

455. Natural Resource Economics
Winter. 4(4-0) 450 or approval of department. Interdepartmental with the departments of Fisheries and Wildlife, Park and Recreation Resources, Resource Development, and Natural Resources.

Basic economic and political principles and techniques that govern the production and consumption of forest land products, including basic forest valuation procedures.

457. Forest Management and Planning

Winter. 4(3-2) 455 or concurrently.

Integrative planning for forest management, including multiple-use aspects. One day field trip required.

460. Arboriculture

Fall. 3(2-3) Approval of department.

Principles and techniques of species selection, establishment, and cultural practices used in the care and maintenance of shade and ornamental trees. Two-day field trip required.

465. Forest and Wood Science Problems

Fall, Winter, Spring, Summer. 1 to 5 credits. Seniors with a 2.80 average, or approval of department.

Special problems course for students qualified for advanced study in some phase of forestry or wood science.

491. Natural Resources and Modern Society

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

Interdepartmental with the Department of Resource Development and Natural Resources.

A survey of the social and economic significance of natural resources in modern industrial and urban society. Current problems of natural resources management and use are examined in terms of the society in which they exist.

804. Forest Ecology

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

Theories, methods of analysis, and discussion of current investigations of energy, nutrients, and biomass dynamics in forest ecosystems.

807. Special Problems

Fall, Winter, Spring, Summer. 2 to 5 credits. May re-enroll for credit with a maximum of 10 credits.

Advanced study in administration, biometrics, photogrammetry, dendrology, silviculture, management, economics, ecology, genetics, arboriculture, hydrology, soils, recreation, physiology, policy, entomology, products harvesting, wood preservation, timber mechanics, wood conversion, fire, range management, extension and pathology.

809. Natural Resources Economics

Winter. 3(3-0) Approval of department. Interdepartmental with the Department of Resource Development.

Applications of economic analysis to natural resource problems.

828. Seminar

Winter. 1(1-0)

Critical study and discussion of advanced forestry topics.

830. Physiological Genetics

Winter. 3(3-0) Approval of department. Interdepartment with the Department of Crop and Soil Sciences.

Physiological bases for genetic variation in higher plants including adaptive physiology, quantitative genetics, growth correlations, biochemical genetics, hybrid physiology, and geneecology.

835. Silviculture

Spring. 3(3-0) 305 or approval of department.

Biological basis of intensive forest management including seedling production, site evaluation and preparation, plantation establishment, intermediate stand treatments and natural reproduction methods. Field trip optional.

840. Recreation Economics

Spring. 4(4-0) 809 or approval of instructor. Interdepartmental with the departments of Park and Recreation Resources and Resource Development and administered by the Department of Park and Recreation Resources.

Applications of economic analysis to recreation resource problems including measurement of demand and supply, valuation of recreation resources, determination of economic impact, economic decision making and policy considerations.

850. Administering the Public Land Agency

Spring. 4(4-0) 450 or approval of department.

Case studies of administrative problems in land management agencies. Students are organized as teams and prepare team reports on specified aspects of each case.

855. The Research Process in Natural Resources

Fall. 3(3-0) Approval of department. Interdepartmental with and administered by the Department of Resource Development.

Research and decision processes as applied in natural resource investigations. Research organization and applications of research results. Oriented to management, social science, and policy studies. Preparation of project proposals.

860. Forest Inventory

Fall of even-numbered years. 3(3-0) 402, STT 422, MTH 112.

Literature based study of the state of the art and current research topics in methods of forest inventory. World-wide in scope, but emphasis on North American systems.

899. Research

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

909. Timber Economics

Fall of odd-numbered years. 3(3-0) 457, 809, EC 800, 801, 802.

Economic theory relevant to study of timber production, regional and national timber supply, demand and price, the effect of institutional factors, and other topics by review of past research.

910. Resource Economics Proseminar

Spring. 3(3-0) May re-enroll for a maximum of 9 credits. Approval of department. Interdepartmental with the departments of Agricultural Economics and Resource Development.

A seminar wherein advanced graduate students in the fields of resource economics participate with faculty in the joint conduct of a major research project in resource economics and policy.

960. Simulation Models in Natural Resource Management

Winter of odd-numbered years. 3(3-0) 855 and knowledge of FORTRAN programming or approval of department. Interdepartmental with and administered by the Department of Resource Development.

The role of simulation models in developing management strategies. Applications of computer simulation in natural resources. Modeling of decision systems in natural resources management.

975. Least Squares Analysis and Linear Programming in Forestry Research

Fall of odd-numbered years. 4(4-0) MTH 112, STT 423, CPS 110 or 120.

Application of least squares analysis and linear programming to problems in forestry research. Include both linear and nonlinear least squares models. Case studies from several forestry disciplines.

976. Multivariate Methods in Forestry Research

Winter of even-numbered years. 4(4-0) 975 or approval of department.

Application of multivariate techniques such as principal components, canonical analysis, factor analysis, and clustering to problems in forestry research. Case studies drawn from several forestry disciplines.

999. Research

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

FRENCH

See Romance and Classical Languages

GENETICS

GEN

College of Natural Science

800. Genetics Seminar

Fall, Winter, Spring. 1(1-0) May re-enroll for a maximum of 12 credits. Approval of director.

Student seminar to cover genetics subjects not considered in formal courses. Course is also intended to give students experience in reviewing and organizing literature in a subject, and orally presenting and defending the analysis.

804. Gene Transmission

(801.) Fall. 3(3-0) ZOL 441 or approval of instructor.

Molecular and formal genetic studies of the replication, recombination, repair and segregation of genetic information in prokaryotes and eucaryotes. Experimental design and methodology will be emphasized.

805. Genetic Organization, Action and Regulation

(803.) Winter. 3(3-0) 804.

Molecular and formal genetic studies of the organization, expression and regulation of gene activity in prokaryotes and eucaryotes. Experimental design and methodology will be emphasized.

806. Population and Quantitative Genetics

(802.) Spring. 3(3-0) ZOL 441 or approval of instructor.

Genetics of quantitative characteristics in populations with special reference to polygenic variation and its interactions with environment, gene action and its measurement, mating systems, and selection.

**Descriptions — Genetics
of
Courses**

880. Special Problems

Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 12 credits. Approval of instructor.

Students with special interests and abilities may study published literature in a selected genetics topic or they may carry on research in the laboratory on a selected subject in collaboration with genetics faculty.

890. Selected Topics in Genetics

Fall, Winter, Spring, Summer. 2 to 5 credits. May re-enroll for a maximum of 9 credits. ZOL 441 and approval of instructor.

Topics will be selected from molecular genetics, physiological genetics, population genetics, quantitative genetics, evolution, radiology and mutagenesis, microbial genetics, somatic cell genetics, behavioral genetics, and human genetics.

999. Research

Fall, Winter, Spring, Summer. 3 to 12 credits. Majors. Research for the doctoral dissertation in genetics.

GEOGRAPHY

GEO

College of Social Science

Courses are classified as follows:

- Cultural—170, 201, 404, 801, 901.
- Economic—213, 409, 412, 413, 435, 454, 806, 809, 835, 906.
- Field Techniques—415, 850.
- Geographic Education—458, 858.
- Historical—310, 810, 910.
- Independent Research—400H, 411, 480, 818, 899, 918, 999.
- Medical—470, 870, 970.
- Physical—206, 206L, 429, 430, 431, 432, 451, 834, 902.
- Political—170, 416, 908.
- Population—215, 320, 836, 934.
- Quantitative Methods—427, 428, 811.
- Regional—204, 300, 315, 316, 319, 321, 322, 340, 342, 350, 360, 361, 362, 363, 364, 812, 912.
- Recreational and Environmental—307, 309, 828.
- Theory and Philosophy—150, 280, 425, 480, 825, 826, 827.
- Urban—318, 401, 402, 403, 805.
- Visual Media and Techniques—122, 223, 224, 424, 426, 446.

122. The World of Maps

(222.) Fall. 3(3-0)

Discussion of types, practical applications, and sources of maps.

150. Geography of Selected Current Problems

Winter. 2(2-0)

The geographic perspective is used to examine U. S. and world problems of major concern such as international conflicts, environment quality, spatial change, and economic development.

170. Future Worlds

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

Geographical approach to environmental, biological, economic, social and political problems facing mankind between now and year 2000. Approved through Fall term 1978.

IDC. Resource Ecology and Man

For course description, see Interdisciplinary Courses.

201. Geography of Culture

(301.) Fall, Winter, Spring, Summer. 4(3-0)

A systematic discussion of cultural geography, stressing cultural processes and relationships.

204. World Regional Geography

Fall, Winter, Spring, Summer. 4(4-0)

Man's relationship with natural and cultural environments.

206. Physical Geography

Fall, Winter, Spring, Summer. 4(4-0)

Analysis of weather, climate, landforms, soils, water and biotic factors of man's environment, including their spatial, genetic, and functional interrelationships.

206L. Physical Geography Laboratory

Fall, Winter, Spring. 1(0-2) 206 or concurrently.

Laboratory study of geographic aspects of map interpretation, aerial photographs, weather, climate, soils, landforms, and vegetation.

IDC. Introduction to Latin America I

For course description, see Interdisciplinary Courses.

213. World Economic Geography

Fall, Winter, Spring, Summer. 4(4-0)

Emphasis on distribution of natural resources, industries and service activities, stressing factors of location and economic concepts of locational change.

215. World Food Issues

Spring. 3(3-0) Interdepartmental with Food Science.

Food resources as related to world distributions of population, soil, water, fuel and minerals. Special attention to urbanization, irrigation, and future food needs and global constraints.

223. Introduction to Cartography

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

Principles and techniques of constructing maps and other graphic devices. Types of map reproduction.

224. Remote Sensing: Airphoto Interpretation

(324.) Fall, Winter. 4(2-4) Sophomores.

Use of aerial photographs in the identification and interpretation of physical and cultural features of the terrestrial environment. Includes principles of photogrammetry, and stresses application and practice.

IDC. Continuing Revolution in China: Problems and Approaches

For course description, see Interdisciplinary Courses.

280. Perspectives on Geography

Spring. 2(2-0)

Introduction to the profession of geography for majors.

300. North America

Fall, Winter, Summer. 4(3-0)

Human and physical geography of North America, north of the Mexican border.

307. Geography of Environmental Quality

(419.) Spring. 4(3-0) Sophomores or approval of department.

Identification of the physical, cultural and psychological factors which constitute human environments, and how they vary and may be modified or controlled.

309. Geography of Recreation

Winter. 3(3-0)

Natural and cultural factors influencing the use of space for recreation. Emphasis on recreation land use in the United States and current problems and conflicts.

310. Historical Geography of the United States

Spring, Summer. 4(3-0)

Reconstruction of geographies of the United States as they existed in the past.

315. South America

(405.) Fall, Spring. 4(3-0) Sophomores or approval of department.

Regional geography of South America with special attention to contemporary geographic problems.

316. Middle America

(406.) Winter. 4(3-0) Sophomores or approval of department.

Interpretation of physical and cultural environment of Mexico, Central America, and the West Indies. Special attention to contemporary geographic problems.

318. Cities of the World

Fall, Winter, Spring, Summer. 4(3-0)

A cross-cultural examination of cities, their historic growth, regional functions, and internal dynamics.

319. Polar Regions

(418.) Winter of even-numbered years. 4(3-0) Sophomores or approval of department.

The arctic, including the continental fringe lands of North America and Eurasia, and the Antarctic. Emphasis on exploration, physical geography, and recent developments in settlement and resource use.

320. Geography of Population

Fall. 4(3-0)

Relationship of the size, composition, and distribution of population to geographic variations in the nature of places.

321. Africa

(420.) Fall. 4(3-0) Sophomores or approval of department.

Emphasis on continent south of Sahara: environments, peoples, problems, and potentials.

322. Africa: Contemporary Problems

(421.) Spring. 4(3-0) Sophomores or approval of department. 321 recommended.

Major development problems examined from environmental, historical, economic, and social perspectives.