876. Statistical Inference in Economics I
Fall. 3(0-0) EC 812A or EC 801, STT 443 or STT 853, or approval of department. Interdepartmental with the departments of Agricultural Economics, and Statistics and Probability.

877. Statistical Inference in Economics II
Winter. 3(3-0) EC 875 or approval of department. Interdepartmental with the departments of Agricultural Economics, and Statistics and Probability.

878. Statistical Inference in Economics III
Spring. 3(3-0) EC 877 or approval of department. Interdepartmental with the departments of Agricultural Economics, and Statistics and Probability.
Validation and application of dynamic econometric models. Bayesian approach to estimation problems. Recent developments in econometric methods and in applied econometric research.

880. Organization and Control in the Political Economy: Institutions and Theory
Winter of even-numbered years, 4(4-0) Interdepartmental with the Department of Management.
Organization and technique in choice and implementation of economic (especially planning, programming) functions of political authority.

881. Organization and Control in the Political Economy: Selected Problems
Winter of odd-numbered years, 4(4-0) Approval of instructor. Interdepartmental with the Department of Management.
Analysis of role and tasks, appropriate techniques and organizational structures of political agencies in planning and management of complex programs.

891. Topics in Applied Econometrics
Spring. 3(3-0) EC 835 or EC 877.
Topics in applied econometrics with particular attention to applications and problems of economic models.

899. Master's Thesis Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department on publication.

900. Selected Problems in Advanced Microeconomic Theory
Fall, Winter, Spring, Summer. 3(3-0) May reenroll for a maximum of 12 credits. EC 812A, EC 812B, EC 812C, EC 813C.
Advanced applications of economic methodology to the analysis of household and firm behavior, risk, uncertainty, and transactions costs.

901. Selected Problems in Advanced Macroeconomic Theory
Fall, Winter, Spring, Summer. 3(3-0) May reenroll for a maximum of 12 credits. EC 812A, EC 812B, EC 812C, EC 813B.
Analysis of the behavior and interaction of multiregion systems.

927. Methodological Approaches to Research
Fall of even-numbered years, Summer of odd-numbered years. 3(3-0) Two terms of graduate study in social science or approval of department. Interdepartmental with and administered by the Department of Agricultural Economics.
Selection, planning, and conduct of research. Alternative research approaches. Role of theory, beliefs and valuations. Critical appraisal of research studies.

990B. Industrial Organization and Public Policy Workshop
Fall, Winter, Spring. 3 to 16 credits. Approval of department.
Critical evaluation of research reports by staff and other students. Students writing doctoral dissertations in the appropriate areas are encouraged to participate in workshop and may do so while registered for EC 999.

990C. Mathematical Economics and Econometrics Workshop
Fall, Winter, Spring. 3 to 16 credits. EC 812A, EC 812C; or approval of department. Interdepartmental with the Department of Agricultural Economics.
Critical evaluation of research reports by students and other students. Students writing doctoral dissertations in the appropriate areas are encouraged to participate in workshop and may do so while registered for EC 999.

990D. Economic Development Workshop
Fall, Winter, Spring, Summer. 3 to 16 credits. EC 850, EC 851, EC 852 or approval of department.
Critical evaluation of research reports by staff and students. Students writing doctoral dissertations in the appropriate areas are encouraged to participate in workshop and may do so while registered for EC 999.

999. Doctoral Dissertation Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

EDUCATION

College of Education

101A. Exploring Elementary Teaching
Fall, Winter, Spring. 3(3-4) Prerequisites.
Placement in the elementary school, achievement through field experience while serving as a teacher aide in an elementary classroom. Concurrent lecture sections focus on techniques of classroom management and operation.

1235. Introduction to Careers in Vocational and Practical Arts Education: Industrial Arts
Fall. Winter and Fall of even-numbered years, Spring of odd-numbered years. 3(3-0) Credits earned in this course are included in computation of GPA and MAPS but are not included in the 180 credits required for graduation.
Opportunities in teaching industrial education, analysis of students' potentialities for this field.

1245. Career Planning in Agriculture and Natural Resources for Secondary School Students
Fall. Winter, Spring. 2(2-0) Credits earned in this course are included in computation of GPA and MAPS but are not included in the 180 credits required for graduation.
Introducing prospective teachers to the process of guiding high school students to careers in agriculture and natural resources.

1255. Career Planning in Business and Distributive Education for Secondary School Students
Fall. Winter, Spring. 2(2-0) Credits earned in this course are included in computation of GPA and MAPS but are not included in the 180 credits required for graduation.
Introducing prospective teachers to the process of guiding high school students to careers in business and distributive education.

141A. General Industrial Arts
Winter and Fall of odd-numbered years, Spring of even-numbered years. 3(0-6) Approval of department.
Introductory experiences in all major areas of industrial arts. Organized under a comprehensive general shop organization similar to that utilized in the modern secondary school.

141B. General Woodwork
Winter and Fall of odd-numbered years, Spring of even-numbered years. 3(0-6) Approval of department.
Woodworking, carpentry, introductory machinery, finishing, designed to exemplify desirable facilities and equipment. Important activities in today's secondary schools.

200. Individual and the School
Fall, Winter, Spring, Summer. 3(3-2) Sophomores. Must be admitted to a teacher education program.
Major psychological factors in the school learning-teaching situation, concepts in human development related to problems in the school situation; teacher's role in motivation, conceptual learning, problem solving, and the development of emotional behavior, attitudes and values, learning of skills, retention and transfer, and measurement of student abilities and achievement.

241A. Advanced Woodwork
Winter and Fall of even-numbered years, Spring of odd-numbered years. 3(0-6) ED 141B (2-2) Prerequisite. Safeguarding the safe operation of woodworking machines in home and school shop. Care and maintenance of shop tools and equipment.

241B. General Metalwork
Winter and Fall of odd-numbered years, Spring of even-numbered years. 3(0-6) Approval of department.
Bench metal, sheet metal, forging, welding, plating, casting, and machinery. Designed to exemplify desirable facilities and course organization for the modern secondary school.
Descriptions - Education

Courses

241C. Industrial Arts Crafts
Fall and Winter of even-numbered years, Spring of odd-numbered years. 3(0-6)
Approval of department.
Typical crafts in outstanding public school programs of industrial arts. Work in plastics, leather, silver, aluminum, copper, metal enameling, lapidary, ceramics, and model making.

241D. Printing and Graphics
Winter and Fall of even-numbered years, Spring of odd-numbered years. 3(0-6)
Approval of department.
Hand composition, press work, printing, bookbinding, block printing, plate making, silk screen work, and photography. Designed to exemplify a desirable approach to the work of this area in the modern secondary school.

321A. Curriculum Methods and Materials—Elementary Education
Fall, Winter, Spring, Summer. 3(1-7)
Juniors, ED 101A, ED 200. Must be taken concurrently or prior to courses in ED 325 series.
Basics, scope, and sequence of curriculum in reading, language arts, and social studies; adaptation of principles to methods and materials of teaching in the elementary and middle school.

325A. Methods of Teaching Reading in the Elementary School
Fall, Winter, Spring, Summer. 3(3-0)
ED 200, Juniors.
Methods and materials of instruction of reading at elementary level. Analysis of learning and teaching problems, and study of concrete materials and classroom attack. Consideration of practical bearings of research and progressive theory on current practice.

325B. Teaching of Language Arts in Elementary Grades
Fall, Winter, Spring, Summer. 3(3-0)
ED 200, Juniors.
Course to acquaint prospective elementary teachers with content material and methods in language arts for grades below the seventh. Students also given opportunity to acquire skills in manuscript and blackboard writing.

325C. School Music Instrumental Methods
Fall. 3(2-2) Instrumental music major. Instrumental instruction program at elementary level.

325H. School Music Vocal Methods
Fall. 3(3-2) Approval of the Department of Music.
Basic instructional program in primary and intermediate grades.

327. Methods of Teaching—Secondary Common Elements
Fall, Winter, Spring, Summer. 2(2-0)
ED 200, a subject area methods course ED 207A to ED 327V concurrently.
Instructional issues common to all subject areas. Selection of instructional techniques based on teacher values and belief systems, learner needs and characteristics, and sound education principles and policies.

327A-V. Methods of Teaching—Secondary Subject Areas
Specifics of classroom instruction in the various subject matter fields. Selection of instructional techniques based on recognized course objectives, needs and characteristics of learners, and sound educational principles and policies.

A. Agriculture
Fall, Spring. 3 credits. ED 200; ED 327 or concurrently.

B. Art
Fall, Winter, Spring. 3 credits. ED 200; STA 300, STA 329; ED 327 or concurrently.

C. Business and Distributive Education
Fall, Winter, Spring. 3 credits. ED 200; ED 327 or concurrently.

D. English
Fall, Winter, Spring, Summer. 3 credits. ED 200; ED 327 or concurrently.

E. Romance Languages
Fall. 3 credits. ED 200; ED 327 or concurrently.

F. Health
Spring. 3 credits. ED 200; ED 327 or concurrently.

G. Physical Education
Fall, Winter, Spring. 3 credits. ED 200;
ED 327 or concurrently.

J. History
Fall, Winter, Spring. 3 credits. ED 200;
ED 327 or concurrently.

K. Home Economics
Fall, Winter, Spring. 3 credits. ED 200;
ED 327 or concurrently.

L. Natural Resources, Environmental Education and Earth Science
Fall. Spring. 3(3-0) ED 200 for education majors; other, approval of department.

M. Industrial Arts
Fall, Spring. 3 credits. ED 200; ED 327 or concurrently.

N. Mathematics
Fall, Spring. 3 credits. ED 200, ED 327 or concurrently.

P. Music—Instrumental
Winter. 3 credits. ED 200; ED 327 or concurrently.

R. Music—Voice
Winter. 3 credits. ED 200; ED 327 or concurrently.

S. Science
Fall, Winter, Spring, Summer. 3(2-2)
ED 200; ED 327 or concurrently.

T. Social Science
Fall, Winter, Spring, Summer. 3 credits. ED 200; ED 327 or concurrently.

U. Communication
Fall, Winter, Spring. 3 credits. ED 200;
ED 327 or concurrently.

V. German and Russian
Fall. 3 credits. ED 200; ED 327 or concurrently.

329F. Introduction to Driver and Traffic Education
Fall, Spring, Summer. 4(3-2) Valid driver's license.
Introduction to and an analysis of the driving task. Theory and practical application will be provided.

341B. Industrial Arts Mechanics
Winter and Fall of even-numbered years, Spring of odd-numbered years. 3(0-6) ED 241B or approval of department.
Work in benches, sheet metal, forging, welding, plate work, and machining of metals. Designed to provide the industrial arts teacher with sufficient breadth and skill to enable him to establish such a program in a secondary school.

341C. General Electricity
Winter and Fall of even-numbered years, Spring of odd-numbered years. 3(0-6) Approval of department.
Low voltage wiring, household devices and appliances, motor and general maintenance, house wiring, elementary radio, and elementary television. Designed to exemplify desirable practice in course organization and facilities for the modern secondary school.

401. Sociology of Education
Winter, Summer. 4(4-0) SOC 241. Interdepartmental with and administered by the Department of Sociology.
School as a social institution, school-community relations, social control of education, and structure of school society.

409. Supervising High School Publications
Spring, Summer. 3(3-0) Juniors, non-majors. Interdepartmental with and administered by the School of Journalism. Staff organization, finance, law, function, and editorial policies of school newspaper and yearbooks.
410. Instructional Design and Technology
Fall, Spring, 2 to 4 credits. May reenroll for a maximum of 6 credits. ED 200.

Students design plans for implementing instruction via systems approach and application of learning principles.

411. School Learning I
Fall, Winter, Spring, Summer. 3(3-0)
ED 200

Verbal learning, concept formation, problem solving and transfer with implications for teaching in schools.

412. Human Growth and Development
Fall, Winter, Spring, Summer. 4(2-4)
ED 200

Patterns in human growth and mental and emotional development of children 3 through 12 and adolescents 12 through 18; observation and participation in schools is an integral part of the course.

413. Mental Health of School Children
Fall, Winter, Spring, Summer. 3(3-0)
ED 200

Social and emotional adjustments of children. Emphasis on balancing factors favoring prevention and resolution of behavior difficulties and evaluation of school programs on basis of their contribution to mental health.

414. Interpersonal Process Recall
Fall, Winter, Spring, Summer. 3(3-2)
ED 200

Approval of instructor.

Interpersonal communication focusing on one's own interpersonal style through self-study of video-recorded interviews.

415. Student Leadership Training
Fall, Winter, Spring. 2(2-2)
May reenroll for a maximum of 4 credits if different topic is taken. Approval of instructor.

Prepares students for leadership roles and responsibilities by encouraging the development of skills and techniques consistent with the principles of our democratic society.

423A. Educational Provisions for the Visually Handicapped
Fall, Summer. 3(3-0) ED 424A, ASC 222

454.

Courses and effects of visual impairment, definitions, statistics and trends, history and legislation; program and services for children and adults through schools, agencies and institutions; medical and psychological aspects.

423B. Curriculum, Methods and Materials for the Visually Handicapped
Fall, Summer. 4(3-2) ED 424A, ED 423C or concurrently.

Comprehensive curriculum essentials; required teacher competencies; and special principles of instruction. Resources, materials and methods of teaching at the elementary school level. Concurrent laboratory experience in classrooms with visually handicapped pupils.

423C. Braille
Fall, Summer. 4(3-2) ED 424A, ASC 454.

A laboratory course designed to teach the skills of reading and writing standard English Braille using required tools.

423D. Low Vision and Its Facilitation
Winter, Summer. 5 credits. PS 279, PS 329.

Medical lectures and laboratory demonstrations regarding various pathologies leading to reduced vision. Visual and optical aids for utilization of residual vision. Educational implications of pathologies, reduced vision and optical aids.

423E. Daily Living Skills for Visually Handicapped Children
Fall, Summer. 3(3-0) ED 424A.

Basic techniques for developing competencies in daily living skills including grooming, eating, orientation and mobility. Readiness activities. Use of cane as mode of travel.

423F. Communication Modifications for Visually Handicapped Children
Spring. 2(2) ED 423C.

A laboratory course including Nemeth Code of Mathematics; science, music and language notations; preparation of classroom materials; establishing test reference materials. Emphasis upon instruction at the secondary level.

423G. Education of the Blind-Deaf
Fall, Winter, Spring. 3(2-2)
May reenroll for a maximum of 8 credits. ASC 222, ASC 277, ASC 451, or concurrently.

Methods of teaching blind-deaf children including guiding principles, curriculum structure, readiness activities; sensory development; discipline; evaluation; methods of communication; speech and speech reading, and language, including language methods and principles.

424A. Education of Exceptional Children
Fall, Winter, Spring. 3(3-0)

Emphasis on the nature of handicapping conditions and educational needs and approaches. Includes mental retardation; emotional disturbance; visual, auditory and physical handicaps.

424B. Psycho-Educational Evaluation of the Handicapped
Fall, Winter, Spring. 3(3-0) ED 424A.

Screening and placement procedures. Terminology and interpretation of tests used for assessment of intelligence, aptitude, achievement, personality and interests of the handicapped.

424C. Organization of Services for the Handicapped
Fall, Winter, Spring. 3(3-0) ED 424A.

Identification and study of organizations important to the operation of special education programs including educational, state and voluntary agencies.

425A. Educational Provisions for Deaf Children and Youth
Winter, Spring. 3(3-0) ED 424A, ED 436, ASC 454.

Adaptation of educational methods and curriculum to the needs of individuals with severe and profound hearing impairment.

425B. Language Development for the Deaf
Fall, Winter, Spring. 3(3-0) ED 424A, ED 436, ASC 222, ASC 454.

Theories of language development; considerations of systems in both oral and total communication philosophies; practice in manual communication.

425C. Speech Development for the Deaf
Fall, Winter. 3(3-0) ED 425B or concurrently.

Techniques for aiding development of intelligible speech in individuals with severe and profound hearing loss.

425D. Manual Communication of the Deaf
Fall, Winter, Spring. 3(3-0) ED 425A, ED 426.

Development of basic skills in finger spelling and the language of signs, with emphasis on signed English; practice in simultaneous use with spoken English.

427A. Educational Provisions for the Physically Handicapped
Fall, Winter, Spring. 3(3-0) ED 424A, ED 427.

Facilities, programs, trends, methods, materials and terminology in education of the physically handicapped. Field trips to special classes and hospital school programs.

427B. Educational Provisions for Learning Disabilities
Fall, Winter, Spring. 3(3-0) ED 424A or approval of department.

Characteristics and terminology of basic learning theories and learning disabilities. Educational practices and programs and major contributors. Field practicum with learning disability children.

427A. Psycho-Educational Characteristics of the Mentally Retarded
Fall, Winter, Spring. 3(3-0) ED 424A or approval of department.

Cognitive, affective and social characteristics of the mentally retarded. Implications for school learning and life adjustment. Differentiation of mental retardation from related conditions.

428B. Curriculum for the Mentally Retarded
Fall, Winter, Spring. 3(3-0) ED 424A or approval of department.

The development of curriculum for mentally retarded children and youth emphasizing current practice in pre-school through secondary school programs for educable and trainable mentally retarded.

428C. Educational Procedures for the Mentally Retarded
Fall, Summer. 3(3-0) ED 424A or approval of department.

Methods of instruction for mentally retarded children and youth, including the development of objectives, assessment of individual abilities, the development of learning skills, and the teaching of non-academic and academic skills.

428D. Education of the Severely Retarded
Fall, Winter. 3(3-0) ED 424A.

Programs in teaching severely mentally retarded children and youth.

429G. Laboratory Programs in Driver and Traffic Education
Fall, Winter, Summer. 3(3-4) ED 326F, valid driver's license.

Examination of the aims, objectives and role of laboratory programs in driver and traffic education. Directed laboratory experiences with new drivers will be provided.
429H. Organization and Administration of Driver and Traffic Education
Fall. Summer of even-numbered years. 3(3-0) ED 329F.
Organizational and administrative aspects of driver and traffic education as they relate to the total school and other specialized programs. Historical and philosophical aspects, evaluation, related professional organizations, and occupational opportunities.

429J. Personality Factors in Driver and Traffic Education
Winter. Summer of odd-numbered years. 3(3-0) ED 329F, PSY 225.
Study of behavior with emphasis on attitudes, motivation, and adjustment and their relationship to unsafe driving. Investigation of principles, and methods appropriate in identifying, understanding, and modifying unsatisfactory behavior.

429K. Fundamentals of Traffic Law
Spring. Summer of odd-numbered years. 3(3-0) ED 329F. (0-6) Interdepartmental with the School of Criminal Justice.
Nature, function and application of traffic law as it applies to the safe and efficient movement of people and goods in a broadly conceived traffic accident prevention program.

429L. Methods and Materials in Driver and Traffic Education
Winter. 3(3-0) ED 329F.
Classroom instruction in driver education. Selection and presentation of appropriate classroom materials. Evaluation of classroom teaching techniques.

429M. Curriculum Development in Driver and Traffic Education
Spring. 3(3-0) ED 429G, ED 429L.
Philosophical basis of curriculum construction. Trends in driver education curriculum development. Development of model curriculum for two, three and four phase driver education programs using accepted principles of curriculum construction.

431A. Educational Media in Instruction
Fall, Winter, Spring. 3(3-0)

431B. Basic Educational Graphics
Fall, Winter, Spring. 3(3-0) ED 431A or approval of department.
A course for teachers and prospective teachers in the local production of visual instructional materials.

432A. Psycho-Educational Characteristics of the Emotionally Disturbed
Fall, Winter, Spring. 3(3-0) ED 432A.
Psycho-educational characteristics of the emotionally disturbed are surveyed and evaluated. Additionally, various strategies which purport to educate the disturbed child are studied and evaluated.

432B. Remedial Practices with the Emotionally Disturbed
Fall, Winter. 3(3-0) ED 432A.
Emphasis is on the specific learning disabilities of the emotionally disturbed, both in the area of assessment and remediation. Specific methods and materials are surveyed and described in terms of their use.

432C. Classroom Management: Emotionally Disturbed
Fall, Winter, Spring. 3(3-0) ED 432A, ED 432B, and one student teaching with emotionally disturbed.
For student teachers in the area of the emotionally disturbed only. The primary emphasis is on psycho-educational curriculum, and management of the emotionally disturbed in school settings.

433. Alcohol: A Social Dilemma
Winter. 3(3-0) Juniors or approval of college. Interdepartmental with and administered by the School of Criminal Justice.
Substance abuse emphasis on beverage alcohol. Sociological, psychological and medical aspects. Prevention, treatment, rehabilitation.

436A. Student Teaching
(Fall, Winter, Spring. 15-15-25)
May reenroll for a maximum of 30 credits. 200 cumulative grade-point average; ED 327 for Secondary Education majors; ASC 477 for Audiology and Speech Sciences majors; approval of college. Applications must be made to the Student Teaching Office as follows: Fall—during the previous October; Winter—during the previous February; Spring—during the previous May.
Participation in activities of school and community. Teaching and related activities, observation, and seminar on the problems of teaching. Usually requires students to live in typical Michigan cities for an entire term.

436B. Student Teaching
(Fall, Winter, Spring. 5-15-30) 2.00 cumulative grade-point average; ED 327 for Secondary Education majors; ASC 477 for Audiology and Speech Sciences majors; approval of college. Applications must be made to the Student Teaching Office as follows: Fall—during the previous October; Winter—during the previous February; Spring—during the previous May.
Participation in activities of school and community. Teaching and related activities, observation, and seminar on the problems of teaching. Usually requires students to live in typical Michigan cities for an entire term. A competency based course.

436C. Student Teaching (Fall, Winter, Spring. 10-30-30) ED 436B. Application must be made to the Student Teaching Office as follows: Fall—during the previous October; Winter—during the previous February; Spring—during the previous May.
Participation in activities of school and community. Teaching and related activities, observation, and seminar on the problems of teaching. Usually requires students to live in typical Michigan cities for an entire term. A competency based course.

436D. Student Teaching-Special Education 2nd Term
Fall, Winter, Spring. 15-5-25) ED 436A.
School and community participation; Planning, conducting and evaluating instruction in special education; management techniques; observations and seminars; working with other special education professionals. An off-campus course in selected Michigan locations.

441A. General Industrial Arts
Fall and Winter of odd-numbered years, Spring of even-numbered years. 3(0-6) ED 436 or approval of department.
Research in the facilities, materials, and organization of general industrial arts in the modern secondary school.

441B. Advanced Industrial Arts Mechanics
Winter and Fall of even-numbered years, Spring of odd-numbered years. 3(0-6) ED 341B or approval of department.
Typical applications of power and its control, internal combustion engines, external combustion engines, motors, drive, and transmission devices, hydraulic and pneumatic equipment, experimentation with organizational patterns and teaching devices when taken for graduate credit.

441C. Advanced General Electricity
Winter and Fall of odd-numbered years, Spring of even-numbered years. 3(0-6) ED 341C or approval of department.
Development and construction of simple electric motors, radios, and electrical devices. Experimentation with the development of organizational patterns appropriate to secondary schools when taken for graduate credit.

441D. Advanced Printing and Graphics
Winter and Fall of odd-numbered years, Spring of even-numbered years. 3(0-6) ED 241D or approval of department.
Printing, plate making, and photography. Attention to development of adult programs in the area of graphics. Development of resource materials when taken for graduate credit.

441E. Advanced Industrial Arts Crafts
Winter and Fall of odd-numbered years, Spring of even-numbered years. 3(0-6) ED 241C or approval of department.
Designed to provide the industrial arts teacher with sufficient breadth and skill to enable him to establish such a program in a secondary school.

442. Principles and Practices in Home Economics
Winter, Spring, Summer. 3(3-0) ED 436.
Analysis of the student teaching experience. Professional expectations, role of the teacher, and scope of home economics programs.

446. Teaching Internship
Fall, Winter, Spring. 5 to 15 credits.
May reenroll for a maximum of 22 credits. ED 331A.
Internship teaching experience under the guidance and supervision of intern consultants and other MSU Faculty. Involves a variety of activities, including full-time teaching experience in a selected school.

450. School and Society
Fall, Winter, Spring. Summer. 3(3-2) ED 200.
Study of the structure, function and purpose of educational institutions. Course provides options for students in meeting professional needs recognized in directed teaching and desired before entering full professional practice.

464. Standardized Tests and Testing Programs
Fall, Winter, Spring. Summer. 3(3-0) ED 200.
History and status of educational measurement. The available standardized tests and sources of information about them. Interpretation of standardized test scores, norms and profiles. Local and wide scale testing programs.
465. Testing and Grading  
Fall, Winter, Spring, Summer. 3(3-0)  
ED 200.  
Construction, use, and evaluation of teacher-made classroom tests, objective and essay, in elementary schools, secondary schools, and colleges. Statistical analysis of test scores and item responses. Grading problems.

470. Science Instruction in Selected Areas for Elementary and Middle School Teachers  
Winter, Spring. 3(3-0) May reenroll for a maximum of 6 credits. ED 325F.  
Extends instructional techniques and knowledge of teaching materials in various science-related curricula for elementary and middle school. Limited to examination of selected topics during any one term.

471B. Classroom Management in Business and Distributive Education  
Fall, Spring. 3(3-2) ED 290, ED 327C concurrently or approval of department.  
Principles and practices of using materials and media, using community resources, providing directed occupational experiences, how to individualize instruction, evaluating student achievement.

472. Organization and Administration of Cooperative Office and Distributive Occupations Programs  
Fall, Spring. 3(3-0) ED 471B or concurrently, or approval of department.  
Development of knowledge and understanding of (1) purpose of preparatory in-school curriculum and its relationship to cooperative programs of office and distributive occupations; (2) organization and administration of a cooperative program; (3) coordination techniques, and (4) correlation of on-the-job and in-school learnings through related instruction class.

473. Individualized Study in Industrial Education  
Fall, Winter. 3 credits. May reenroll for a maximum of 3 credits. Approval of department.  
Development of professional and technical competencies in industrial education using laboratory, library, school, government, and industrial settings.

475. Practicum in Developmental and Corrective Reading  
Fall, Winter, Spring. 3(1-2) ED 325A.  
Application in a field setting of instructional principles introduced in ED 335A. Also a broad theoretical base for teaching reading.

IDC. Canadian-American Studies  
For course description, see Interdisciplinary Courses.

477. Use of Paraprofessionals in Counseling  
Fall, Spring. 3(3-0)  
History and current status of the paraprofessional movement. Review of the selection, training, and evaluation processes; identification of issues and problems in the use of support personnel.

481. Museum as an Educational Tool  
Spring. 4(4-0) Juniors.  
The museum as an educational tool. Classroom preparation for the museum experience. Museum strategies including dioramas, collections, models, exhibits and reconstructions. Application of museum strategies to other educational settings.

482. Seminars in Education  
Fall, Winter, Spring, Summer. 1 to 5 credits. Approval of department.  
Seminars in the various fields of emphasis in education.

483. Readings and Independent Study in Education  
Fall, Winter, Spring. Summer. 1 to 8 credits May reenroll for a maximum of 8 credits. Juniors, approval of department.  
Study on an individual basis in the various fields of emphasis in education.

484. Field Experience in Education  
Fall, Winter, Spring, Summer. Variable credit. May reenroll for a maximum of 12 credits. Approval of department.  
Supervised undergraduate practicums in education.

485. Elementary Pre-Intern Seminar  
Winter, Spring. 4(4-0) Approval of department. Completion of Phase I of Internship Teaching.  
Selected professional and clinical educational problems are studied in a field setting as an integrated part of the pre-intern twenty-week block of courses.

486. Foreign Field Experience in Elementary Education  
Winter, Spring. 4(4-0) Approval of department. ED 321A.  
Supervised undergraduate practicum combining a study of a foreign country’s culture and related educational practices as an integral part of Phase I (student teaching) of Internship Teaching in a foreign country.

489. Core Seminar in Special Education  
Fall, Winter, Spring. 3(2-0) ED 101A, ED 424A, admission to special education, core students only.  
Consideration of affective interactions with children, parents, other professionals, and self. Attention to sharing field experiences, examining belief-behavior consistency, teaching in the affective domain, and the parent-teacher partnership.

490A. Field Experience: Deaf Education  
Fall, Winter, Spring. 3(0-6) ED 436; ED 425B, ED 425C or concurrently.  
Observation/participation in day classes for hearing impaired learners at elementary, secondary or post-secondary levels. Minimum 60 clock hours.

490B. Field Experience: Emotionally Impaired  
Fall, Winter, Spring. 3(1-5) May reenroll for a maximum of 12 credits. ED 101A.  
Supervised practicum in an educational program for emotionally impaired learners accompanied by a discussion period on application of educational strategies.

490C. Field Experience: Mental Retardation  
Fall, Winter, Spring. 3(0-9) May reenroll for a maximum of 9 credits. Approval of department.  
Supervised practicum in an educational program for mentally retarded learners.

490D. Aiding Teachers of Visually Handicapped Learners  
Fall, Winter, Spring. 1(0-3) May reenroll for a maximum of 4 credits. Juniors and majors in education of visually handicapped or blind deaf children.  
Three separate experiences aiding teachers of preschool, primary, intermediate and adolescent-young adult, multi-impaired visually handicapped learners in public and residential school programs.

490E. Aiding Teachers of Blind/Deaf Learners  
Fall, Winter, Spring. 1(0-3) May reenroll for a maximum of 3 credits. Juniors and majors in education of blind/deaf children.  
Three separate experiences aiding teachers of blind/deaf learners in teaching low-functioning, preacademic and primary level children.

490F. Teaching Low Vision Skills  
Fall, Winter, Spring. 1(0-3) Juniors and majors in education of visually handicapped or blind deaf children.  
Assisting learners with limited residual vision make maximal use of prescribed low vision aids; and interpreting the use of such aids to teachers of nonhandicapped children.

490G. Teaching Daily Living Skills to Visually Handicapped Learners  
Fall, Winter, Spring. 1(0-3) Juniors and majors in education of visually handicapped or blind deaf children.  
Supervised practice with visually handicapped and blind deaf learners to develop competencies in teaching orientation and mobility, and the other skills of daily living.

490J. Field Experience: Special Education Core  
Fall, Winter, Spring. 3(0-16) ED 101A, ED 424A, admission to special education, core students only.  
Supervised practicum in an educational program for handicapped learners, taken concurrently with ED 424B and ED 424C.

495. Reading in the Content Areas of the Secondary Level  
Fall, Winter, Spring. 3(2-0) Approval of instructor.  
Strategies for reading assessment and instruction compatible with content area teaching objectives. Practical applications in classroom settings for learners in grades 7-12 as well as adults. Performance based.

800. Crucial Issues in Education  
Fall, Winter, Spring, Summer. 3(3-0)  
Approval of department.  
Problem analysis of timely issues in education analyzing their legal, historical, sociological, and philosophical dimensions. Attention centered on problems of continuing concern. Particular attention devoted to the role of the teaching profession in issues involving public policy.

801. Seminars in Social and Philosophical Foundations of Education  
A. Philosophy of Education  
Fall, Winter, Spring, Summer. 3(3-0)  
Approval of department.  
Identification of underlying philosophical problems in education. Use of philosophical methodologies in analyzing these problems. Development of a consistent personal philosophy of education.
D. Social Criticism and Education
Fall, Summer. 3(3-0) ED 801A, approval of department.
Deals historically with the development of modern education in the last three centuries. An intensive study of the works of leading figures in educational thought. Emphasis upon Rousseau's 'Emile'. Works by Pestalozzi, Herbart, Froebel, James, and others examined.

E. Comparative Educational Philosophies
Winter, Summer. 3(3-0) ED 801A.
Critical analysis and evaluation of the educational philosophies of Plato and Dewey and their implications for practice.

F. Modern Philosophies of Education
Spring, Summer. 3(3-0) ED 801A.
Critical analysis and evaluation of leading modern philosophies of education and their implications for practice, such as: existentialism, idealism, materialism, realism, reconstruc-}

502A. Education in the U.S.A.
Fall. 3(2-4) Passed English Language Center examination or approval of department.
Designed to provide first term foreign students in graduate programs with theoretical and experien-}

tial background in American education.

502B. Education in the U.S.A.
Winter. 3(2-4) ED 502A or approval of department.
Designed to provide foreign students in graduate programs with theoretical and experien-
tial background in American education.

803. Curriculum Innovation in Elementary and Middle School Science
Summer. 3(3-0) Experience in teaching, ED 325F or approval of department.
In-depth examination of the objectives, learning theory, instructional strategies, classroom ac-
tivities, and science content of a single elementary science program selected from among such curriculum revision projects.

804. Historical and Comparative Foundations of Education
A. History of American Education
Fall, Winter, Spring, Summer. 3(3-0) Approval of department.
Survey of higher education in the United States and its foreign antecedents. Survey of higher education today with attention to purposes, curriculum, organization, financing, and the major issues in these areas. Emphasis upon the influences of the United States higher education in foreign countries.

B. Higher Education in the United States
Fall, Spring, Summer. 3(3-0) Approval of department.
Survey of higher education in the United States and its foreign antecedents. Survey of higher education today with attention to purposes, curriculum, organization, financing, and the major issues in these areas. Emphasis upon the influences of the United States higher education in foreign countries.

C. Educational History: Plato to Locke
Winter, Summer. 3(3-0) Approval of department.
Examines the development of educational thought and practice in the Western World.

D. Development of Educational Thought and Practice in the Modern World
Spring, Summer. 3(3-0) Approval of department.
Studies the development of modern education in the last three centuries. An intensive study of the works of leading figures in educational thought. Emphasis upon Rousseau's 'Emile'. Works by Pestalozzi, Herbart, Froebel, James, and others examined.

E. Education in the Western World
Fall, Summer. 3(3-0) Approval of department.
Comparative study of educational systems and philosophies of Canada, England, France, Russia, and other Western countries. Visiting foreign educators. Field trip to Canada.

F. Education in the Non-Western World
Winter. 3(3-0) Approval of department.
Comparative study of educational systems and philosophies of Asian and African countries to gain insight into the American educational system. Visiting foreign educators.

805. Seminar in Urban Teaching
Fall, Spring, Summer. 3(3-0) Approval of department.
Exploration of literature related to problems, programs, and techniques of effective teaching in urban schools. Importance of student and teacher characteristics and program organization and goals will be assessed as they relate to quality education.

806. Problems of the Professional in Higher Education Administration: Men and Women
Spring. 3(3-0) Approval of department.
Examines the role of the professional in higher education in the United States and Canada, focusing on the experiences and contributions of men and women in these roles. Emphasis upon the implications of these roles for the future of higher education.

807. Contemporary Issues in American Higher Education Administration
Winter. 3(3-0) Approval of department.
Examines contemporary issues in American higher education administration, with a focus on the role of gender in shaping these issues.

808. Methods and Materials in Children's Literature
Fall, Winter, Spring, Summer. 3(3-0) Undergraduate course in children's literature, graduate students. Critical evaluation of current research and materials used in teaching and administration.

809. Advanced Methods of Teaching Language Arts
Fall, Winter, Spring, Summer. 3(3-0) Graduate students.
Survey of principles and instructional methods for teaching listening, speaking, and writing at the elementary and middle school levels; examination of current practices and research through self-selected areas of special study.

810. Teaching Elementary School Social Studies
Fall, Winter, Spring, Summer. 3(3-0) Approval of department.
Survey of research with special attention to child development and of teaching and development of school programs.

811. Growth and Behavior
Fall, Winter, Spring, Summer. 3(3-0) Approval of instructor.
Survey of research with special attention to applications to teaching and development of school programs.

812. Social and Emotional Behavior in the Classroom
Fall, Winter, Spring, Summer. 3(3-0) Six credits in Psychology or Educational Psychology.
Survey of experimental and clinical research related to life factors which affect social-emotional development; implications for teaching.

814. Classroom Discipline
Summer. 3(3-0) Experience in teaching or pupil personnel work.
The study and practice of positive strategies for the resolution of classroom discipline problems.

815. Principles of Guidance and Personnel Services
Fall, Winter, Spring, Summer. 3(3-0) Survey of guidance services and their application in educational settings—elementary and secondary. Introduction to the field of pupil personnel work in schools. Practical guidance problems are considered.

815C. Student Personnel Work in Higher Education
Fall, Summer. 3(3-0) Overview of student personnel services in colleges and universities. Philosophy, organization, and administration of the personnel program at this level and of specific services provided. Opportunity to visit and study college personnel programs.

815D. Introduction to Rehabilitation Counseling
Fall. 3(3-0) Open to rehabilitation counseling majors only.
Overview of field of rehabilitation, orientation to the Michigan Division of Vocational Rehabilitation. Rehabilitation counseling prepracticum experience with Michigan Department of Vocational Rehabilitation.

815E. Rehabilitation Internship
Winter, Spring. 3 to 21 credits. ED 815F. Supervised graduate internship in rehabilitation counseling.

815F. Overview of Rehabilitation Placement
Winter. 3(3-0) ED 815D. An overview of the impact areas of job placement for the handicapped. Presentations on placement models, state agency approaches, pertinent legislation, and employer, counselor, and client perspectives.
815G. Assessing Vocational Potential
Spring. 3(3-0) ED 815F.
Techniques for assessing the vocational potential of disabled individuals including use of vocational tests, medical information, and occupational information for an integrated vocational appraisal.

815H. Assessing Employer Needs
Fall. 3(3-0) ED 815F, ED 815G.
Techniques for surveying employers, gaining entry for an interview, presenting oneself, client, and agency, and assisting clients in their search for employment.

815J. Research Applications in Rehabilitation
Fall, Winter, Spring, Summer. 3(3-0) ED 815E. concurrently or approval of department.
Individual study and research related to an aspect of rehabilitation.

816. Procedures in Guidance
A. Career Development Services
Fall, Winter, Summer. 3(3-0) ED 815B; or concurrently.
Analysis of group and individual methods providing information related to career planning, educational opportunities, and person-social concerns. Utilization of information from placement agencies, follow-up studies, and community surveys in career revision is stressed.

B. Counseling and Guidance in the Classroom
Fall, Winter, Spring, Summer. 3(3-0) ED 815B, or concurrently.
Examination of factors underlying counseling activities of teachers and administrators. Basic principles, methods and techniques related to diagnosing, interviewing and referring counselors for special assistance are included.

C. Practice in Group Counseling Techniques
Winter, Summer. 3(3-0) ED 815B.
Emphasis upon development of counseling skills thorough analyzing and leading small groups. Students participate in a group to examine in depth their own self-image and motives. Didactic content is related to experiences in the group.

D. Practice in Individual Interviewing Techniques
Spring, Summer. 3(3-0) ED 816A and ED 816B.
Role-playing, video tapes, audio tapes and demonstration are utilized in helping each student develop skills in counseling with children and counseling with parents. Techniques appropriate for various age levels and problems will be practiced.

817A. Introduction to Urban Counseling
Fall. 3(3-0) ED 819A and ED 819B concurrently.
Problems—health, socio-cultural, economic, educational, legal, vocational—as manifested by urban residents and their resolution through counseling. Emphasis on systems and personal change mechanisms.

817B. Systemic Counseling
Fall. 3(3-0) Approval of department.
An evaluation of the theory and philosophy of systemic counseling. Issues pertaining to systemic change will be examined.

817C. Urban Counseling Practicum
Fall, Winter, Spring, Summer. 3 credits. May reenroll for a maximum of 12 credits. ED 817A or approval of instructor. A minimum of 12 hours per week of supervised counseling will be performed in an urban agency setting. Emphasis on developing counseling skills applicable to urban residents and urban agencies.

817D. Urban Career Development System Analysis
Winter. 3(3-0) ED 817A and approval of department. Critique of existing theories of vocational (career) development and interest inventories for use with urban residents, examination of barriers to urban residents, and development of alternative models.

817K. Community Evaluative Research
Spring. 3(3-0) ED 817A, ED 867, and ED 869, approval of department. Application of evaluative research methods to the solution of urban problems; review of current evaluative techniques: identification of problems, design, experiments; review of selected studies.

818A. Behavior Disorders in Children
Spring. 3(3-0) 12 graduate credits in educational psychology or a related area. Characteristics, causes and treatment of school related behavior disorders in children considered within a developmental framework.

818B. Roles and Functions of School Psychologists
Spring. 3(3-0) Admission to Ed.S. program or approval of instructor. History and current status of the field. Current concerns in assessment, reporting of findings, consultation and legal-ethical responsibilities.

819A. Counseling Practice
Fall. 3(3-0) Admission to M.A. Counseling Program. The practice of counseling and guidance in schools, community colleges, and rehabilitation agencies.

819B. Introduction to Counseling Theory
Fall. 3(3-0) Admission to M.A. Counseling Program. Selected theories of counseling with special attention to the application of theories of learning in the counseling process.

819C. The Guidance Information Service
Spring. 3(3-0) ED 819A and ED 819B. The use of occupational, educational and social information in counseling interviews and in guidance programs.

819D. The Counseling Process
Winter. 3(3-0) ED 819A and ED 819B. The counseling process with emphasis given to students learning a systematic approach to counseling. Selected remedial and preventative counseling strategies will be studied. Methods and techniques for assisting with individual and environmental change will be examined. Procedures for consulting with parents, teachers, and agency personnel will be studied.

819F. Counseling Practicum I
Fall, Winter, Spring. 6(4-8) ED 819C and ED 819D. Supervised counseling experienced in selected schools and agencies followed by analysis and critique of these experiences through group and individual consultation with instructor.

819G. Counseling Practicum II
Fall. 6(4-8) ED 819F.
Continuation of ED 819F.

819H. Development Counseling Services
Fall. 3(3-0) ED 819F. A systems approach to the management of pupil personnel services. Students will use the approach in solving simulated problems.

819J. Group Procedures in Counseling
Summer. 3(3-0) ED 819F. An examination of theories of group counseling with special attention given to group dynamics, research methods, and techniques. Tapes of group counseling will be analyzed and practice in leading groups under simulated conditions will be provided.

820. Principles of Curriculum Improvement
Fall, Winter, Spring, Summer. 3(3-0) Experience in teaching; approval of department. Principles of curriculum improvement will be developed through the critical analysis of practices found in public schools.

821A. Curriculum Construction
Fall, Winter, Spring. 3(3-0) ED 820. Approaches to curriculum construction; organization and function of personnel; initiating and evaluating curriculum change; curriculum research.

821C. Work Experience in the Curriculum
Fall. 3(3-0) Work environment in schools, colleges, agencies and business and industry; educational objectives and outcomes; administrative aspects of work experience programs; research in the field.

821D. Seminar in Middle School Curriculum
Fall, Spring, Summer. 3(3-0) Contrasting patterns of programs for early adolescents; age range and characteristics of middle school pupils; problems and potential of the middle school.

822A. Community College
Fall, Winter, Spring. 3(3-0) Purposes, functions, and offerings of the community college.

822B. Adult Education: A General Survey
Fall, Spring. Summer. 3(2-2) Approval of department. Overview of extent, origins, forms, purposes, content, sponsors, methods and guiding theories of continuing education and its significance for individuals, institutions, communities and nations.
822F. Occupational Analysis and Course Construction in Vocational Education
Winter, Summer. 3(3-0) Approval of department.
Techniques of analyzing an occupation to determine the processes, instructional units and curricular arrangements.

822G. Curriculum Construction in Industrial Education
Winter, Summer. 3(3-0) Approval of department.
Selection of general and specialized areas of study in junior and senior high school and adult industrial education courses. Industrial problems, their relation to a particular community and its needs in relation to instruction.

822J. Organization and Management of School Shops
Spring, Summer. 3(3-0) Approval of department.
Planning and organization of school shops in terms of adequacy, adaptability, efficiency, economy, and safety.

822N. Principles and Programs of Vocational Education and Practice
Fall, Summer. 3(3-0)
Principles of vocational and technical education, comprehensive school program characteristics, program planning. Special emphasis is given to programs in agriculture, distributive, health, home economics, industrial, and office education. For vocational and practical arts teachers and local coordinators and directors of programs.

822P. Coordination in Occupational Training Programs
Fall, Winter. 3(3-0) Approval of department.
Analysis of objectives and scope of distributive, office, trade and industrial cooperative education programs, apprenticeship, and general education work experience. Emphasizes organization and administration, instructional procedures, coordination techniques, club activities, and evaluation of cooperative occupational education.

822Q. Current Issues and Developments in Occupational Education
Fall, Winter, Spring, Summer. 3(3-0)
Examination of issues and problems in occupational education. Special emphasis on the emerging role of various governmental and private agencies in manpower development. Designed for majors in fields other than vocational education.

822S. Developing Occupational Curricula in Two-Year Colleges
Fall, Winter. 3(3-0) ED 822N, ED 822A, or approval of department.
Occupational curriculum development and course construction. Developmental projects involving community college faculty, students and employers. For prospective teachers and administrative personnel in two-year colleges.

823. Instructional Simulation
Winter. 3(3-0) Teaching experience.
Design and use of simulations and instructional games in the curriculum for development of social skills, values, and affects.

824. Seminar in Instructional Development
Winter, Summer. 3(3-0)
Skills and competencies in applying instructional systems principles to learning and teaching problems.

825. Seminar in Instructional Television
Spring, Summer. 3(3-0) Approval of department. Interdepartmental with the Department of Telecommunication.
Television use in instruction, particularly as it concerns the learner, the classroom teacher, the instructional developer and the administration.

826. Social Studies Curriculum K-12
Winter. 3(3-0) Teaching experience.
Social studies curriculum planning, development and improvement. Emphasis on holistic K-12 view but each student will be encouraged to concentrate on a selected area or topic.

827. Improving Secondary Social Studies Instruction
Fall, Spring, Summer. 3(3-0) Teaching experience.
Recent literature, curricular materials, and research in secondary social studies. Individual projects on new curricular developments in one of the following areas: history, geography, civics, economics, sociology, anthropology, or psychology.

828B. Teaching Adult and Young Farmer Classes in Agriculture
Fall, Summer. 3(3-0) Approval of department.
Objectives of adult education in agriculture, organizing and promoting classes, course planning, instructional procedures, follow-up and evaluation.

828C. Continuing Education: Learning Theory and Program Development
Fall, Winter, Summer. 3(2-2) Twelve credits in Education, approval of department.
Theories of adult learning and community development, their implications for design and management of continuing education, and alternative methods for integrating social and physical environments, materials, media and personnel to increase knowledge and enhance personal and social maturity.

828D. Instructional Methods in Business and Industry
Winter, Summer. 3(3-0) Approval of department.
Designed for personnel responsible for the training function. Various instructional methods examined with emphasis on the conference method of problem solving.

828F. Principles and Problems of Instruction in Higher Education
Fall, Winter, Spring. 3(3-0) Approval of department.
Instructional problems in the various areas of higher education with emphasis on common principles underlying each of them.

829. Medical Information for Human Service Professionals
Fall. 3(3-0) Approval of instructor.
Provide a basic understanding of the major body systems and the chronic diseases and disabilities associated with these systems. Emphasis on medical lectures by physicians.

829A. Career Education
Fall, Winter, Summer. 3(3-0)
Historical background, curricular implications and instructional strategies related to kindergarten through adult career education programs. Program content and organization for developing awareness, exploration, decision making and planning skills.

830A. Special Methods and Materials of Teaching
Fall, Winter, Spring, Summer. 3(3-0)
May enroll in different subject-matter areas for a maximum of 15 credits. Graduate student in education; experience in teaching; undergraduate course in the area; approval of department.
Develops an understanding of the basic principles and techniques of effective instruction in the various subject-matter areas in the school curriculum. Students will be expected to investigate research as it relates to the improvement of instruction in a special field of study.

830C. Problems in Elementary Reading Instruction
Fall, Winter, Spring, Summer. 3(3-0)
Graduate student in education; undergraduate methods course in reading; approval of department.
For experienced teachers. Includes consideration of the basic aspects of ability to read, desirable reading attitudes, habits, and skills. Practices and materials used in reading programs are examined and appraised. Outstanding investigations dealing with problems in this area are studied and evaluated.

830D. Methods in Reading at the Secondary Level
Fall, Winter, Spring, Summer. 3(3-0)
Graduate students; teaching experience; approval of department.
An analysis of the reading problems of high school and college students. Material and procedures for identifying the reading attainments and needs of the individual. Basic principles and techniques for improving reading skills.

830E. Diagnosis of Reading Difficulties
Fall, Winter, Spring, Summer. 3(2-2)
Graduate students in education, ED 830C or ED 830D; approval of department.
Causes and types of reading retardation are considered, and procedures for working with retarded readers are examined. Laboratory experiences in administering and interpreting standardized and informal tests are provided.

830F. Clinical Practice in Remedial Reading
Fall, Winter, Spring. 3(2-2)
Graduate students in education, ED 830C or ED 830D; ED 830E recommended, approval of department.
Students work with individual cases, observe and practice group procedures in the University reading clinic.

830G. Methods of Teaching Agricultural Mechanics
Winter. 3(3-0) Approval of department.
Methods of instruction including program planning, scheduling, use of teaching aids, management of buildings, facilities and equipment, the selection, organization, and evaluation of activities in farm mechanics.

830H. Methods of Teaching Industrial Arts
Winter, Spring, Summer. 3(3-0) Approval of department.
Methods of instruction for instruction in the industrial arts, including program planning, scheduling, use of teaching aids, management of facilities and equipment, the selection, organization, and evaluation of activities in related fields.

830I. Methods of Teaching Business and Industry
Winter, Spring, Summer. 3(3-0) Approval of department.
Methods of instruction for instruction in various fields of business and industry, including program planning, scheduling, use of teaching aids, management of facilities and equipment, the selection, organization, and evaluation of activities in related fields.

830J. Methods of Teaching Home Economics
Winter, Spring, Summer. 3(3-0) Approval of department.
Methods of instruction for instruction in various fields of home economics, including program planning, scheduling, use of teaching aids, management of facilities and equipment, the selection, organization, and evaluation of activities in related fields.

830K. Methods of Teaching Social Science
Winter, Spring, Summer. 3(3-0) Approval of department.
Methods of instruction for instruction in various fields of social science, including program planning, scheduling, use of teaching aids, management of facilities and equipment, the selection, organization, and evaluation of activities in related fields.

830L. Methods of Teaching Science
Winter, Spring, Summer. 3(3-0) Approval of department.
Methods of instruction for instruction in various fields of science, including program planning, scheduling, use of teaching aids, management of facilities and equipment, the selection, organization, and evaluation of activities in related fields.
830H. Seminar in Developmental Reading
Fall, Winter, Spring, Summer. 3(3-0)
ED 830F.
Focuses on subject matter of reading and reading instruction factors which psychologically influence the development of reading skills, the implementation of developmental reading programs and evaluation of such programs.

830J. Seminar in Diagnostic and Remedial Reading
Fall, Winter, Spring, Summer. 3(3-0)
ED 830E.
Focuses on the psychological and physiological nature of reading retardation, the relationships between clinical reading programs and the larger curriculum environment, and the role of the reading diagnostician.

831A. Educational Media in Instruction
Fall, Winter, Spring, Summer. 3(3-0)
ED 831A or approval of department.
Students may not receive credit in both ED 431 and ED 831A.
Improvement of teaching through educational media. Learning principles, nature and application of films, filmstrips, slides, transparencies, flat pictures, developmental boards, models, tape recordings, radio and television, and equipment operation.

831B. Graphics Design and Use in Instruction
Fall, Winter, Spring, Summer. 3(3-0)
ED 831A or approval of department.

831C. Photography in Instruction
Fall, Summer. 3(3-0) ED 831B, or approval of department.
Design, production, and use of photographic materials for instruction. Production of photographs, slides, filmstrips, overhead transparencies, sound tapes, and motion pictures. 35mm still camera (preferably a single lens reflex) required.

831D. Instructional Materials in Vocational and Practical Arts Education
Winter of odd-numbered years, Summer. 3(3-0) Approval of department.
For teachers of agriculture, business, home economics, industrial arts and vocational-industrial education. Selection, preparation and use of distinctive materials that characterize shop and laboratory instruction.

832. Advanced Methods and Materials in Special Education
C. Learning Disabilities
Winter, Summer. 3(3-0) ED 437B, student teaching or clinical experience with handicapped or approval of department.
Approaches to remediation of learning disabilities in classroom identification, evaluation, methods, materials, aids, and programs, are considered within major theoretical structures.
D. Mentally HANDICAPPED CHILDREN AND YOUTH
Winter. 3(3-0) ED 428A, ED 428B, ED 428C.
An analysis of research, trends, and programs in the area of mental retardation. Emphasis upon the relationship these factors have to problems of curriculum, teaching methods, guidance of students, and general classroom management.

E. Emotionally Impaired
Summer. 3(3-0) ED 432A, ED 432B, ED 432C.
Review and analysis of recent research findings, intervention strategies, and curriculum development applied to emotionally impaired children and youth.

833. Teaching Elementary School Mathematics
Fall, Summer. 3(3-0) Experience in teaching and approval of department.
Advanced methods and materials used in teaching mathematics concepts in the elementary school.

834. Teaching Elementary School Geometry
Winter, Summer. 3(3-0) Experience in teaching and approval of department.
Advanced methods and materials used in teaching concepts of informal geometry, coordinate geometry, measurement, geometrical concepts and measurement topics.

835. Teaching Elementary School Arithmetic
Spring. Summer of even-numbered years. 3(3-0) Experience in teaching and approval of department.
Advanced methods and materials used in teaching concepts of the whole, integer, rational and real number systems including systems of numeration.

836. Elementary Education: School Mathematics Instruction
Winter, Summer. 3(3-0) Experience in teaching and enrolled in mathematics education.
Review of the literature— theoretical and research orientations in school mathematics including planning, group instruction, individual instruction, evaluation and instructional materials.

837A. Supervision of Student Teaching Summer. 3(3-0) Approval of department.
Designed to assist supervising teachers in guidance of student teachers. In addition to a general overview of the problems of student teaching, the following topics will be studied: trends in teacher education, orientation of student teachers to student teaching, responsibilities of the supervising teacher, relationships between supervising teachers and college personnel, conferences with student teachers, and evaluation of student teaching.

838. Classroom Analysis Fall, Winter, Spring. 3(3-0) Admission to M.A. in Classroom Teaching Program (MACT).
Development of procedures and skills essential for analyzing and improving teaching performance. Students will establish goals of self-modification where needed. Offered only in an off-campus setting.

839. Instructional Development Fall, Winter, Spring. 2 to 4 credits.
May re-enroll for a maximum of 12 credits. ED 839A.
Designed to improve a teacher's effectiveness in classroom instruction through individualized projects. Offered only in an off-campus setting.

839C. Classroom Synthesis Fall, Winter, Spring. Summer. 3(3-0)
ED 839B; 36 credits applicable toward the MACT.
Designed to refine one's personal educational philosophy, and establish long and short-term goals for improvement of teaching effectiveness. Offered only in an off-campus setting.

1DC. Interdisciplinary Seminar on Africa
For course description, see Interdisciplinary Courses.

839. Program Development in Distributive Education
A. Principles and Organization Fall, Summer. 3(3-0)
Goals, historical background, and trends; contributions to individual development and manpower needs; program organization for secondary, post-secondary, and adult levels; overview of curriculum and instructional strategies; program evaluation.
B. Curriculum Development Winter, Summer. 3(3-0) ED 839A or approval of department.
Adapting content of marketing and related disciplines to develop occupational competencies, selection of learning experiences; materials, and media; development of performance goals related to career objectives; scope and sequence patterns.
C. Seminar in Distributive Education Summer. 2 to 3 credits. Advanced graduate standing or approval of department.
Focus on current issues and problems, curricular development projects, and research emphasis upon individual investigations and writing.

840. Improving Instruction in Business Education
Improving instructional processes through research findings, readings, and experience; Objectives, scope and sequence, geometry, telecommunications, difficulties, selecting learning activities, evaluating achievement, selecting materials, and equipment.
A. Typewriting and Office Procedures Summer. 3(3-0) Experience in teaching.
B. Shorthand and Transcription Summer. 3(3-0) Experience in teaching.
C. Data Processing Summer. 3(3-0) Experience in teaching.
D. Distributive Subject (839C) Summer. 3(3-0) Experience in teaching.
Selecting appropriate teaching strategies; use of the project method; laboratory simulations, on-the-job training, youth organizations, and other methods; evaluation of student achievement.

841. Driver and Traffic Education
A. Innovations in Driver and Traffic Education Fall. Summer. odd-numbered years.
Examination of the broad spectrum of innovations in driver and traffic education. Particular emphasis will be placed on their adoption and application for improving classroom and laboratory instruction.
Descriptions - Education of Courses

B. The Highway Transportation System
Spring, Summer of even-numbered years. 3(3-0)
Overview of the development, management, and operation of the highway transportation system and its implications for the traffic safety educator.

C. Principles of Traffic Communications
Winter, Summer of odd-numbered years. 3(3-0)
Specialized problems involved in traffic safety communications in a transportation centered society. Design and manipulation of the communication center and influence driver behavior. Planning public information and community support programs.

D. Motor Vehicle Administration
Fall, Summer of even-numbered years. 3(3-0)
Functions of motor vehicle administration in highway traffic administration. Driver licensing, motor vehicle inspection, vehicle titling and registration, and financial responsibility as legal and administrative methods of driver and vehicle control.

842A. Curriculum and Program Planning
Summer. 3(3-0)
Needs and goals in education and manpower training for business, general business and economic education; program structure; professional and youth organizations; related legislation and historical background.

842B. Contemporary Issues in Education for Business
Summer. 3(3-0) Twenty-four graduate credits or approval of department.
Analysis and discussion of selected issues relating to: 1. education for business—structure, manpower needs, legislation, curriculum, training by government and business, 2. curriculum and instruction. Emphasis upon problem-solving and extensive reading.

842D. Seminar - Research in Business Education
Summer. 2 to 8 credits. Prior course in research or approval of department.
Emphasis on review of research and developmental projects and application to business education program; study of design particularly to student's personal research interests.

843. Program Development in Office Education
A. Strategy and Structure
Fall, Summer. 3(3-0) Twelve graduate credits in Business or Vocational Education or approval of department.
Criteria of vocational office education planning, organizing a program; curriculum patterns including block-time and senior intensive, content scope and sequence; program evaluation; special attention to legislation and curriculum research.

B. Classroom Systems
Winter, Summer. 3(3-0) Approval of department.
The initiation of new classroom systems in office education, the scope and sequence in office education systems; their curriculum content and instructional objectives. Emphasis on follow up and evaluation design.

C. Seminar
Spring, Summer. 2 or 3 credits. Advanced graduate standing or approval of department.
Focus as needed on current issues and problems in program development projects; contemporary research. Emphasis on individual investigations and writing.

845. New Social Studies Curricula
Spring of odd-numbered years. 3(3-0) ED 830A.
Focuses on new and emerging elementary and middle school social studies curricula. Specific attention given to selection and analysis of curricular models, programs, and materials; adaptation to specific needs of schools.

846. Specialized Methods and Materials for Teaching Elementary Science
Fall, Spring, Summer. 3(3-0) Experience in teaching; approval of department.
Develops additional competency in science education for the experienced teacher at elementary and middle school levels. Specialized methods for individual and group instruction are emphasized and evaluated.

847. Seminar in Elementary Science Education
I
Winter, Summer. 3(3-0) Experience in teaching; ED 325F or ED 546 or approval of department.
Philosophical and psychological concepts relevant to the objectives and implementation of science education and a review of research in teaching science at the elementary level.

848. Individual Problems in Elementary and Middle School Science Education
Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 6 credits. ED 546 or ED 547; teaching experience.
Identification of one or more problems in elementary or middle school science to be studied independently. Problem analysis would typically include readings, action research and original composition.

849. Trends and Issues in Language Arts
Fall, Summer. 3(3-0) ED 830A.
To investigate and criticize trends, issues and research in language arts programming and instruction.

850. The Teacher and Administrative Leadership
Fall, Winter, Spring, Summer. 3(3-0) Twelve credits in Education and approval of department.
Not intended for school administration majors. Theory and practice underlying administration of schools in a democratic society. Intended for educational personnel seeking basic information in such areas as educational organization, roles of administrative leadership in schools and communities, and teacher's roles in administration.

851. Foundations of Administration
Emphasizes basic administrative theory and research, issues on current practice and emerging trends in such problems and issues as personnel, plant, finance, community school programs, and instructional improvement. Intended primarily for persons actively preparing for administrative positions in schools and other educational agencies.

A. Theory and Organization
Fall, Winter, Summer. 3(3-0) Approval of department.

B. Practice and Problems
Winter, Spring, Summer. 3(3-0) ED 851A or approval of department.

852. Administration of Educational Institutions
Exploration of the nature and scope of responsibilities of areas in educational administration. Designed to serve as an initial application of administrative theory for those aspiring to one of the several areas.

A. Elementary School Administration
Fall, Winter, Spring, Summer. 3(3-0) Twelve graduate credits in Education including ED 851A, ED 851B, or approval of department.

B. Secondary School Administration
Fall, Winter, Summer. 3(3-0) Twelve graduate credits in Education including ED 851A, ED 851B, or approval of department.

C. Instructional Supervision
Fall, Winter, Summer. 3(3-0) Twelve graduate credits in Education including ED 851A, ED 851B, or approval of department.

D. Business Administration of Schools
Winter, Summer. 3(3-0) Twelve graduate credits in Education including ED 851A, ED 851B, or approval of department.

E. Middle School Administration
Winter, Summer. 3(3-0) Twelve graduate credits in Education including ED 851A, ED 851B, or approval of department.

Organization and administrative aspects of middle schools. Emphasis on basic characteristics of a middle school and how the administrator implements these characteristics. Research on middle schools studied.

853. Administration of Educational Programs
Designed to promote the study of application of theory and research to specialized program areas. Persons will normally select the section allied to their major program area.

A. Audio-Visual Programs
Winter, Summer. 3(3-0) Twelve graduate credits in Education including ED 850 or approval of department.

B. Vocational Education Programs
Summer. 3(3-0) Twelve graduate credits in Education including ED 850 or approval of department.

C. Administration of Pupil Personnel and Guidance Programs
Spring, Summer. 3(3-0) ED 815B.

D. Administration of Special Education Programs
Winter, Summer. 3(3-0) Approval of department.

Organization and administrative aspects of special education programming. Federal, state, intermediate and local district level programs in special education are reviewed.

854. Environmental Education in the School
Spring, Summer. 3(3-0)
Environmental issues and their implications for educational practices and policies. The role of the school in developing environmental consciousness.

855. Research in Educational Administration
Fall, Winter, Spring, Summer. 3(3-0) ED 551A, ED 551B, ED 567.
The identification of an individual research problem and the application of principles and techniques of educational research in seeking a solution to the problem.
856. Creativity in Education
Fall. 3(3-0) Teaching Experience.
Definitions, manifestations, processes and theories of creativity, experiences with modes of creative expression and problem solving techniques. Development and application to the education profession. Field trips may be required.

857. Futuristics and Education
Spring. 3(3-0) Teaching experience.
Current educational programs in futuristics. Development of concepts, materials and programs related to education in and for the future. Proposed methodology for the future.

861. Elementary School Curriculum
Winter, Summer. 3(3-0) Regular admission to graduate program and approval of department.
Curriculum definition as related to purposes of the elementary school, foundations and rationale for curriculum study, revision, and improvement; procedures and organizational aspects of curriculum planning, key components of new educational curricular designs.

862. Elementary Education Trends and Current Research
Fall, Winter, Spring, Summer. 3(3-0) Completion of 27 credits of graduate course work on a regular program and approval of department.
Advanced graduate students (those nearing completion of the M.A. program or on the doctoral program) are given an opportunity to explore current research activities.

863. Trends and Issues in Children's Literature
Winter and Summer of odd-numbered years. 3(3-0) ED 830A.
Provides graduate students an opportunity to discuss and evaluate current research related to children's literature as well as juvenile books and to conduct an in-depth study in the field of children's literature.

864. The Teaching of Critical Reading
Winter and Summer of even-numbered years. 3(3-0) ED 830A.
Provides graduate students an opportunity to study current research in critical reading, to identify and evaluate appropriate instructional materials, and to conduct an in-depth study in the field of critical reading.

865. Principles of Educational Measurement
Winter, Summer. 3(3-0) ED 464 or ED 465; ED 869.
Nature of measurement and type scales. Units, scores, norms, sampling, item analysis, batteries and profiles. Principles of reliability and validity. Use of test scores in decision making.

866. Appraisal of Individual Intelligence and Personality
A. Individual Measurement—Wechsler
Winter, Summer. 3(3-0) ED 464 or ED 465 or PSY 415; approval of department.

B. Individual Measurement—Wechsler
Fall, Spring, Summer. 3(3-0) ED 464 or ED 465 or PSY 415; approval of department.
Measurement of intelligence with the Wechsler scales. Observation, practice, supervision, and interpretation.

C. Personality Assessment in Education
Spring. 3(3-0) ED 464 or ED 465; ED 813 or PSY 427.
Study of general personality structure and methods in personality assessment related to education.

867. Educational Research Methods
Fall, Winter, Spring. 3(3-0) Approval of department.
Rationale for and methods of research in education. Emphasis is given to the identification of researchable problems and the interpretation of research studies in the student's major field.

868. Evaluation of Programs of Vocational and Practical Arts Education
Fall, Winter, Spring. 3(3-0) Approval of department.
Evaluation principles and practices in the specialized areas of agricultural, business, and industrial education.

869. Quantitative Methods in Educational Research
Fall, Winter, Spring. 4(3-1) Pretest and approval of department.
Application of descriptive statistical techniques to educational data. Introduction to estimation and tests of hypotheses. Interpretation of statistical reports.

870. Non-Formal Education for Rural Development
Fall. 3(3-0)
General principles relating non-formal education and rural development. Comparison of non-formal, extension, continuing education systems in African, Asian, American, European rural societies; impact on continuity and change in rural social systems.

871. The Secondary School: Role, Function and Structure
Fall, Winter, Spring. 3(3-0) Teaching experience in secondary school classrooms.
Examines the role, function and structure of various secondary schools. Emphasizes the relationships that do and should exist with other segments of the educational enterprise as well as with external agencies, organizations and institutions.

872. The American Secondary School Student
Fall, Winter, Spring. 3(3-0) Teaching experience in secondary school classrooms.
Focuses upon the issues and problems confronting the secondary school student as an adolescent and/or young adult. Attention is given to the relevance of school curriculums and staff competencies to meeting these needs of secondary students. Emphasis will be placed upon developing guidelines for needed change.

873. Student Development and College Personnel Services I
Fall. 3(3-0) Majors in College Student Personnel, approval of department.
History, development, philosophy, organization and administration of college student personnel as a profession. Emphasis upon the college student as an individual and a study of services, programs and staff skills needed to provide for his growth, needs and development.

874. Student Development and College Personnel Programs II
Winter. 3(3-0) Majors in College Student Personnel, approval of department.
Emphasis upon the student as a member of groups, peer and group influence and behavior, student organizations and group activities, services, strategies and staff skills for conducting such programs.

875. Student Development and College Personnel Programs III
Spring. 3(3-0) Majors in College Student Personnel, approval of department.
Study of living and learning environments and related staff skills, facilities and programs which affect student behavior and development; examination of personal qualities, professional organizations and other factors associated with being a professional person.

876. The American College Student
Fall, Winter, Spring. 3(3-0) Students in graduate degree programs or approval of department.
Analysis of research data, theory, hypotheses and strategies regarding the nature of the college student and his learning environment.

877. Educational Program Evaluation
Winter, Summer. 3(3-0) ED 860.
History and current status of program evaluation, including a review of various evaluation models, common problems of implementation and alternative evaluation designs.

878. Research in Higher Education
Fall, Winter, Spring. 2 to 6 credits. May reenroll for a maximum of 9 credits. Master's students in Administration and Higher Education; ED 957.
Problems and practices in Higher Education Administration. Development of research prospectus, review of significant literature, conduct of research under supervision, and presentation of findings and conclusions.

879. Educational Development Planning: Basic Concepts
Winter. 3(3-0) Approval of department.
Basic concepts of economic, social and political development are studied as they place demands upon educational planners to cope with them. The distribution of development benefits is stressed.

880. Educational Planning and National Development
Spring. 3(3-0) ED 879.
Formulation of educational development strategies and plans to deal with crucial national and community development problems areas paying particular attention to meeting the special needs of audiences with special problems.

881. Workshops in Education
Fall, Winter, Spring. 1 to 6 credits. May reenroll for credit. Approval of department.
Laboratory approach which provides opportunities for experienced educational personnel to concentrate their study on common administrative and supervisory problems.
Courses

882. Seminars in Education
Fall, Winter, Spring, Summer. Variable credit. Approval of department. Seminars in the various fields of emphasis.

883. Readings and Independent Supervision
Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 9 credits. Approval of department. Study on an individual or group basis in the various fields of emphasis.

884. Laboratory and Field Experience in Education
Fall, Winter, Spring, Summer. Variable credit. Approval of department. Supervised graduate practicum, observation, internships, and externships in the various areas of emphasis.

886. Development of Self-Understanding
Fall, Winter, Spring, Summer. 3(3-0). Development of self-awareness and understanding of one's personal and interpersonal style influences and is influenced by human relationships in educational settings.

887. Seminar: Continuing Education Leadership in Local Communities
Spring. 3(3-0) May reenroll for a maximum of 6 credits. Major approval of department. Formal and non-formal community education for adults. Administration, agency cooperation, accountability, ethical and political concerns, managing controversy, and balancing objective study with advocacy in programs of personal and community development.

890A. Issues in Education of Deaf
Spring. 3(3-0) Graduate students. Designed for graduate non-majors seeking to expand information and understanding of severe and profound hearing loss; educational implications, programs.

890B. Issues in Education of Emotionally Impaired
Fall, Spring. 3(3-0) Special Education majors only, approval of instructor. This seminar focuses on crucial issues related to programming for emotionally impaired students.

890C. Issues in Mental Retardation
Spring, Summer. 3(3-0) Approval of department. Current issues in the area of mental retardation are identified, researched, and discussed.

890D. Psychosocial Diagnosis of the Handicapped
Fall, Spring. 3(3-0) Approval of department. Emphasis upon principles of assessment and their utilization in the classroom. An interdisciplinary approach in assessment techniques delineating theory and application.

889F. Parent-Teacher Relationships in Special Education
Fall, Spring. 3(3-0) Development of skills for parent-teacher conferences and consultative-teacher relationships. Strategies for managing home-school relationships in special education. Special problems of parents of handicapped children.

889G. Community Agency Programs for the Handicapped
Summer. 3(3-0) Approval of department. Various official and voluntary agencies and organizations which offer programs and services for the handicapped and the relationship of these programs to special education.

889H. Special Education Finance
Fall of odd-numbered years. 3(3-0) Graduate students. Analysis of major special education funding systems, the Michigan system, intermediate school district special education tax, constituent district reimbursement policies and approaches to special education budgeting.

890A. Field Experience: Education of Deaf
Fall, Winter, Spring, Summer. 3 to 12 credits. May reenroll for a maximum of 12 credits. Graduate students, prior teaching or clinical experience. Supervised graduate field experience in educational programs for the deaf and hearing impaired.

890B. Field Experience: Emotionally Impaired
Fall, Winter, Spring, Summer. 3 to 12 credits. May reenroll for a maximum of 12 credits. M.A. candidates in special education-emotionally impaired, approval of department. Supervised graduate field experience in educational programs for the emotionally impaired.

890C. Field Experience: Mental Retardation
Fall, Winter, Spring, Summer. 3 to 12 credits. May reenroll for a maximum of 12 credits. Approval of instructor. Supervised graduate field experience in educational programs for the mentally retarded.

890D. Field Experience: Teaching Visually Handicapped Learners
Fall, Winter, Spring. 3 to 12 credits. May reenroll for a maximum of 18 credits. Approval of department. Supervised graduate field experience in educational programs for the visually handicapped.

890E. Field Experience: Teaching Blind/Deaf Learners
Fall, Winter, Spring. 3 to 12 credits. May reenroll for a maximum of 18 credits. Approval of department. Supervised graduate field experience in educational programs for the blind/deaf.

890F. Field Experience: Learning Disabilities
Summer. 3 to 12 credits. May reenroll for a maximum of 12 credits. ED 4278, ED 804E, ED 804F. Supervised graduate field experience in educational programs for those with learning disabilities.

891A. Independent Study: Education of Deaf
Spring. 2 to 6 credits. May reenroll for a maximum of 10 credits. Graduate students. Supervised study in deaf education conducted according to a written agreement stating the problem or topical area of study, the methodology and the product of the study.

891B. Independent Study: Emotional Impairment
Winter, Spring. 2 to 6 credits. May reenroll for a maximum of 12 credits. Graduate students. Supervised study in emotional impairment conducted according to a written agreement stating the problem or topical area of study, the methodology and the product of the study.

891C. Independent Study: Mental Retardation
Fall, Winter, Spring, Summer. 1 to 12 credits. May reenroll for a maximum of 12 credits. Approval of instructor. Supervised study in mental retardation conducted according to a written agreement stating the problem or topical area of study, the methodology and the product of the study.

891D. Independent Study: Visually Handicapped or Blind/Deaf
Fall, Spring. 3 to 12 credits. May reenroll for a maximum of 12 credits. Supervised study in visually handicapped or blind/ deaf conducted according to a written agreement stating the problem or topical area of study, the methodology and the product of the study.

891E. Independent Study: Special Education
Fall, Winter, Spring. 3 to 6 credits. May reenroll for a maximum of 12 credits. Approval of instructor. Supervised study in special education conducted according to a written agreement stating the problem or topical area of study, the methodology and the product of the study.

899. Master's Thesis Research
Fall, Winter, Spring, Summer. 2 to 12 credits. Approval of department.

901. Educational Sociology: Seminar
Fall, Winter. 3 or 4 credits. Approval of department. Interdepartmental with and administered by the Department of Sociology.

904. Historical and Comparative Foundations of Education: Advanced Comparative and International Education
Spring. 3(3-0) ED 804E, ED 804F. Objectives, content, methodology, research problems of comparative and international education analyzed. Social and cultural forces affecting educational planning and institution building studied. Agencies involved in international education identified.
911. Educational Psychology Seminar
Fall, Winter, Spring. 3(3-0) May reenroll for a maximum of 15 credits. Doctoral candidates or approval of instructor. Educational psychology doctoral candidates must enroll in the fall.

917C. Counseling Supervision in Urban Settings
Fall, Winter, Spring. 3(1-12) May reenroll for a maximum of 6 credits. ED 917C (12 credits).

921. Curriculum Research Seminar
Spring. 3(3-0) ED 867; ED 921A. Description of curriculum in an educational institution or program. Design of descriptive, evaluative and experimental studies within ongoing complex social systems.

922. Research on Teaching
Fall. 3(3-0) ED 867.
Implications from findings of the major investigations into teaching processes. Relates to the curriculum of in-service and pre-service teacher education.

923. Seminar: Curriculum Competencies and Careers
Fall. 3(3-0) Doctoral students in curriculum or approval of department.

924. Seminar: Curriculum Issues
Spring. 3(3-0) Doctoral students in curriculum or approval of department.
In-depth exploration of the nature, history and significance of several perennial issues such as curriculum balance and curriculum control. Overview of selected current and probable future issues.

925. Seminar: Curriculum Innovation
Summer. 3(3-0) Doctoral students in curriculum or approval of department.
Theories of and models for curriculum innovation and change: use of models to effect change. Analysis and evaluation of past and present curriculum innovations. Characteristics and roles of change agents.

931A. Seminar in Instructional Technology: Research and Development
Fall. 3(3-0) Approval of department.
History and development of instructional technology emphasizing leaders, events, research and legislation affecting use of instructional technology in education.

931B. Seminar in Instructional Technology: Research and Development
Winter. 3(3-0) Approval of department.
Analysis and appraisal of selected research studies in instructional technology with attention to purposes, rationales, assumptions, designs, methodologies and findings.

931C. Seminar in Instructional Technology: Research and Development
Spring. 3(3-0) Approval of department.
Analysis and appraisal of student’s dissertation proposals and reports on surveys of related literature.

933. Elementary Education: School Mathematics Learning
Spring. 3(3-0) Experience in teaching and enrolled in mathematics education.
Extensive review of the research of Bruner, Piaget, Gagne, etc., on how students learn in general and how they learn mathematics in particular.

934. Elementary Education: School Mathematics Curriculum
Fall. 3(3-0) Experience in teaching and enrolled in mathematics education.
Emphasizes the place of mathematics in the curriculum, the strands of mathematics that should be included—the ordering of topics of each strand and emphasis of the respective strands.

940. Research Study in Higher Education Administration
Fall, Winter, Summer. 3(3-0) Graduate students or interscholastic coaches.
Administration of health care in K-12 athletic programs; prevention medicine, legal implications, recognition of trauma and emergency medical management stressed. Growth and development concepts introduced in selection of student athletes.

944. Administration of Athletic Medicine and Health
Fall, Winter, Summer. 3(3-0) Graduate students or interscholastic coaches.
Administration of health care in K-12 athletic programs; prevention medicine, legal implications, recognition of trauma and emergency medical management stressed. Growth and development concepts introduced in selection of student athletes.

950. Theory and Practice of Administration
Fall, Winter, Spring. 3(3-0) Approval of department.
Administrative processes as exemplified in agencies such as schools, colleges, universities, government agencies, business enterprises, and voluntary organizations. Relation of administrative theory to the practice of administration and to scientific knowledge of human relations in a free society.

951. Community Relations
Winter, Spring, Summer. 3(3-0) Approval of department.
Communication strategies and problems for administrator of educational institutions. Problem identification and analysis are stressed.

952. Educational Finance
Fall, Summer. 3(3-0) Approval of department.

953. Education Law
Fall, Winter, Summer. 3(3-0) Approval of department.
Designed to discover general legal principles and examine laws and lawmaking agencies that affect educators and educational institutions and appropriate means to influence law development.

954. Planning Facility Learning Environments
Spring, Summer. 3(3-0) Approval of department.
A multi-discipline approach to the learning environment of the individual through life-long educational experiences. Role of the educator and specialists in facilitating the educational program. Sites, building and equipment.

955. Educational Personnel Administration
Fall, Spring, Summer. 3(3-0) Approval of department.
Recruitment, selection, orientation, training, salary and fringe benefits, welfare, morale, negotiations, etc., to assist the administrator to function more effectively with personnel.

956. Planning Change in Educational Organizations
Winter, Summer. 3(3-0) Approval of instructor.
Analysis of research, theory and practice of the change process in educational organizations. Planned change concepts and methods are examined and tested by laboratory and field experiences.

957. The Department in Higher Education
Winter. 3(3-0) Approval of department.
The Department as an administrative structural element of the University. The duties and responsibilities of the chairperson as they relate to the management of the Department.

958. Management Systems in Higher Education Administration
Fall, Spring. 3(3-0) Approval of department.
The application of National Center for Higher Education Management Systems tools to decision making in higher education administration. Resource Allocation Prediction Model I & student flow and faculty activity analysis are major tools investigated.

959. Using Standardized Tests for Decision Making
Fall, Spring. 3(3-0) Approval of department.
School administrative decision-making based on information yielded by standardized tests. Participants will also engage in private consultations with the instructor concerning system or building data.

960. Counseling Theories
Winter, Summer. 3(3-0) Approval of instructor.
Survey of counseling theories and research with emphasis on current issues which have implications for counseling practice or for counselor education.

961. Field Research Methods in Education
Spring. 3(3-0)
Methods of interview, participant observation of observation for carrying on educational research.
965A. Psychometric Theory
Spring of even-numbered years. 3(3-0) ED 965, ED 969B.
Advanced theoretical aspects and derivation of formulas involved in reliability, validity, item analysis, weighting and differential prediction, sampling and norm construction, and the relation of item characteristics to test statistics.

965B. Problems of Educational Measurement
Winter of even-numbered years. 3(3-0) ED 965, approval of department.
Advanced consideration of the logical and philosophical bases of educational measurement. Theory of test planning and development and evaluation. Problems of test administration and scoring. Issues in test use.

965C. Evaluation of Higher Education
Spring. 3(3-0) ED 928E.
Ways in which evaluation takes place in higher education, course examinations, grading, comprehensive examinations, teacher evaluation, institutional evaluation, state surveys, and regional and national studies of higher education programs.

967. Advanced Research Methods in Education
Fall, Spring. 4(3-1) ED 867 and ED 869, or Ed 969B.
Principles and techniques in survey research with limited consideration of content analysis and observational studies. Sampling, instrumentation, data collection, and data analysis.

968B. Research Analysis in Personnel Work
Winter, Summer. 3(3-0) Approval of department.
Critical review of research and literature in counseling and personnel services.

969. Quantitative Methods in Educational Research
B. Advanced Quantitative Methods in Educational Research
Fall, Winter, Summer. 4(3-1) ED 869 or pretest and approval of instructor.
Principles and techniques in the application of inferential statistics to educational data with emphasis on the analysis of variance and multiple comparison procedures. Overview of regression techniques.

C. Experimental Design in Education
Winter, Spring. 4(3-1) ED 969B.
Theory and practice in the design, analysis, and interpretation of experimental and quasi-experimental research.

970. Reading and Research in Student Teaching
Spring. 3(3-0) Approval of department.
Literature, research and practice in teacher education field experiences. Concentration on issues, problems and skills needed in supervision of student teachers.

971. Externship in Educational Administration
Fall, Winter, Spring. 3 credits. May reenroll for a maximum of 27 credits. Present or past position as an educational administrator. Discussion of participants' current administrative problems and solution strategies, faculty visits to participants' schools and schools on issues in educational administration.

972. Multidisciplinary Seminar in Educational Administration
Fall, Winter, Spring. 3 credits. May reenroll for a maximum of 18 credits. 9 credits of ED 971.
Discussion of generic problems and issues in administration identified and interpreted through selected readings and speakers from the several behavioral sciences.

973. College Student Personnel Administration I
Fall. 3(3-0) Approval of department.
Emphasis on planning, organization, financing, research, evaluation and administration for programs and services which aim principally to serve individual student needs: counseling, orientation, health, placement, financial aids, etc.

974. College Student Personnel Administration II
Winter. 3(3-0) Approval of department.
Student organizations and activities; student union; on and off-campus living environments. Emphasis on planning, organization, financing, research, evaluation and administration of these programs and services.

975. College Student Personnel Administration III
Spring. 3(3-0) Approval of department.
Analysis of student rights and responsibilities; academic freedom; regulation of student conduct; systems of governance and judicial processes; legal basis for student personnel programs and administration.

977. Teacher Assessment and Development
Fall. 3(3-0) Completion of 27 credits at graduate level.
Concepts of teacher assessment, techniques and instruments for analysis of teaching, current assessment practices, and strategies for teacher development based on needs.

978. Professional Lectures in Educational Administration
Fall, Winter, Summer. 3(3-0) Graduate students in Educational Administration.
Lectures by faculty in Educational Administration in individual faculty research and service interests, exploration of recent research and other scholarly publications.

982. Seminars in Education
Fall, Winter, Spring, Summer. Variable credit. Approval of department.
Seminars in the various fields of emphasis.

983. Readings and Independent Study in Education
Fall, Winter, Spring. Variable credit. Approval of department.
Study on an individual or group basis in the various fields of emphasis.

984. Laboratory and Field Experience in Education
Fall, Winter, Summer. Variable credit. Approval of department.
Supervised advanced graduate practicums, observation, internships, and externships in the various areas of emphasis.

985. Counseling Pre-Practicum
Spring. 3(2-1) Doctoral status in college counseling or related area and approval of department.
Seminar emphasizing establishing good interpersonal relationships, self-understanding, an understanding of psychodynamics, and test interpretation as preparing counseling responsibilities. Approach is didactic and experimental with limited contacts with clients.

986. Counseling Practicum I
Fall. 3(3-0) ED 985 or approval of department.
Supervised experience working with college students in a counseling relationship. Group discussions, group supervision and observation of counseling interviews, and individual supervision.

986B. Counseling Practicum II
Winter. 3(3-0) ED 986A.
Supervised experience working with college students in a counseling relationship. Group discussions, group supervision and observation of counseling interviews, and individual supervision.

988. Behavioral Counseling Laboratory
Fall, Winter, Spring. 1 to 6 credits.
May reenroll for a maximum of 21 credits. Supervised experience in behavioral counseling (individual and group), community consultation, applied behavioral research, journal manuscript preparation, preparing instructional materials, and instructional management.

990A. Field Experience: Special Education Administration Simulation
Spring. 3(0-9) Approval of department.
Supervised graduate practicum in administration of the Special Education program of a simulated school district.

990B. Field Experience: Special Education Administration
Fall, Winter, Summer. 3 to 12 credits. May reenroll for a maximum of 18 credits. Approval of department.
Supervised graduate practicum or internship in special education administration.
990C. Field Experience: Special Education
Spring. 3 to 12 credits. May be repeated for a maximum of 15 credits. Approval of department.
Supervised graduate practicum in special education teacher training.

999. Dissertation Research
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

**ELECTRICAL ENGINEERING AND SYSTEMS SCIENCE**

College of Engineering

**Electrical Engineering**

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<th>Course Code</th>
<th>Title</th>
<th>Offered</th>
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<td>275</td>
<td>Consumer Electronics</td>
<td>Fall, Winter, Spr.</td>
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<tr>
<td>214</td>
<td>Basic Electronic Circuits</td>
<td>Spring, Winter, Spr.</td>
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<tr>
<td>300</td>
<td>Electric Circuits I</td>
<td>Fall, Winter, Spr.</td>
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<td>301</td>
<td>Electric Circuits II</td>
<td>Winter, Spring, Spr.</td>
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<tr>
<td>302</td>
<td>Basic Electronic Circuits</td>
<td>Spring, Winter, Spr.</td>
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<tr>
<td>421</td>
<td>Power System Analysis</td>
<td>Spring</td>
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<td>430</td>
<td>Digital Electronics I</td>
<td>Fall</td>
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<td>431</td>
<td>Digital Electronics II</td>
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<tr>
<td>306</td>
<td>Electromagnetic Fields and Waves I</td>
<td>Winter, Spring</td>
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<td>307</td>
<td>Electromagnetic Fields and Waves III</td>
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<tr>
<td>308</td>
<td>Fields and Waves Laboratory</td>
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<tr>
<td>345</td>
<td>Introduction to Electronic Instrumentation Systems</td>
<td>Fall, Winter, Spr.</td>
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<td>346</td>
<td>Radiation and Propagation of Electromagnetic Waves</td>
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<td>415</td>
<td>Control Systems Design</td>
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<td>416</td>
<td>Introduction to Computer-Aided Circuit Design</td>
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<td>419</td>
<td>Physical Phenomena and Electronic Instrumentation</td>
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<td>420</td>
<td>Electromechanical Energy Conversion</td>
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<td>455</td>
<td>Deterministic Communication Systems</td>
<td>Fall</td>
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<td>456</td>
<td>Applied Probability in Communication Theory</td>
<td>Winter</td>
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</tbody>
</table>

**Description of Courses**

**306. Electromagnetic Fields and Waves I**
Winter, Spring. 3(3-0) E E 305.
Magnetic fields; EM sources, vector potential, magnetic media, inductance, and energy storage. Time-varying fields and Maxwell's equations; energy conservation, potential theory, and EM boundary-value problems.

**307. Electromagnetic Fields and Waves III**
Spring, Summer. 3(3-0) E E 306. E E 306 concurrently.
Application of Maxwell's equations; radiation, propagation, reflection, and power flow of plane wave, EM waves; EM boundary value problems. Transmission line theory; transient and steady state waves, standing and traveling waves, reflections and standing-wave ratio.

**308. Fields and Waves Laboratory**
Spring, Summer. 1(0-3) E E 306. E E 307 concurrently.
Experimental investigation of charged particle motion in EM fields, dielectric and magnetic properties and materials, probing of currents and charges, and propagation of transient and steady-state waves. Digital computer solutions for EM field and wave problems.

**345. Introduction to Electronic Instrumentation Systems**
Fall, Winter, Spring. 4(3-3) PHY 285.
Basic electronic concepts; passive and active components; operational amplifiers; switching devices, equivalent circuits; transducers, signal conditioning, recording, data management, basic elements of control.

**415. Control Systems Design**
Winter. 3(3-0) SYS 313. Interdepartmental with Systems Science.
Controller design via root locus and frequency response methods; controlability, observability; state-space design techniques for continuous and computer-controlled feedback systems; survey of digital control.

**416. Introduction to Computer-Aided Circuit Design**
Spring. 3(3-0) CPS 120. E E 302.
Introduces the techniques used for automatic formulation, analysis and optimization of linear and nonlinear electronic circuits. Students will write a modest but useful analysis program package.

**419. Physical Phenomena and Electronic Instrumentation I**
Winter. 4(3-3) PHY 289, PHY 298 or approval of department, MTH 215. Interdepartmental with and administered by the Department of Physics.
Concepts of electronics relative to the use of physical phenomena and their subsequent applications to provide reliable instrumentation. Nuclear radiation detectors, photometers and magnetometers are examples of specific topics covered.

**420. Electromechanical Energy Conversion**
Winter. 3(3-0) E E 301, E E 305.
Review of electromagnetics; design, specification, and use of d.c. machines in industrial and servomechanical application, synchronous generators and transformers for power systems; three-phase power, per unit notation.

**421. Power System Analysis**
Spring. 3(3-0) E E 430.
Model of power system components; analysis and planning techniques including load flow, short circuit, transient stability; voltage and frequency control; economic operation of power systems.

**430. Digital Electronics I**
Fall. 3(3-0) E E 202.
Characteristics and applications of digital integrated circuits. Number systems and Boolean algebra. Gates, flip-flops, clocks, counters, shift registers, A/D and D/A converters. Basic applications of these devices.

**431. Digital Electronics II**
Winter. 3(3-0) E E 430 or CPS 421.
Basics of minicomputer and microcomputer based systems. Programming fundamentals. The I/O bus, interfacing, data acquisition, data storage, and data communication. Practical design problems.

**433. Digital Electronics Laboratory**
Winter, Spring. 1(0-3). May reenroll for a maximum of 2 credits. E E 431 or concurrently.
Design, construct and test representative digital electronic circuits. Hands-on experience with minicomputer, microcomputers and programmable calculators. Applications in data acquisition and control.

**435. Guided Transmission Systems**
Fall. 3(3-0) E E 307.
Guided wave theory; normal modes, propagation characteristics in rectangular and circular waveguides. Stripline and microstrip. Electromagnetic resonators; frequency and Q. Circuit theory of waveguiding systems. Scattering matrix; system applications.

**436. Radiation and Propagation of Electromagnetic Waves**
Winter. 3(3-0) E E 307.
Radiation, propagation, scattering and reception of electromagnetic waves; circuit and radiation characteristics of wire and microwave and antenna. Radiation fields, self and mutual impedances of antennas and arrays; microwave aperture antennas.

**438. Transmission and Radiation Laboratory**
Winter. 1(0-3) E E 435; E E 436 concurrently.
Microwave transmission and radiation laboratory. Measurement of frequency, wavelength, standing waves, impedance, and power. Experiments on transmission lines, waveguides, cavity resonators, microwave circuits, and circuit and radiation properties of antennas.

**455. Deterministic Communication Systems**
Fall. 3(3-0) Approval of department.
Communication systems. Representation of signals in time and frequency domain. Processing of signals by linear, simple nonlinear and time-variant systems. Linear and nonlinear, analog and digital modulation and demodulation; for example, AM, FM, PCM.

**456. Applied Probability in Communication Theory**
Winter. 3(3-0) E E 455 or approval of department.