927. Comparative Nutrition — Protein Metabolism and Developmental Biology
Winter of even-numbered years. BCH 452 and a previous course in principles of nutrition. Interdepartmental with the Department of Animal Husbandry. Protein quality assessment, protein status, protein calorie malnutrition, amino acid metabolism, metabolic aspects of protein metabolism and growth.

928. Comparative Nutrition — Minerals
Spring of even-numbered years. BCH 452, PSL 602 or concurrently. Interdepartmental with Animal Husbandry Department. Forms and location in body, metabolic roles, deficiency and toxicity signs, interrelationships, requirements and biological availability of sources.

929. Comparative Nutrition — Vitamins
Spring of odd-numbered years. BCH 452 and a previous course in principles of nutrition. Interdepartmental with and administered by the Animal Husbandry Department. Chemical and physical properties, standards of animal requirements, metabolic roles, antagonism, deficiency and toxicity signs, requirements and factors affecting requirements.

999. Research
(F N 999.) Fall, Winter, Spring, Summer. Variable credit. Approval of department.

FOOD SYSTEMS ECONOMICS AND MANAGEMENT
See Agricultural Economics

FOREIGN LANGUAGES
See German and Russian, Linguistics and Oriental and African Languages, and Romance and Classical Languages.

FORESTRY FOR
College of Agriculture and Natural Resources
In 305, 306, 402 and 430, field trips are scheduled for several consecutive days away from the campus for integrated field experience, primarily in the second half of spring term of the junior year, so that these courses must be taken concurrently. These courses include enrollment in other courses during that term. The approximate cost of these field trips is $200.

101. Resource Ecology and Man
Fall, Winter. (3-0) BCH 452. For course description, see Interdisciplinary Courses.

102. Introduction to Forestry
Fall, Spring. (3-0) Forestry in its broadest sense, including: historical development, forest growth, protection and management, economic and social aspects of forests, forest products, national and world economy and policy. Emphasis on multiple use concepts. One-day field trip required.

103. Forest Vegetation
Fall, Spring. (3-4) BOT 205 or approval of department. Noncultivation, classification, and identification of important trees, shrubs, and herbaceous plants of forest and field.

104. Plants and Their Environment
Winter. (3-0) BCH 452 with and administered by the Natural Resources Department. Fundamental ecological relationships between various climates, edaphic and biotic environmental factors of the ecosystem and plant response, including structure, function and evaluation of species.

301. Quantitative Methods for Natural Resources
Winter. (4-3) MTH 109 or 111. Collection and analysis of information pertaining to natural resources. Survey design, field procedures, equipment, and analytical techniques.

304. Forest Ecology
Fall. (4-3) 204; BOT 205. The forest is viewed as a biological community. Forest site relationships are quantified by examining the existing physical environment and relating it to the forest species occupying that community.

305. Silviculture
Spring. (4-3) 204, 304. Must be taken concurrently with 305, 402 and 430. Natural and artificial forest reproduction methods; intermediate stand treatments; timber aspects of silviculture; field studies of silvicultural methods. Extended field trips required.

306. Forest Fire Protection and Use
Spring. (3-2) Juniors or approval of department. Must be taken concurrently with 305, 402 and 430. Causes and effects of forest fires. Combustion, fire behavior and fire weather. Prevention and control planning and techniques. Fire in forest land management. Extended field trips required.

309. Wood Technology
Fall. (4-3) Structure of wood. Mechanical and physical properties of wood. Wood anatomy and relating to growth.

402. Forest Inventory
(302.) Spring. (2-2) Must be taken concurrently with 305, 402 and 430. Field and office techniques of forest inventory, with primary emphasis on timber resources. Extended field trips required.

409. Forest Hydrology
Fall. (3-0) CSS 210. Hydrologic cycle, with emphasis on soil, water and ground water regimes; instrumentation and measurement of the various components. Effects of forest management on watersheds and water yields.
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 affect the production and consumption of natural resources, 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) Junior. Interdepartmental with the Resource Development Department and Natural Resources.

A survey of the social and economic significance of natural resources in modern industrial and urban society. Current problems of natural resource 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, ecology, genomics, silviculture, management, economics, forestry, 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 Resource Development Department. 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 Science.

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

835. Silviculture
Spring. 3(3-0) 365 or approval of department. Biological basis of intensive forest management including site evaluation and preparation, planting establishment, intermediate stand treatments, and natural reproduction methods. Field trip optional.

840. Recreation Economics
Spring. 4(4-0) 803 or approval of instructor. Interdepartmental with the Department 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. Research Methods
Fall. 3(3-0) Approval of department. Interdepartmental with and administered by the Resource Development Department. Research techniques applicable to management, and policy-oriented natural resource investigations. Analysis of project designs; preparation of project proposals. Evaluation of representative published research studies.

860. Forest Inventory
Fall of even-numbered years. 3(3-0) 402, SST 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.

900. 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.

904. Gene Transmission
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 procaryotes and eucaryotes. Experimental design and methodology will be emphasized.

905. Genetic Organization, Action and Regulation
Winter. 3(3-0) 804. Molecular and formal genetic studies of the organization, expression and regulation of gene activity in procaryotes and eucaryotes. Experimental design and methodology will be emphasized.

906. Population and Quantitative Genetics
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.