

**855. The Industrial Revolution in Europe**  
Winter of even-numbered years. 3 credits. 318, 324. Interdepartmental with the History Department.

The preconditions that led to the momentous changes in agriculture and industry in Europe from 1700-1914.

**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.

**859. Labor Legislation and Public Policy**  
Spring. 3 credits. 305 or approval of department.

Criteria for public policy concerning unions and collective bargaining; current problems in labor legislation; role of federal and state governments in industrial relations; decision-making process in labor legislation.

**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.

**911. Theory of the Firm and the Consumer**  
Fall, Summer. 3(3-0) 812 or approval of department.

Imperfect markets, rational behavior and other advanced topics.

**912. Activity Analysis in Economic Theory**  
Winter. 3(3-0) Approval of department.

Linear programming, with an introduction to the theory of games. Production with fixed technical preparations.

**913. General Equilibrium Economics**  
Winter. 3(3-0) 813 or approval of department.

General equilibrium economics: statics and dynamics. General equilibrium economics involving time and risk. Integration of the micro-theories of production, consumption and markets with the macroeconomic variables. Dynamics as development through time.

**914. Welfare Economics**  
Spring. 3 credits. 812 or approval of department.

Individual values, Pareto optimality and social welfare.

**915. Economic Dynamics**  
Spring. 3(3-0) 811 and 813 or approval of department.

Models of economic behavior over time with emphasis on stability conditions, the trade cycle, and economic growth.

**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. 812, 814, or 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. 812, 821A, or 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**

**101. Introduction to Teaching**  
A. ELEMENTARY EDUCATION.

Fall, Winter, Spring. 3(1-4) Approval of department.

Teaching profession, American educational heritage, teaching of children and youth, preparation and opportunities.

**B. SPECIAL EDUCATION.**

Fall, Winter, Spring. 1(1-0) Freshmen and Sophomores only.

Opportunities in education of children and youth impaired in vision, hearing, mental ability, emotional adjustment, speech and physical handicaps.

**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)

**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**

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

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

**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.

**312. Human Growth and Development**

Fall, Winter, Spring, Summer. 4(2-4) 200.

Growth of children from birth to adolescence and techniques for measurement. Problems of adjustment and physiological and psychological factors associated with them. Young children observed and studied in laboratory and natural situations.

**321. Curriculum, Methods, and Materials**

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.

**A. 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.

**B. ELEMENTARY MATHEMATICS AND SCIENCE**

Fall, Winter, Spring, Summer. 5(4-2) Concurrently with 321A, 321C; MTH 201; B S 202; PHS 203.

**C. ELEMENTARY LANGUAGE ARTS AND SOCIAL STUDIES**

Fall, Winter, Spring, Summer. 7(6-3) Concurrently with 321A, 321B.

**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. Children's Literature**

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

Designed to acquaint elementary school teachers with wide variety of reading materials suitable for various grade levels below junior high school.

**325D. Teaching of Social Studies in Elementary Grades**

Fall, Winter, Spring, Summer. 3(3-0) 200, Juniors; SS 233.

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 School**

Fall, Winter, Spring, Summer. 3(3-0) 200, Juniors, N S 193; BS 202; PHS 203.

Extends the science background of prospective elementary teachers. Emphasis is placed upon methods and materials for science in elementary classrooms.

**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**

Specifies 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; 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.**

Fall, 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.

**M. INDUSTRIAL ARTS.**  
Fall, Winter of even-numbered years.  
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 credits. 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.

**W. METHODS OF TEACHING  
SECONDARY GEOGRAPHY**  
Fall. 5 credits.

**329F. Introduction to Driver and  
Traffic Education**  
(429F.) Fall, Spring, Summer. 4(3-2)

Valid driver's license. Introduction to and an analysis of the driving task. Theory and practical application will be provided.

**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.

**402. Supervising High School  
Publications**  
Spring, Summer. 3(3-0) Juniors:  
non-majors. Interdepartmental with and administered by the School of Journalism.

Staff organization, makeup, illustrations, 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.

**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) Ap-  
proval 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 ad-  
ministration of residence halls. Spring: for  
graduate students preparing for student person-  
nel 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.

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

Dealing with atypical children in regular and special classrooms. Methods of facilitating growth and development of children who are crippled, hard of hearing, defective in vision, defective in speech, etc. Opportunity to observe and participate in instruction of such pupils in Lansing area.

**426B. Teaching of Geography in  
Elementary and Junior High  
Schools**  
Summer. 3(3-0) One course in geog-  
raphy or approval of the Geography Department.

Objectives, problems, available materials, instructional techniques, and evaluation aspects of teaching geography in the elementary and junior high schools.

**429. Disabling Conditions: Special  
Education and Rehabilitation**  
Fall. 3(3-0) 424.

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) Interdepart-  
mental 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.

**430A. Education of Visually Handi-  
capped, Blind-Deaf Children  
and Youth**  
Fall, Winter, Spring, Summer. Vari-  
able credit. May re-enroll for a maximum of  
15 credits. 321C, 424; ASC 454.

Educational provisions for the visually handicapped. Educational procedures for visually handicapped children. Educational procedures for blind-deaf children. Braille. Low vision aids. Orientation and mobility skills for visually handicapped children.

**430B. Education of Deaf Children and Youth**

Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 15 credits. 325A, 325B, 424; ASC 454.

Educational provisions for the deaf; methods, materials, curriculum. Speech and language development in an oral philosophy.

**430C. Education of Physically Handicapped Children and Youth**

Fall, Spring, Summer. Variable credit. May re-enroll for a maximum of 15 credits. 321C, 424 or approval of department.

Educational, social and psychological provisions for education of crippled, hospitalized or home-bound children and youth. Emphasis upon cerebral palsy, multi-handicapped and learning disabilities.

**430D. Education of Mentally Retarded Children and Youth**

Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 15 credits. 424 or approval of department.

Educational provisions, social control, and methods and curriculum for mentally retarded children.

**430E. Education of Emotionally Disturbed Children and Youth**

Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 15 credits. 424 or approval of department.

Classroom observation and management techniques. Remedial practices for children with specific learning disabilities. Seminar on methods and materials.

**431. Instructional Media in Instruction**

Fall, Winter, Spring. 3(3-1) 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.

**436. Student Teaching**

Fall, Winter, Spring, Summer. 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**

Winter and Fall 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.

**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.

**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.

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.

**471A. Instructional Systems in Business and Office Education**

Fall, Spring. 4(3-2) 200; 327C concurrently or approval of department.

Application of learning principles to selection of materials, media, and methods. Measurement and evaluation of learning in relation to objectives.

**471B. Instructional Systems in Distributive Education**

Fall, Spring. 4(3-2) 200; 327C concurrently or approval of department.

Dimensions of the total distributive education programs: the organizational patterns, principles of curriculum formulation, selection and use of appropriate teaching strategies, and the effective use of youth clubs.

**472. Organization and Administration of Cooperative Office and Distributive Occupations Programs**

Fall, Spring. 3(3-0) 471A or 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.

**476. 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.

**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.

(801B.) 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.

**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.

**G. ADVANCED COMPARATIVE AND INTERNATIONAL EDUCATION**

*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.

**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, Summer. 3(3-0) 312.*  
Survey of research with special attention to applications to teaching and school programs.

**813. Social and Emotional Behavior in the Classroom**

*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 col-

leges 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(2-4) Open to rehabilitation counseling majors only.*

Overview of field of rehabilitation. Orientation to the Michigan Division of Vocational Rehabilitation. Rehabilitation counseling pre-practical experience with Michigan Department of Vocational Rehabilitation.

**816. Techniques of Counseling and Guidance**

**A. OCCUPATIONAL, EDUCATIONAL, AND SOCIAL INFORMATION.**

*Fall, Winter, Spring, Summer. 3(3-0) 815B or approval of department.*

Methods for providing occupational, educational and social information in the guidance program. Techniques of teaching units in occupations, orientation or other life-adjustment areas considered. Techniques of placement and follow-up; community, educational or occupational trends; and classification and description of jobs and industries.

**B. PROCEDURES IN INDIVIDUAL ANALYSIS.**

*Fall, Winter, Spring, Summer. 3(3-0) 815B or approval of department.*

Place of the inventory service in the personnel and instructional programs. Practice in the use and analysis of techniques for understanding the individual including both testing and non-testing procedures.

**C. GROUP PROCEDURES IN GUIDANCE.**

*Fall, Winter, Spring, Summer. 3(3-0) 815B or approval of department.*

Principles and practices of group counseling. Students participate in a group to examine in depth their own interaction and motives. Didactic content related to experiences of the course. Enrollment limited.

**D. PROCEDURES IN COUNSELING.**

*Fall, Winter, Spring, Summer. 3(3-0) 464, 816B.*

Diagnosis and interpretation of case study materials. Role-playing observation of interviewing procedures. Consideration of basic issues in counseling. Practice in test interpretation.

**820. Principles of Curriculum Improvement**

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

**821A. Curriculum Construction**

*Fall, Winter, Spring, Summer. 3(3-0) 820.*

Approaches to curriculum construction; organization and function of personnel; initiating and evaluating curriculum change; curriculum research.

**821B. The Core Curriculum**

*Winter. 3(3-0) 821A.*  
Critical study of existing core programs. Special attention to techniques of selection and organization of course materials and to cooperative planning of units of work. At least one resource unit developed by students.

**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.

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

Philosophies, methods and techniques, materials, agencies and facilities for developing and operating a program of adult education. Emphasis on participating in local adult education activities as a laboratory for evaluating ways and means of procedures.

**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.

**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.

**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**  
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.

**829A. Education of the Gifted Student**  
Winter, Spring, Summer. 3(3-0) Approval of department.

Study of the dimensions of giftedness — identification, characteristics, development, and societal role — is made. Emphasis will be placed upon the problems of curriculum, teaching, administration, and guidance. Literature in areas of creativity, critical thinking, and motivation will be reviewed as this applies to the development of gifted children.

**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(3-1) 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(3-1) 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(2-2) 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) 424, 430A, student teaching or clinical experience with visually handicapped children or approval of department.

Relationship of research, theories in education and related disciplines to educational practice, curriculum development, instructional modification, and guidance of visually handicapped pupils in a variety of organizational arrangements.

B. DEAF CHILDREN AND YOUTH.

Winter, Summer. 3(3-0) 430B, student teaching or clinical experience with acous-

tically 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) 430C, student teaching or clinical experience with physically handicapped children 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) 430D, student teaching or clinical experience with mentally handicapped children or approval of department.

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 DISTURBED CHILDREN AND YOUTH.

Winter. 3(3-0) 430E, student teaching or clinical experience with emotionally disturbed children or approval of department.

An analysis of the organization, operation, and supervision of classrooms in open and closed treatment settings. Specific psychoeducational procedures, instructional material modifications, and classroom management techniques will be examined and appraised from the standpoint of theory and research.

**837A. Supervision of Student Teaching**  
Summer. 3(3-0) Approval of department.

Designed to assist supervising teachers in guidance of student teachers. In addition to a general overview of the problems of student teaching, the following topics will be studied: trends in teacher education, orientation of student teachers to student teaching, responsibilities of the supervising teacher, relationships between supervising teachers and college personnel, conferences with student teachers, and evaluation of student teaching.

**838. 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**

(822R.) Summer. 3(3-0).

Needs and goals in education and manpower training for business, general business and economic education; program structure; professional and youth organizations; related legislation and historical background.

**842B. Contemporary Issues in Education for Business**

Summer. 3(3-0) Twenty-four graduate credits or approval of department.

Analysis and discussion of selected issues relating to: 1. education for business—structure, manpower needs, legislation, curriculum, training by government and business, 2. curriculum and instruction. Emphasis upon problem-solving and extensive reading.

**842C. Theory of Instruction in Business and Distributive Education**

(ED 940.) 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.

**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, 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.

**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**  
(969A.) Fall, Winter, Spring, Summer.  
4(3-2) Approval of department.

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.

**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.

**899. Research**  
Fall, Winter, Spring Summer. 2 to 12 credits. Approval of department.

**901D. Educational Sociology: Seminar**  
Fall, Winter, Spring. Variable credit.  
Approval of department. Interdepartmental with and administered by the Sociology Department.

**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.

**928A. Methods and Materials of Instruction in Continuing Education**  
Winter, Summer. 3(2-2) Twelve credits in Education, approval of department.

Differences in methods used with children and adults. Psychology of adult learner and techniques for stimulating new interests and purposes. Various methods of instruction evaluated and teaching skills demonstrated. Materials of instruction including books and pamphlets, visual and auditory aids, recorder, etc. Use of field trip as adult learning device.

**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.

**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**  
(965.) 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**  
(968A.) 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**  
Spring, Summer. 4(3-2) 867 and 869, or 969B.

The research process in survey, clinical, and historical studies. Sampling data collection techniques and data analysis. Emphasis on non-experimental research.

**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, Spring, Summer. 4(3-2)  
869.

Principles and techniques in the application of inferential statistics to educational data with emphasis on the analysis of variance. Overview of correlation methods, non-parametric procedures and multi-variate techniques.

C. EXPERIMENTAL DESIGN IN EDUCATION.  
Winter, Spring, Summer. 4(3-2) 969B.

Theory and practice in the design, analysis, and interpretation of experimental and quasi-experimental research.

**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.

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

**ELECTRICAL ENGINEERING  
AND SYSTEMS SCIENCE\***

**College of Engineering**

**Electrical Engineering** EE

**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.

**311. Fundamentals of System Modeling**  
Fall, Winter. 3(3-0) MTH 334; PHY 288.

System measurements, signal representations, mathematical models for systems of lumped physical components, topological equations for electrical networks; linear graph theory and its application to modeling electrical, mechanical, hydraulic, and other systems.

**312. Analysis of Linear Systems**  
Winter, Spring. 3(3-0) 311.

State Models for general systems; numerical and analytical solutions.

\*Effective March 1, 1969.

**313. Analysis of Large Scale Systems**  
Spring, Summer. 3(3-0) 312.

Stability, pulse and frequency response characteristics, analysis by Laplace and Z transforms, subassemblies of multi-terminal components.

**321. Analog and Digital Computation Laboratory**  
Fall, Winter. 1(0-3) MTH 334, PHY 288; 311 concurrently.

Numerical solution of electrical systems problems, component modeling by digital computer, analog computer simulation.

**345. Instrumentation and Computation Laboratory**  
Fall, Winter, Spring. 4(3-3) PHY 288.

Signal measuring and generating devices; accuracy and error considerations in laboratory measurements; terminal characteristics of components from measurements; use of analog computers.

**374. Electronics I**  
Fall, Winter. 4(4-0) PHY 288.

Current, voltage and power. DC, AC and transient RLC circuit analysis. Resonance phenomena; bridges; nonlinear circuitry. Two-port networks and their equivalent circuits. Computer-aided analysis and design of circuits.

**375. Electronics II**  
Winter, Spring. 4(4-0) 374.

Volt-ampere characteristics of the transistor. Voltage, current and power amplification. Stability and transient effects. Oscillators, operational amplifiers.

**376. Electronics III**  
Spring, Summer. 3(3-0) 375.

Boolean algebra and logic circuits. Design, analysis, and evaluation of monostable, astable and bistable multi-vibrator circuits, logic circuits and systems. Aspects of reliability.

**384. Electronics Laboratory I**  
Fall, Winter. 1(0-3) 374 concurrently.

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

**386. Electronics Laboratory II**  
Spring, Summer. 1(0-3) 376 concurrently.

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

**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) 313 or M E 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) 313.

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.

**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.

**455. Deterministic Communication Systems**  
Fall. 3(3-0) 374 or approval of department.

Communication systems. Representation of signals in time and frequency domain. Processing of signals by linear, simple nonlinear and time-variant systems. Linear and nonlinear, analog and digital modulation and demodulation; for example, AM, FM, PCM.

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

Probability theory as applied in the study of communication systems. Representation of random signals and noise as stochastic processes. Autocorrelation and spectral density.

**457. Introduction to Statistical Communication Theory**  
Spring. 3(3-0) 456; 467 concurrently.

Representation, processing and filtering of random signals. Performance of analog, linear and nonlinear modulation systems with noise. Optimal digital communication systems.