

**Descriptions — Economics
of
Courses**

857. Wage Theory

Fall. 3 credits. 320, 324, or approval of department. Interdepartmental with the School of Labor and Industrial Relations.

Advanced analysis of: theories of wage determination; labor market research, economic effects of collective bargaining upon the national wage structure, output, employment, distribution of national income, the price level; nature and effects of government wage policies.

858. Industrial Relations

Winter. 3 credits. 305 and approval of department. Open to graduate students in economics and related fields such as labor and industrial relations, psychology, sociology, anthropology, political science, business, and history. Interdepartmental and administered jointly with the School of Labor and Industrial Relations.

Problems and issues in the administration and negotiation of collective bargaining agreements; includes both economic and noneconomic aspects of industrial relations policies and practices.

860. Economics of the Firm

Fall, Winter, Summer. 4 credits. Graduate students in Business Administration. Not open to Economics majors.

Analysis of the firm. Problems facing management; economizing in use of resources, optimal combinations of products, pricing, competitive forces in markets affecting the firm.

861. American Economy

Fall, Winter, Spring, Summer. 4 credits. Thirty credits in MBA core program. Not open to Economics and Agricultural Economics majors.

Determinants of the national income, employment, and capital formation. National income accounts. Business fluctuations. Fiscal and monetary policy.

862. Business and Public Policy

Winter, Spring. 4 credits. 860 or approval of department. Not open to majors. Problem of government regulation of business. Economic models which relate to regulation. Regulatory legislation, regulatory bodies, and alternatives available.

876. Statistical Inference in Economics I

Fall. 3(3-0) 812A or 801; STT 443 or 863; or approval of department. Interdepartmental with the Agricultural Economics, and Statistics and Probability Departments.

Review and extension of single-equation regression models. Properties of least-squares estimators under alternative specifications. Problems of analyzing nonexperimental data. Errors in variables, autoregressive and heteroscedastic models.

877. Statistical Inference in Economics II

Winter. 3(3-0) 876 or approval of department. Interdepartmental with the Agricultural Economics, and Statistics and Probability Departments.

Specification interpretation and estimation of simultaneous equation models. Nonlinear models. Bayesian approach to estimation problems. Recent developments in econometrics.

878. Statistical Inference in Economics III

Spring. 3(3-0) 877 or approval of department. Interdepartmental with the Agricultural Economics, and Statistics and Probability Departments.

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. 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

Spring. 4(4-0) Approval of instructor. Interdepartmental with and administered by the Department of Management.

Analysis of role and tasks, appropriate techniques and organizational structures of political agencies in planning and management of complex programs.

895. Graduate Reading in Economics

Fall, Winter, Spring, Summer. Variable credit.

899. Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

900. Selected Problems in Advanced Microeconomic Theory

Fall, Winter, Spring, Summer. 3(3-0) May re-enroll for a maximum of 12 credits. 812A, 812B, 812C; 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 re-enroll for a maximum of 12 credits. 813A, 813B.

Analysis of the behavior and interaction of multimarket systems.

972. 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 Agricultural Economics Department.

Selection, planning and conduct of research. Alternative research approaches. Role of theory, beliefs and valuations. Critical appraisal of research studies.

990A. Monetary Theory and Policy Workshop

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 999.

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 999.

990C. Mathematical Economics and Econometrics Workshop

Fall, Winter, Spring. 3 to 16 credits. 812A, 832; or approval of department. Interdepartmental with the Agricultural Economics 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 999.

990D. Economic Development Workshop

Fall, Winter, Spring, Summer. 3 to 16 credits. 850, 851, 852 or approval of department.

Critical evaluation of research reports by staff and students. Students writing doctoral dissertations in Development are encouraged to participate in the workshop and may do so while registered for 999.

999. Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

**ED
EDUCATION**

College of Education

101A. Exploring Elementary Teaching

Fall, Winter, Spring. 3(1-4) Pre-education major.

Emphasis on the nature of teaching in the elementary school achieved through field experience while serving as a teacher aide in an elementary classroom. Concurrent lecture sessions focus on techniques of classroom management and operation.

102A. Introduction to Secondary Education

Fall. 1 credit. May not receive credit for 102A and 450.

Series of monthly seminars on secondary school problems and issues.

102B. Personal Dimensions of Secondary Teaching

Winter. 2 credits. May not receive credit for 102B and 200. 102A.

Laboratory setting emphasizing personal values, beliefs and behaviors related to teaching in secondary schools. Includes micro-teaching, small group processes and individual assessment activities.

102C. Secondary School Youth Culture

Spring. 2 credits. May not receive credit for 102C and 450. 102B.

Laboratory setting emphasizing characteristics of adolescent social system in and out of school. Participants will include students from local schools, EBSTEP members, and upperclassmen in secondary teacher education.

124. Introduction to Careers in Vocational and Practical Arts Education

Opportunities in teaching agriculture, business, home economics or industrial education and in closely related fields; analysis of student's potentialities for these fields.

A. AGRICULTURE.

Fall. 2(1-2) Interdepartmental with Agriculture.

B. BUSINESS AND DISTRIBUTIVE EDUCATION.

Fall, Winter. 2(2-0)

C. HOME ECONOMICS.

Spring. 2(2-0)

D. INDUSTRIAL ARTS.

Winter and Fall of even-numbered years, Spring of odd-numbered years. 2(2-0)

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.

Handwork, patternwork, carpentry, introductory machinework, finishing. Designed to exemplify, in both organization and equipment, desirable practices in today's secondary schools.

200. Individual and the School

Fall, Winter, Spring, Summer. 5(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.

200A. Educational Psychology

Spring of odd-numbered years. 3(3-0)
Approval of department.

Same goals as Education 200, but assumes a background in general psychology.

202A. Educational Psychology: Adolescence

Fall. 2(2-0) May not receive credit for 202A and 200. 102B.

Emphasizes cognitive, affective and physical growth of adolescents; theories of learning as applied to secondary education; problems of early adolescence.

202B. Workshops in Secondary Education

Winter. 2(2-0) May not receive credit for 202B and 450. 202A.

Students select from a variety of single session workshops focusing on psychological and sociological aspects of teaching in secondary schools.

202C. Alternative Secondary School Structures

Spring. 1 credit. May not receive credit for 202C and 450. 202B.

On-site examination of a variety of secondary school organizational patterns, together with on-campus analysis of underlying theories of social organization and curriculum construction.

241A. Advanced Woodwork

Winter and Fall of even-numbered years, Spring of odd-numbered years. 3(0-6)
141B or approval of department.

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 machining. Designed to exemplify desirable facilities and course organization for the modern secondary school.

241C. Industrial Arts Crafts

Winter and Fall 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, book-binding, 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(0-7)
200, September experience, 2.0 scholastic average. Must be taken concurrently with or prior to courses in 325 series.

Bases, 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)
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)
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. Critical Reading and Children's Literature

Fall, Winter, Spring, Summer. 3(3-0)
200, Juniors.

Development of strategies for helping children to develop critical reading skills through literary experience.

325D. Teaching of Social Studies in Elementary Grades

Fall, Winter, Spring, Summer. 3(3-0)
200, Juniors; three terms of social science.

To help students develop understanding of philosophy and aims of social studies movement in elementary schools, and ability to further such aims through familiarity with a variety of materials, knowledge of social studies subject matter, and competence in using a variety of methods.

325E. Teaching of Mathematics in Elementary Grades

Fall, Winter, Spring, Summer. 3(3-0)
200, Juniors; MTH 201.

Presents methods and materials for teaching mathematics in the elementary school. Methods and techniques of presenting mathematics content meaningfully to elementary pupils will be illustrated.

325F. Teaching Science in the Elementary and Middle School

Fall, Winter, Spring, Summer. 3(3-0)
200, Juniors; three terms of Natural Science.

Extends the science education background of perspective elementary and middle school teachers. Emphasis is placed upon methods and materials for teaching science at the elementary and middle school levels.

325G. School Music Instrumental Methods

Fall. 3(2-2) Instrumental music major.

Instrumental instruction program at elementary level.

325H. School Music Vocal Methods

Fall. 4(3-2) Approval of the Music Department.

Basic instructional program in primary and intermediate grades.

327. Methods of Teaching—Secondary Common Elements

Fall, Winter, Spring, Summer. 2(2-0)
200; a subject area methods course 327A to 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.
Winter. 3 credits. 200; 327 or concurrently.

B. ART.
Fall, Winter, Spring. 3 credits. 200; STA 303, 320; ED 327 or concurrently.

C. BUSINESS AND DISTRIBUTIVE EDUCATION.
Fall, Winter, Spring. 3 credits. 200; 327 or concurrently.

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

E. ROMANCE LANGUAGES.
Winter, Spring. 3 credits. 200; 327 or concurrently.

F. HEALTH.
Spring. 3 credits. 200; 327 or concurrently.

G. PHYSICAL EDUCATION.
Fall, Winter, Spring. 3 credits. 200; 327 or concurrently.

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

K. HOME ECONOMICS.
Fall, Winter, Spring. 3 credits. 200; 327 or concurrently.

**Descriptions — Education
of
Courses**

- L. **NATURAL RESOURCES, ENVIRONMENTAL EDUCATION AND EARTH SCIENCE.**
Fall, Spring. 3(3-0) 200 for education majors; others, approval of department.
- M. **INDUSTRIAL ARTS.**
Fall, Spring. 3 credits. 200; 327 or concurrently.
- N. **MATHEMATICS.**
Fall, Winter, Spring. 3 credits. 200; 327 or concurrently.
- P. **MUSIC—INSTRUMENTAL.**
Winter. 3 credits. 200; 327 or concurrently.
- R. **MUSIC—VOICE.**
Winter. 3 credits. 200; 327 or concurrently.
- S. **SCIENCE.**
Fall, Winter, Spring, Summer. 3(2-2) 200; 327 or concurrently.
- T. **SOCIAL SCIENCE.**
Fall, Winter, Spring, Summer. 3 credits. 200; 327 or concurrently.
- U. **COMMUNICATION.**
Fall, Winter, Spring. 3 credits. 200; 327 or concurrently.
- V. **GERMAN AND RUSSIAN.**
Fall. 3 credits. 200; 327 or concurrently.
- 329F. Introduction to Driver and Traffic Education**
(429F.) Fall, Winter, Summer. 4(3-2)
Valid driver's license. Introduction to and an analysis of the driving task. Theory and practical application will be provided.
- 341A. Advanced Metalwork**
Winter and Fall of even-numbered years, Spring of odd-numbered years. 3(0-6) 241B or approval of department.
Work in bench metal, sheet metal, forging, welding, plating, casting, 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.
- 341B. Industrial Arts Mechanics**
Winter and Fall of odd-numbered years, Spring of even-numbered years. 3(0-6) Approval of department.
Work with small motors and internal combustion engines, drive and transmission devices. Designed to exemplify desirable practice in course organization and facilities for the modern 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 a desirable approach to this area in the industrial education program of the modern secondary school.
- 400H. Honors Work for Elementary Education Majors**
Fall, Winter, Spring. 18 credits. 200; approval of elementary education honors adviser.
- 401. Sociology of Education**
Winter, Summer. 3(3-0) SOC 241.
Interdepartmental with and administered by the Sociology Department.
School as a social institution, school-community relations, social control of education, and structure of school society.
- 409. Supervising High School Publications**
(402.) Spring, Summer. 3(3-0) Juniors; non-majors. Interdepartmental with and administered by the Journalism Department.
Staff organization, makeup, illustration, copy preparation, advertising, and editorial policies of school newspapers and yearbooks.
- 410. Instructional Design and Technology**
Fall, Winter, Summer. 2 to 4 credits. 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) 200.
Verbal learning, concept formation, problem solving and transfer with implications for teaching in schools.
- 412. Human Growth and Development**
(312.) Fall, Winter, Spring, Summer. 4(2-4) 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) 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.
- 415. Student Leadership Training**
Fall, Winter, Spring. 2(0-3) Approval of the Dean of Students.
Prepares students for leadership roles and responsibilities by encouraging the development of skills and techniques consistent with the principles of our democratic society.
- 416. Personnel Work in Student Housing**
Fall, Spring. 3(3-0) Fifteen credits of Education or approval of department. Fall: primarily for students selected to assist in administration of residence halls. Spring: for graduate students preparing for student personnel work.
Organization, policies, practices, procedures of residence halls at Michigan State University and other educational institutions.
- 417. Introduction to Libraries and Materials Centers**
Fall. 3(3-0) Juniors or approval of department.
Development of libraries, origin, services, operations, routines. Role and responsibility of the school library as related to the curriculum.
- 418. Selection of School Library Materials**
Winter. 4(3-2) 417.
Principles of selection of school library materials. Guides to selection of books, periodicals, audiovisual and other non-book materials. Evaluation of media, lists and guides for developing media collections.
- 419. Basic Reference Sources and Services**
Spring. 4(3-2) 417.
Identification, evaluation, selection, and use of basic reference sources including the card catalog, indexes, encyclopedias, dictionaries, handbooks, almanacs, et cetera.
- 420. Organization and Cataloging of Library Materials**
Fall. 4(3-2) 418.
Procedures in the acquisition of school library materials; cataloging and classification, and related processes in the proper organization of school library materials.
- 421. School Library Administration**
Winter. 4(3-2) 420.
Administrative problems pertaining to school libraries and materials centers. Budget planning and preparation, personnel, relation to teaching faculty, physical facilities. School library standards. Coordination of library services and the school curriculum.
- 422. Field Assignment in School Libraries and Materials Centers**
Spring. Eight credits. 419, 421.
School library experiences for the student. Supervised practice and observation in school library activities; book selection; circulation and reference assignments; audiovisual work; budget preparation; and exhibits.
- 423A. Educational Provisions for the Visually Handicapped**
(430A.) Fall, Summer. 3(3-0) 424A, ASC 454.
Causes 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**
(430A.) Fall, Summer. 4(3-2) 424A, 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**
(430A.) Fall, Summer. 4(3-2) 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 of odd-numbered years. 3(3-0) PSL 323.
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**
(430A.) Fall, Summer. 3(3-0) 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. 3(2-2) 423C.
A laboratory course including Nemeth Code of Mathematics; science, music and language notations; preparation of classroom materials; establishing text reference materials. Emphasis upon instruction at the secondary level.

423G. Education of the Blind-Deaf

(430A.) Fall, Winter, Spring. 3(2-2)
May re-enroll for a maximum of 9 credits. ASC
222, 277, 454; 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

(424.) Fall, Winter, Spring, Summer.
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

(430C.) Spring. 3(3-0) 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) 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

(430B.) Winter, Spring. 3(3-0) 424A, 436, ASC 454.

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

425B. Language Development for the Deaf

(430B.) Fall, Winter, Spring, Summer.
3(3-0) 424A, 436, ASC 222, 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

(430B.) Winter, Spring. 3(3-0) 425B
or concurrently.

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

427A. Educational Provisions for the Physically Handicapped

(430C.) Fall. 3(3-0) 424A, 436.

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

(430C.) Fall, Spring, Summer of odd-numbered years. 3(3-0) 424A.

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

428A. Psycho-Educational Characteristics of the Mentally Retarded

(430D.) Fall, Summer. 3(3-0) 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

(430D.) Fall, Summer. 3(3-0) 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

(430D.) Fall, Summer. 3(3-0) 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, Spring. 3(3-0) 424A.

Procedures in teaching severely mentally retarded children and youth.

429. Disabling Conditions: Special Education and Rehabilitation

Fall. 3(3-0) 424A.

Etiology, medical, educational-vocational implications of disablement for special education and rehabilitation. Emphasis on medical lectures by physicians.

429G. Laboratory Programs in Driver and Traffic Education

Winter, Spring, Summer. 5(3-4) 329F,
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, Spring, Summer. 3(3-0) 429G.

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, Spring, Summer. 3(3-0) 429G,
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

Fall, Summer. 3(3-0) 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.

431. Educational Media in Instruction

Fall, Winter, Spring. 3(3-0) Juniors.

Educational media for preservice teachers. Selection and utilization of flat pictures, slides, filmstrips, motion picture films, sound, models, radio, television and field trips. Equipment operation acquired through self-instruction laboratory.

432A. Psycho-Educational Characteristics of the Emotionally Disturbed

(430E.) Fall, Spring, Summer. 3(3-0)

424A. 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

(430E.) Fall, Summer. 3(3-0) 424A,
432A. For majors in the area of the emotionally
disturbed only.

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

(430E.) Fall, Winter, Spring. 3(3-0)
424A, 432A, 432B; and 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 and Drugs: A Social Dilemma

Winter. 3(3-0) Seniors or approval of
college. Interdepartmental with and administered
by the School of Criminal Justice.

An overview investigation of the substance abuse phenomena with emphasis on alcohol. Sociological, psychological and medical aspects are discussed with implication for prevention, treatment and rehabilitation.

436. Student Teaching

Fall, Winter, Spring. Variable credit.
327 for secondary majors; approval of department;
2.0 scholastic average; ASC 477 for
Speech Correction majors.

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.

441A. General Industrial Arts

Fall and Winter of odd-numbered
years, Spring of even-numbered years. 3(0-6)
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)
341B, 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)
341C or approval of department.

Development and construction of simple electric motors, radios, and electronic devices. Experimentation with the development of organizational patterns appropriate to secondary schools when taken for graduate credit.

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441D. Advanced Printing and Graphics
Winter and Fall of odd-numbered years, Spring of even-numbered years. 3(0-6) 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) 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

Fall, Winter, Spring. 3(3-0) 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. Variable credit. May re-enroll for a maximum of 17 credits. 321A.

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. 5(3-2) 436 or 446.

School as a social institution, teacher as a member of the profession and as a representative of the community, society as basic orientation for both the teacher and the school. Purposes of the public school, major concepts of educational philosophy, and politico-legal-economic support of the schools.

464. Standardized Tests and Testing Programs

Fall, Winter, Spring, Summer. 3(3-0) 200.

History and status of educational measurement. The available standardized tests and sources of information about them. Interpretation of standard test scores. Norms and profiles. Local and widescale testing programs.

465. Testing and Grading

Fall, Winter, Spring, Summer. 3(3-0) 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 re-enroll for a maximum of 6 credits. 325F.

Extends instructional techniques and knowledge of teaching materials in various science-related curricula for elementary and middle school children. Limited to examination of selected topics during any one term.

471B. Classroom Management in Business and Distributive Education

Fall, Spring. 4(3-2) 200, 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) 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 re-enroll for a maximum of 9 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) 325A.

Application in a field setting of instructional principles introduced in 325A. Also a broad theoretical base for teaching reading.

IDC. Canadian-American Studies

For course description, see Interdisciplinary Courses.

482. Seminars in Education

Fall, Winter, Spring, Summer. 1 to 8 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 re-enroll 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 re-enroll 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. 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.

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 resolving these problems. Development of a consistent personal philosophy of education.

D. SOCIAL CRITICISM AND EDUCATION.

Fall, Summer. 3(3-0) 801A, approval of department.

Educational implications of critical analyses of contemporary society. Particular attention given to discrepancies between ideology and practice. Building school programs designed to cope with cultural inadequacies.

E. COMPARATIVE EDUCATIONAL PHILOSOPHIES

Winter, Summer. 3(3-0) 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) 801A.

Critical analysis and evaluation of leading modern philosophies of education and their implications for practice, such as: existentialism, idealism, perennialism, realism, reconstructionism.

802A. Education in the U.S.A.

Fall, Winter. 4(2-4) Passed English Language Center examination or approval of department.

Designed to provide first term foreign students in graduate programs with theoretical and experiential background in American education.

802B. Education in the U.S.A.

Winter, Spring. 4(2-4) 802A.

Designed to provide foreign students in graduate programs with theoretical and experiential background in American education.

803. Curriculum Innovation in Elementary and Middle School Science

Summer of odd-numbered years. 3(3-0)

Experience in teaching, 325F or approval of department.

In-depth examination of the objectives, learning theory, instructional strategies, classroom activities, 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.

Development of educational thought and practice in the United States. Importance of cultural influences. A critical examination of progress toward educational goals. Implications of historical background for present problems.

B. HIGHER EDUCATION IN THE UNITED STATES.

Fall, Winter, Spring, Summer. 3(3-0) Approval of department.

Development 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. Attention is also given to a world view of higher education with special focus upon the influences of United States higher education in foreign countries.

C. EDUCATIONAL HISTORY: PLATO TO LOCKE.

Winter, Summer. 3(3-0) Approval of department.

Deals historically with relation of school to developing social trends. An intensive study of the works of leading figures in educational thought. Emphasis upon Plato's *Republic*. Works by Aristotle, Comenius, Locke and others examined.

D. DEVELOPMENT OF EDUCATIONAL THOUGHT AND PRACTICE IN THE MODERN WORLD.

Spring, Summer. 3(3-0) 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. 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.

811. School Learning II

Winter, Spring, Summer. 3(3-0) 410 or 411.

Survey of research with special attention to applications to teaching and development of school programs.

812. Growth and Behavior

Fall, Spring, Summer. 3(3-0) 412 or approval of instructor.

Survey of research with special attention to applications to teaching and school programs.

813. Social and Emotional Behavior in the Classroom

Winter, Spring, Summer. 3(3-0) 812.

Survey of research on school class as a social group; the development of attitudes and values.

815B. 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 pre-practicum experience with Michigan Department of Vocational Rehabilitation.

815E. Rehabilitation Internship

Fall, Winter. 3 to 21 credits. May re-enroll for a maximum of 21 credits. 819F. Supervised graduate internship in rehabilitation counseling.

815F. Overview of Rehabilitation Placement

Winter. 3(3-0) 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) 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

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

816. Procedures in Guidance

A. CAREER GUIDANCE IN THE CURRICULUM
Fall, Winter, Spring, Summer. 3(3-0) 815B; or concurrently.

Group and individual methods providing information related to career planning, educational opportunities and personal-social concerns are analyzed. Utilization of information from placement agencies, follow up studies, and community surveys in curriculum revision is stressed.

B. GUIDANCE TECHNIQUES IN THE CLASSROOM
Fall, Winter, Spring, Summer. 3(3-0) 815B; or concurrently.

Examination of factors underlying counseling activities of teachers and administrators. Basic principles, methods and techniques related to diagnosing, interviewing, consulting and referring counselees for special assistance are included.

C. PRACTICE IN GROUP GUIDANCE TECHNIQUES
Fall, Winter, Spring, Summer. 3(3-0) 816B.

Emphasis upon development of counseling skills through 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 GUIDANCE TECHNIQUES
Fall, Winter, Spring, Summer. 3(3-0) 816A and 816B.

Role-playing video tapes, audio tapes and demonstrations are utilized in helping each student develop skills in counseling with children and consulting with parents. Techniques appropriate for various age levels and problems will be practiced.

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

Winter. 3(3-0) 819A and 819B. The use of occupational, educational and social information in counseling interviews and in guidance programs.

819D. The Counseling Process

Winter. 3(3-0) 819A and 819B. The counseling process with emphasis given to students learning a systematic approach to counseling. Students practice interviewing skills in a counseling laboratory.

819E. Counseling and Consulting Strategies

Spring. 3(3-0) 819C and 819D. 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

Spring. 3(2-1) 819C and 819D. Students will spend one day per week in a school or agency where they will counsel under supervision. One hour per week with a counselor supervisor is required.

819G. Counseling Practicum II

Fall. 3(2-1) 819F. A second course in counseling practicum. Students will spend one day per week in a school or agency where they will counsel under supervision. Students must spend one hour per week with a counselor supervisor.

819H. Development of Counseling Services

Fall. 3(3-0) 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) 819F. An examination of theories of group counseling with special attention to goal-directed groups. Tapes of group counseling will be analyzed and practice in leading groups under simulated conditions will be provided.

819K. Research in Counseling

Summer. 3(3-0) 869. Emphasis on research methods useful to counselors: measuring counseling outcomes, developing local test norms and expectancy tables, evaluating guidance services, studying behavior change in the single case.

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.

**Descriptions — Education
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821A. Curriculum Construction
Fall, Winter, Spring, Summer. 3(3-0)
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, Summer. 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 Practical Arts
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) 822N, 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.

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
(928A.) 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.

828E. Principles and Problems of Instruction in Higher Education
Fall, Winter, Spring, Summer. 3(3-0)
Approval of department.

Instructional problems in the various areas of higher education with emphasis on common principles underlying each of them.

830A. Special Methods and Materials of Teaching
Fall, Winter, Spring, Summer. 3(3-0)

May re-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; 830C or 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, Summer. 3(2-2)

Graduate students in education; 830C or 830D; 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.

831A. Educational Media in Instruction
Fall, Winter, Spring, Summer. 3(3-0)

Students may not receive credit in both 431 and 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)
831A or approval of department.

Concepts, principles and techniques for preparation and use of graphics in instruction. Design and presentation of materials for developmental boards, slides, transparencies, models, and exhibits. Simple production techniques for teaching.

831C. Photography in Instruction

Fall, Summer. 3(3-0) 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.

831E. Planetarium Instruction and Management

Summer. 4(4-0) Approval of department.

Planning and instruction using modern planetarium facilities.

832. Advanced Methods and Materials in Special Education

A. VISUALLY HANDICAPPED CHILDREN AND YOUTH.

Spring. 3(3-0) 423A, B, C, 424A; student teaching or clinical experience with visually handicapped children or approval of department.

An analysis of theories and research in education and related disciplines of educational practice. Relationship to curriculum development, instructional modifications and guidance of pupils in a variety of organizational arrangements.

B. DEAF CHILDREN AND YOUTH.

Winter, Summer. 3(3-0) 425A, student teaching or clinical experience with acoustically handicapped children or approval of department.

A review of recent research, and a study of its implications for the education of deaf children. History, legislation, service agencies, social adjustment, educational and vocational programs will be investigated and discussed.

C. LEARNING DISABILITIES

Winter, Summer of odd-numbered years. 3(3-0) 427B, student teaching or clinical experience with handicapped or approval of department.

Approaches to remediation of learning disabilities in the classroom. Identification, evaluation, methods, materials, aids, and programs, are considered within major theoretical structures.

D. MENTALLY HANDICAPPED CHILDREN AND YOUTH.

Winter. 3(3-0) 428A, B, C.
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) 432A, B, C.

Review and analysis of recent research findings, intervention strategies, and curriculum developments applicable 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 of odd-numbered years. 3(3-0) Experience in teaching and approval of department.

Advanced methods and materials used in teaching concepts of informal geometry, coordinate geometry, metric geometry, transformational geometry 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—on instruction 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.

IDC. 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) 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. INSTRUCTIONAL STRATEGIES

Spring, Summer. 3(3-0) 839A and 839B or approval of department.

Selecting appropriate teaching strategies; use of the project method, laboratory simulations, on-the-job training, youth organizations, and other methods; evaluation of student achievement.

D. SEMINAR IN DISTRIBUTIVE EDUCATION

Summer. 2 to 3 credits. Advanced graduate standing or approval of department.

Focus on current issues and problems, curriculum development projects, and research; emphasis upon individual investigations and writing.

840. Improving Instruction in Office Subjects

Improving instructional processes through research findings, readings, and experience: Objectives, scope and sequence, diagnosis of learning difficulties, selecting learning activities, evaluating achievement, selecting materials, media 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.

841. Driver and Traffic Education

A. INNOVATIONS IN DRIVER AND TRAFFIC EDUCATION

Fall, Summer. 3(3-0).

Explanation 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.

B. THE HIGHWAY TRANSPORTATION SYSTEM

Fall, Summer. 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. 3(3-0).

Specialized problems involved in traffic safety communications in a transportation center society. Design and manipulation of the communication process to better understand and influence driver behavior. Planning public information and community support programs.

D. MOTOR VEHICLE ADMINISTRATION

Spring, Summer. 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.

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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.

842C. Theory of Instruction in Business and Distributive Education

Spring, Summer. 3(3-0) Graduate course in learning theory or approval of department.

Analysis of research and literature in learning theory and application to problems: self-instructional programming, selection of learning activities and materials, skill building, measurement and curriculum. Emphasis upon independent study in selected specializations.

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 of 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; curriculum development projects; contemporary research. Emphasis on individual investigations and writing.

844. Research in Elementary Social Studies Instruction

830A. Spring of even-numbered years. 3(3-0)

Focuses on role, function, and design of research studies on the improvement of social studies instruction in elementary and middle schools.

845. New Social Studies Curricula

830A. Spring of odd-numbered years. 3(3-0)

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; 325F or 846 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 re-enroll for a maximum of 6 credits. 846 or 847; 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 of odd-numbered years. 3(3-0) 830A.

To investigate and criticize trends, issues and research in language arts programming and instruction.

850. Teacher and the 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, focuses 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) 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.

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

B. SECONDARY SCHOOL ADMINISTRATION.

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

C. INSTRUCTIONAL SUPERVISION.

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

D. BUSINESS ADMINISTRATION OF SCHOOLS.

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

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 850 or approval of department.

B. VOCATIONAL EDUCATION PROGRAMS.

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

C. PUPIL PERSONNEL PROGRAMS.

Fall, Spring, Summer. 3(3-0) 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.

855. Research in Educational Administration

Fall, Winter, Spring, Summer. 3(3-0) 851A, 851B, 867.

The identification of an individual research problem and the application of principles and techniques of educational research in seeking a solution to the problem.

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) 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) 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, Spring, Summer. 3(3-0) 464 or 465; 869.
Nature of measurement and types of 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 I.
Winter, Summer. 3(3-0) 464 or 465 or PSY 415; approval of department.
Fundamentals of individual intelligence measurement. Measurement of intelligence with the Stanford-Binet. Observation, practice, and interpretation in an educational setting.
B. INDIVIDUAL MEASUREMENT II.
Fall, Spring, Summer. 3(3-0) 464 or 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) 464 or 465; 813 or PSY 826.
Study of general personality structure and methods in personality assessment related to education.
- 867. *Educational Research Methods***
Fall, Winter, Spring, Summer. 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, Summer. 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, Summer. 4(3-1) Pretest and approval of instructor.
Application of descriptive statistical techniques to educational data. Introduction to estimation and tests of hypotheses. Interpretation of statistical reports.
- 871. *The Secondary School: Role, Function and Structure***
Fall, Winter, Spring, Summer. 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, Summer. 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, Summer. 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.
- 881. *Workshops in Education***
Fall, Winter, Spring, Summer. 2 to 10 credits. May re-enroll for a maximum of 10 credits. Approval of department.
Laboratory approach which provides opportunities for experienced educational personnel to concentrate their study on common administrative and supervisory problems.
- 882. *Seminars in Education***
Fall, Winter, Spring, Summer. Variable credit. Approval of department.
Seminars in the various fields of emphasis.
- 883. *Readings and Independent Study in Education***
Fall, Winter, Spring, Summer. Variable credit. 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 practicums, observation, internships, and externships in the various areas of emphasis.
- 887. *Seminar: Continuing Education Leadership in Local Communities***
Spring. 3(2-2) May re-enroll for a maximum of 6 credits. Majors or 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.
- 899. *Research***
Fall, Winter, Spring Summer. 2 to 12 credits. Approval of department.
- 901. *Educational Sociology: Seminar***
(901D.) 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***
(804G.) Spring. 3(3-0) 804E; 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 re-enroll for a maximum of 15 credits. Doctoral candidates in educational psychology. First enrollment must be in fall.
Review of major areas and critical analysis of research problems and professional issues.
- 915A. *Counseling Proseminar I***
Fall. 3(3-0) Admission to doctoral study in counseling or pupil personnel administration.
Orientation to counseling and pupil personnel administration. Examination of historical and philosophical bases, selection and training practices, and evaluation of outcomes. Apprenticeship experiences in instruction and research.
- 915B. *Counseling Proseminar II***
Winter. 3(3-0) 915A.
Continuation of 915A.
- 915D. *Rehabilitation as a Profession***
Fall, Winter, Spring. 2 credits. Doctoral candidate.
Orientation to doctoral study in rehabilitation counseling.
- 921. *Curriculum Research Seminar***
Spring. 3(3-0) 867; 821A.
Identification of researchable variables in the curriculum of 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) 867.
Implications from findings of the major investigations into teaching processes. Relates to the curriculum of in-service and pre-service teacher education.
- 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.

**Descriptions — Education
of
Courses**

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.

947. Seminar in Elementary Science Education II

Spring of odd-numbered years. 3(3-0) 847; enrolled in graduate program.

Analysis of research in science education at the elementary level in such areas as curriculum, methodology, and evaluation. Application of research to individual investigations.

949. Advanced Seminar in Language Arts

Spring. 3(3-0) 849.

Development of language arts programs in elementary education, preparation of language arts teachers, analysis of research in language arts and those substantive disciplines related to language arts.

950. Theory and Practice of Administration

Fall, Winter, Spring, Summer. 3(3-0) Approval of department.

Administrative process 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.

Communications 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.

Current issues concerning financing public elementary and secondary education in the United States. Current and historical analysis of patterns of revenue sources and expenditures.

953. Education Law

Spring, 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

Winter, 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.

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.

965A. Psychometric Theory

Spring. 3(3-0) 865, 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

Fall, Winter. 3(3-0) 865, 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) 828E.

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 problems.

967. Advanced Research Methods in Education

Fall, Spring. 4(3-1) 867 and 869, or 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) 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, Summer. 4(3-1) 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.

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 exist 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.

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, Summer. 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, Spring, Summer. Variable credit. Approval of department.

Supervised advanced graduate practicums, observation, internships, and externships in the various areas of emphasis.

985. Counseling Pre-Practicum

Winter, 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 preparation for assuming counseling responsibilities. Approach is didactic and experiential with limited contacts with clients.

986A. Counseling Practicum I

Fall, Winter, Spring. 3(0-3) 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

Fall, Winter, Spring. 3(0-3) 986A.

Supervised experience working with college students in a counseling relationship. Group discussions, group supervision and observation of counseling interviews, and individual supervision.

986C. Counseling Practicum III

Fall, Winter, Spring. 3(0-3) 986B.

Supervised experience working with college students in a counseling relationship in the residence halls. Individual supervision, increased client contact hours, and participation in staff activities.

987A. Seminar: Continuing Education and Social Policy

Fall. 3(3-0) May re-enroll for a maximum of 6 credits. Majors or approval of department.

Continuing education, as social force impacting and impacted by government and corporate policy. Examination of domestic and foreign examples of interaction between social policy and continuing education.

987B. Seminar: Continuing Education in Higher Education Institutions

Winter. 3(3-0) May re-enroll for a maximum of 6 credits. Majors or approval of department.

Patterns, problems, and potential for continuing education in two and four year colleges. Problems of governance, reward system, leadership roles, etc.

988. Behavioral Counseling Laboratory

Fall, Winter, Spring. 1 to 6 credits. May re-enroll 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.

999. Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

ELECTRICAL ENGINEERING AND SYSTEMS SCIENCE

College of Engineering

Electrical Engineering

E E

275. Consumer Electronics

Fall, Winter, Spring. 3(3-0)

Electronic circuit components and devices; their operation in transmitters, receivers, stereo-amplifiers, etc. Electronic measurements, magnetic recording, speaker systems, and other topics will be considered.

300. Electric Circuits I

Fall, Winter. 4(4-0) MTH 113.

Current voltage and power. DC and transient circuit analysis. Forced response. Sinusoids and the phasor concept. Bridges.

301. Electric Circuits II

Winter, Spring. 4(4-0) 300, MTH 214.

Sinusoidal steady-state response. Average power and rms concepts. Complex frequency response. Magnetically coupled circuits. Two-port networks. Transfer functions.

302. Basic Electronic Circuits

Spring, Summer. 4(4-0) 301, MTH 215.

Volt-ampere characteristics of diodes and transistors. Voltage, current and power amplification. Stability, transient and high-frequency effects. Feedback, oscillators and operational amplifiers.

303. Electronics Laboratory I

(384.) Winter. 1(0-3) 300 or concurrently.

Experimental and measurement procedures as appropriate to topics covered in 374.

304. Electronics Laboratory II

(386.) Spring, Summer. 1(0-3) 302 concurrently.

Experimental investigation of topics covered in 375 and 376. Computer-aided analysis and design of electronic circuits.

305. Electromagnetic Fields and Waves I

Fall, Winter. 3(3-0) MTH 215, PHY 288.

Vector analysis. Electrostatic fields: EM sources, scalar potential, Poisson's and Laplace's equations, dielectric media, capacitance, and energy storage. Boundary value problems for electrostatic fields.

306. Electromagnetic Fields and Waves II

Winter, Spring. 3(3-0) 305.

Magnetostatic fields; EM sources, vector potential, magnetic media, inductance, and energy storage. Time-varying fields and Maxwell's equations: energy conservation, potential theory, and radiation concepts.

307. Electromagnetic Fields and Waves III

Spring, Summer. 3(3-0) 306; 308 concurrently.

Application of Maxwell's equations: radiation, propagation, reflection, and power flow of plane 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) 306; 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. 4(3-3) PHY 288.

Basic electronic concepts; passive and active components; operational amplifiers; switching devices, equivalent circuits; transducers; signal conditioning; recording; data management; basic elements of control.

400. Current Topics in Electrical Engineering

Winter. 1(2-0) May re-enroll for a maximum of 3 credits. Approval of department.

Topics include communication systems, instrumentation systems and data management, advance laboratory techniques, modeling, circuit design, computer analysis.

403. Special Problems

Fall, Winter, Spring, Summer. 1 to 4 credits. Approval of department.

Investigation of a topic in electrical circuits or systems compatible with the student's prerequisites, interest, and ability.

415. Control Systems

Fall. 3(3-0) ME 455, MTH 334.

Formulation of automatic control problems; review of modeling method; specifications, controllability and stability; controller design via root locus and state-vector methods; survey of digital control.

416. Control System Design

Winter. 3(3-0) 415.

Realization of linear controllers, consistent models for plant and computer sampling, algorithms for digital control, organization of digital controllers.

418. Introduction to Network Synthesis

Spring. 3(3-0).

Overview: specification, approximation, synthesis. Physical realizability of passive two-element kind one-port and two-port functions. Foster and Cauer one-port syntheses. Lattice, ladder and cascade two-port syntheses. Selected active network synthesis.

419. Physical Phenomena and Electronic Instrumentation I

Winter. 4(3-3) PHY 289 or 293B; MTH 215. Interdepartmental with and administered by the Physics Department.

Concepts of electronics relative to uses in investigations of physical phenomena and their subsequent applications to provide reliable instrumentation. Nuclear radiation detectors, photometers and magnetometers are examples of specific topics covered.

435. Guided Transmission Systems

Fall. 3(3-0) 308.

Electric circuit theory from EM field theory. Guided wave theory: normal modes, propagation characteristics, power transport, wave impedances, traveling and standing waves, rectangular and circular waveguides. Electromagnetic resonators: frequency and Q.

436. Microwave Networks and Antennas

Winter. 3(3-0) 435; 438 concurrently.

Circuit theory for wave-guiding systems: impedance description of microwave one and N-port networks, scattering matrix, excitation and coupling. Radiation and scattering: radiation fields, fields and impedance of cylindrical antennas and arrays, microwave antennas.

437. Microwave Electronics and Plasma

Spring. 3(3-0) 436; 439 concurrently.

Electron dynamics; field-particle interactions; space-charge waves; cyclotron waves; klystron; magnetron; traveling-wave amplifier; quadrupole amplifiers; microwave solid-state devices; gas discharges; plasma; waves in plasma.

438. Transmission and Radiation Laboratory

Winter. 1(0-3) 435; 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.

439. Microwave Electronics and Plasma Laboratory

Spring. 1(0-3) 438; 437 concurrently.

Experimental investigations on topics from 437. Laboratory experiments on klystron characteristics, traveling wave amplifier, microwave semiconductor oscillator, plasma measurements, and plasma-field interactions.