone M907–M908–M909.

$2 + 2 + 2$ q.h.

Minor Course

M901–M902–M903. Materials adapted to pupil's needs.

$1 + 1 + 1$ q.h.

Tuba

Major Course

O907–O908–O909. Studies by Sear, Bernard, Vasilieu and others; solos by Beversdorf, Vaughan Williams, Hindemith, and Persichetti; *Horn Concerti* of Strauss and Mozart; orchestral studies by Sear. Preparation of recital. $3 + 3 + 3$ q.h.

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Major Course for Music Education

O904–O905–O906. *See,* Tuba O907–O908–O909.

$2 + 2 + 2$ q.h.

Minor Course

O901–O902–O903. Materials adapted to pupil's needs.

$1 + 1 + 1$ q.h.

Percussion

Major Course

J907–J908–J909. Snare drum: studies such as Albright, *Contemporary Studies for Snare Drum;* Delecluse, *Douze Etudes pour Gaisse Claire;* Wisler, *Polyrhythmic Independence for Hands and Feet;* excerpts from contemporary symphonic literature. Mallet and keyboard percussion: Land, Bach *Inventions;* Voxman, *Selected Studies.* Tympani: Remsen, *Contemporary Tympani Studies;* First, *Solo Tympanist;* solos for percussion instruments by Desportes, Petit, Baudo, Bigot, and others. Preparation of recital. $3 + 3 + 3$ q.h.

Major Course for Music Education

J904–J905–J906. *See,* Percussion J907–J908–J909.

$2 + 2 + 2$ q.h.

Minor Course

J901–J902–J903. Materials adapted to pupil's needs.

$1 + 1 + 1$ q.h.

Theory and Composition

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.

917. *History of Theory.* The study and evaluation of historical treatises on the development of the theory of music. 3 q.h.

920, 921, 922. *Seminar in Materials of Music.* The study of techniques used in musical composition with emphasis on 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.

923, 924, 925. *Advanced Composition.* By permission of instruc-

tor only. Working in the larger forms, for chorus or orchestra.
$$3 + 3 + 3 \text{ q.h.}$$

Music History and Literature

940. *Music in the Middle Ages.* The development of polyphonic music from early organum to about 1450, with emphasis on techniques, styles, and forms. Seminar, with readings, reports, and musical illustrations. Prereq.: Music 782. 3 q.h.

941. *Music in the Renaissance.* Musical developments from about 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.

944, 945. *Direction of Master's Thesis.* Open to candidates for the Master of Music degree upon petition to the Dana School of Music. Approval given after student's thesis topic has been approved and his advisor assigned. 3 + 3 q.h.

Sacred Music

960, 961, 962. *Seminar in Sacred Music.* An examination of corporate worship practices and music in area churches. 1 + 1 + 1 q.h.

963. *Church Music Administration.* Problems in personnel, scheduling, budget, and equipment as encountered in the local church. 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 Educaton.* 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. 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.

980. *Independent Projects in Music.* Independent projects in music of a library, laboratory or field work nature designed to meet the needs of the student. Approval by major advisor with concurrence of the dean.   1–9 q.h.

PHILOSOPHY

Martin A. Greenman, *Chairman of the Department*
Arts and Sciences Office Building

    800. Theories of Knowledge. (4 q.h.)
    801. Metaphysics. (4 q.h.)
    802. Theories of Value. (4 q.h.)
    803. Symbolic Logic. (5 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.)

PHYSICS

Frank M. Ellis, *Chairman of the Department*
101 Ward Beecher Hall

901, 902. *Classical Mechanics.* 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 710. $3 + 3$ q.h.

910, 911. *Introduction to Quantum Mechanics.* Quantum phenomena in relation to classical physics. Schrodinger 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 711.   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, 1957–58; problems of man in space. Prereq.: Physics 510, 601, and Mathematics 710, 711.
                                                                    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 711.   3 + 3 q.h.

POLITICAL SCIENCE

Ivis Boyer, *Chairman of the Department*
Arts and Sciences Office Building

800.   Select Problems, American Government.   (3 q.h.)
801.   Select Problems, Public Administration.   (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 Hotchkiss, *Chairman of the Department*
Ford Hall

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.

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.

SECONDARY EDUCATION

William A. Shipman, *Chairman of the Department*
School of Education

850. Reading Problems in the Secondary School. (3 q.h.)
910. *Supervision of Practice Teachers—Secondary.* 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.
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.* 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.* The principal's responsibility for management problems such as purchasing, budgeting, building maintenance, insurance, food services, pupil transportation, etc. 3 q.h.
951. *The School Principal's Communication Relationships.* (El. Ed. 951) Techniques of public relations; needs and methods for effective internal communication; administration of staff and pupil personnel. 3 q.h.
953. *Practicum in Administration for School Principals.* 3 q.h.

SOCIOLOGY

James W. Kiriazis, *Acting Chairman of the Department*
Arts and Sciences Office Building

859, 860. History of Social Philosophy and Social Theory
(4 + 4 q.h.)
810, 814. Advanced General Anthropology: Cultural and Physical.
(4 + 4 q.h.)
851. Research Methods: Sociological and Anthropological. (5 q.h.)
807. Urban Society. (4 q.h.)
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.
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

Ruth B. Clayton, *Chairman of the Department*
School of Education

851. Principles and Practices in Curriculum Planning and Development for Slow Learners: Social Studies. (3 q.h.)
852. Principles and Practices in Curriculum Planning and Development for Slow Learners: Language Arts. (3 q.h.)
853. Principles and Practices in Curriculum Planning and Development for Slow Learners: Arithmetic. (3 q.h.)
854. Preparation, Selection and Adaptation of Instructional Materials for Slow Learners. (3 q.h.)
855. Occupational Orientation and Job Training. (3 q.h.)
856. Diagnosis of Reading Difficulties. (3 q.h.)
857. Development of Remedial Reading Techniques. (3 q.h.)
976. *Problems and Issues in Mental Retardation.* A forum for presenting positions relative to the recurring philosophical, sociological and political issues in mental retardation. 3 q.h.
977. *Research and Problems in the Education of the Mentally Retarded.* Consideration of problems concerning practices in the educaton of the mentally retarded and the examination of pertinent psycho-

logical, educational, medical, and other relevant research in the determination of trends and practices regarding the mentally retarded. 3 q.h.

978. *Administration and 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. *The Mentally Retarded in Society.* Especially organized to inform students of the services provided across the nation, within the states and locally. Guest speakers from agencies, private and public, serving the Retarded Act as informants and catalysts regarding unmet needs. Examination of federal, state, and community planning and research affecting the mentally retarded. 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.

SPEECH AND DRAMA

R. Donald Elser, *Chairman of the Department*
Arts and Sciences Office Building

811–812. Debate and Discussion. (3 + 3 q.h.)
813. Classical Rhetoric. (4 q.h.)
814. Medieval and Renaissance Rhetoric. (4 q.h.)
816. American Rhetoric. (4 q.h.)
817. British and American Oratory. (4 q.h.)
818. Contemporary Public Address. (4 q.h.)
821–822–823. Theatre Directing. (3 + 3 + 3 q.h.)
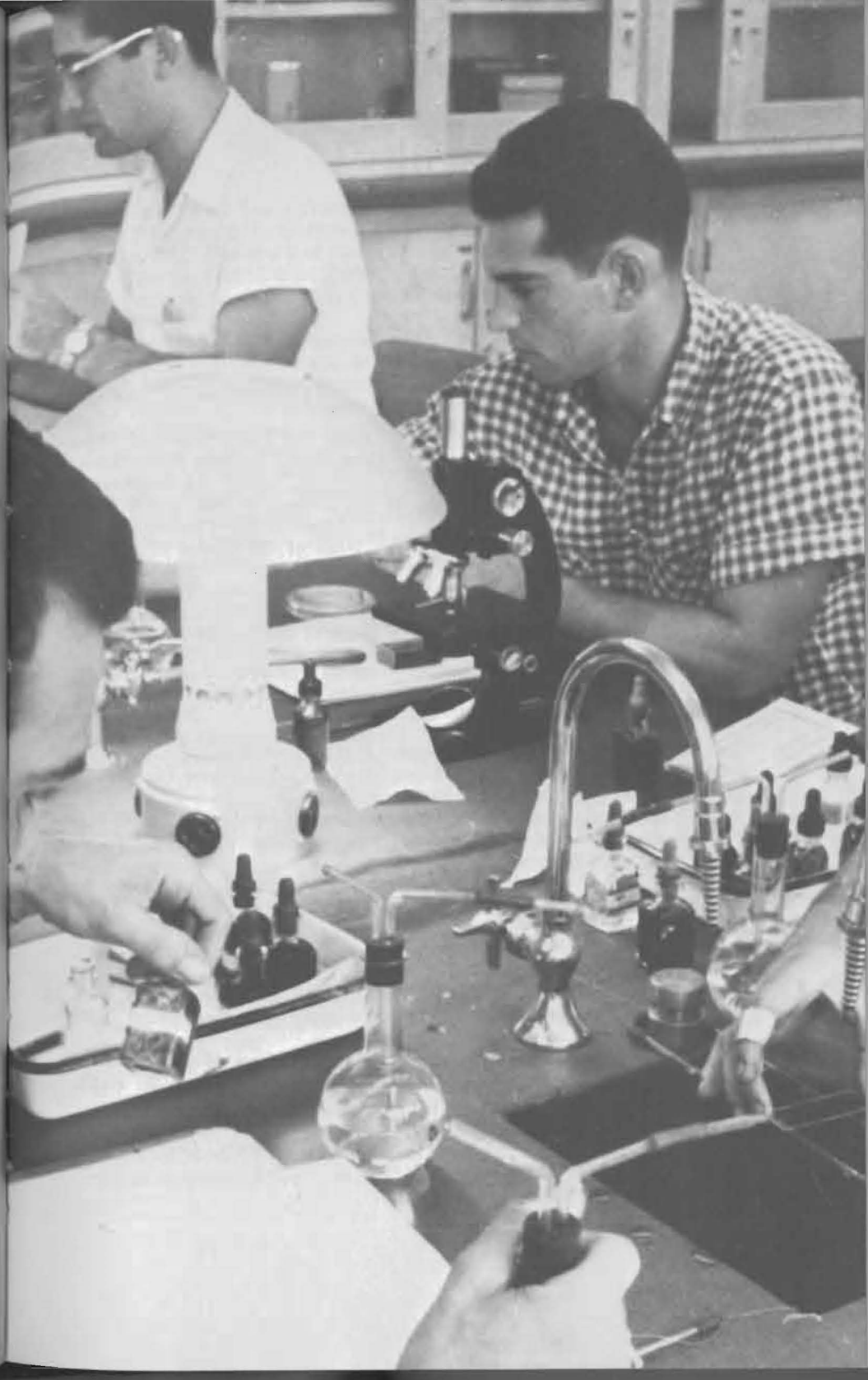
Graduate Faculty

Administrative Members

Albert L. Pugsley, Sc.D., LL.D. — President
William H. Coffield, Ph.D. — Vice-President for Academic Affairs

Charles H. Aurand, Mus.M. — Dean the Dana School of Music
M. Jean Charignon, Ph.D. — Dean of the William Rayen School of Engineering

Karl W. Dykema, A.M. — Dean of the College of Arts and Sciences
Earl E. Edgar, Ph.D. — Dean of the Graduate School
Robert L. Miller, M.B.A. — Dean of the School of Business Administration

Nicholas Paraska, Ph.D. — Dean of the Technical and Community College

Joseph F. Swartz, Ph.D. — Dean of the School of Education

Senior Members

Domenico B. Aliberti, Associate Professor of Foreign Languages: Maturita Classica (Bachelor), Liceo "L. Valli", Barcellone PG (Italy), 1950; D.Ltr., University of Messina, Italy, 1959.

J. Leonard Azneer, Associate Professor of Education; B.A., Yeshiva University, 1941; M.H.L., Jewish Theological Seminary, 1949; Ph.D., University of Pittsburgh, 1959.

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Mark F. Walker, Professor of Music: B.M., Butler University, 1940; M.Mus., Butler University, 1949; Ph.D., Indiana University, 1955.

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Ralph E. Yingst, Assistant Professor of Chemistry: A.B., University of Chicago, 1950; B.S., Lebanon Valley College, 1955; Ph.D., University of Pittsburgh, 1964.

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:

Shaffiq Ahmed, Associate Professor of Metallurgical Engineering: 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 Western Reserve University, 1965.

Donald W. Byo, Associate Professor of Music: B.M., Youngstown State University, 1954; M.Ed., Kent State University, 1959.

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Associate Members

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UNIVERSITY
1. Book Store
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4. Dana Recital Hall
5. Dana School of Music
6. Dana Studio
7. East Hall
8. Engineering Science Building
9. Executive Offices
10. Ford Hall
11. Jones Hall
12. Kilcawley Student Center
13. Kilcawley Men's Residence Hall
14. Beeghly Physical Education Center (Completion in 1970)
15. Planetarium
16. Pollock House
17. Placement Office
18. Rayen School
19. School of Education
20. Tod Hall
21. University Library
22. Ward Beecher Science Hall
23. West Hall

NON-UNIVERSITY
24. Buechner Hall
25. Butler Institute of American Art
26. First Christian Church
27. Lincoln Hotel
28. Newman Center
29. Pilgrim Collegiate Church
30. Public Library
31. St. John's Episcopal Church
32. St. Joseph's School
33. Y.W.C.A.
34. Arts and Sciences Office Building

PARKING
P-1 Faculty Parking
P-2 Student Parking
➤ One Way Traffic

FIFTH AVE.
ARLINGTON ST.
LINCOLN AVE.
P-2
8
15
N.PHELPS ST.
33
32
27
11
29
18
P-1
RAYEN AVE.
28
WICK AVE.
30
3
31

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