305  Wood Composites
Spring. 3(3-0) R: Open to undergraduate students in the Forestry major. Quality factors that influence the conversion of logs into lumber.

306  Forest Biometry
Spring. 4(3-2) P: MTH 116 or MTH 124 or MTH 132 or LBS 118 RB: FOR 204 R: Not open to freshmen or sophomores. Describing location and area of forest resources. Quantification of site, stand, and tree characteristics. Sampling and inventory. Predicting growth and yield.

307  Lumber Manufacturing and Processing
Spring. 3(3-0) P: FOR 304 or approval of department R: Open to undergraduate students in the Forestry major.

308  Forest Science Research Seminar
Spring. 2(2-0) P: Completion of Tier I Writing Requirement R: Open to juniors or seniors in the Forestry major. Approval of department.

330  Social Applications in Forestry
Spring. 2(2-0) P: ISS 210 or ISS 215 or ISS 220 or ISS 225 Social factors underlying forest resource management issues. Public values, attitudes, knowledge, and behavior with respect to forests. Public participation, conflict resolution, and communicating forest issues.

393  Forest Products Internship
Summer. 2 credits. RB: FOR 304 or FOR 305 R: Open only to juniors in the Forestry major.

400  Forest Harvest Operations
Spring. 2(1-2) P: CSS 210 and FOR 404 and (MTH 124 or concurrently) or (MTH 132 or concurrently) RB: FOR 406 and FOR 420 R: Open only to juniors or seniors. Forest harvest systems, components and equipment, non-timber products, and road and transport planning. Soil, slope, riparian and wetland limitations. Erosion prediction and control. Harvest contracting and best management practices.

404  Forest and Agricultural Ecology
Fall. 3(3-0) R: Open only to juniors or seniors in the College of Agriculture and Natural Resources. Field exercises cover primary production, community structure, soil resources, biodiversity, succession, nutrient cycling, and impacts of global environmental change.

404L  Forest and Agricultural Ecology Laboratory
Fall. 1(0-3) R: Open only to juniors or seniors in the College of Agriculture and Natural Resources. Field studies and data analysis of ecological processes central to the sustainable management of forest and agricultural resources.

419  Applications of Geographic Information Systems to Natural Resources Management
Spring. 4(2-2) Interdepartmental with Community, Agriculture, Recreation and Resource Studies and Biosystems Engineering and Fisheries and Wildlife and Geography. RB: GEO 221 Application of geographic information systems, remote sensing, and global positioning systems to integrated planning and management for fish, wildlife, and related resources.

420  Forestry Field Studies
Spring. 3 credits. RB: FOR 306 and FOR 406 R: Open only to juniors or seniors in the College of Agriculture and Natural Resources. Field exercises cover primary production, community structure, soil resources, biodiversity, succession, nutrient cycling, and impacts of global environmental change.

424  Forest Resource Modeling
Spring of even years. 2(1-2) P: FOR 306 or FW 364 or STT 200 or STT 201 Understanding and predicting forest growth. Organizing information on observed and measured forest patterns. Predicting forest response. Growth and yield prediction, tree survival modeling, and resource competition modeling.

430  Environmental and Natural Resource Law
Fall. 3(3-0) Interdepartmental with Environmental Economics and Policy and Environmental Studies and Applications. RB: RD 430 Legal principles applied to the environment and natural resources. Sovereignty, property rights, land and water use, jurisdiction, public trust doctrine, wetland law, and eminent domain. Case and statutory law analysis.
441 Plant Breeding and Biotechnology
Spring. 3(3-0) Interdepartmental with Crop and Soil Sciences and Horticulture. Administered by Crop and Soil Sciences. P: CSS 101
Plant improvement by genetic manipulation. Genetic variability in plants. Traditional and biotechnological means of creating and disseminating recombinant genotypes and cultivars. Importance of plant breeding to our food system, economy, and environment.

466 Natural Resource Policy
Spring. 3(3-0) Interdepartmental with Fisheries and Wildlife and Park, Recreation and Tourism Resources and Resource Development. Administered by Forestry. R: Not open to freshmen or sophomores.
Natural resources policy-making in the context of scientific, environmental, social, and legal-institutional factors. Historical evolution of policies and case studies of contemporary policy issues.

478 Pest Management II: Biological Components of Management Systems (W)
Spring of even years. 3(2-3) Interdepartmental with Crop and Soil Sciences and Entomology and Fisheries and Wildlife and Horticulture. Administered by Entomology. P: (ENT 404 or ENT 470 or PLP 405 or CSS 402) and completion of Tier I writing requirement
Principles of host plant resistance and biological control and their relationship to the design of agro-ecosystems. Classification of insect biological control agents.

480 Woody Plant Physiology
Spring. 3(3-0) Interdepartmental with Horticulture. P: PLPB 105 or BS 111 R: Not open to freshmen or sophomores.
Physiology of carbon utilization. Effects of water, temperature, nutrition, and light on apical, vegetative, and reproductive growth of woody plants.

819 Advanced Plant Breeding
Fall of even years. 3(3-0) Interdepartmental with Crop and Soil Sciences and Horticulture. Administered by Horticulture. RB: STT 422 and ZOL 341
Genetic expectations resulting from breeding strategies with cross- and self-pollinated crop plants. Germplasm collections, mapping populations, and modifications of reproductive biology useful for crop improvement.

820 Plant Reproductive Biology and Polyploidy
Spring of odd years. 1(3-0) Interdepartmental with Crop and Soil Sciences and Horticulture and Plant Biology and Plant Pathology. Administered by Horticulture. RB: Introductory Genetics and Plant Biology
Genetic processes underlying variations in plant reproductive biology and polyploidy. Utilization of these characteristics in plant breeding.

822 Historical Geography of Crop Plants
Spring of odd years. 1 credit. Interdepartmental with Crop and Soil Sciences and Horticulture and Plant Biology and Plant Pathology. Administered by Horticulture. RB: Introductory Genetics and Plant Biology
Development and spread of the major crop species.

824 Forest Soils
Fall of even years. 3(2-2)
Evaluation and inventory of forest soils and landscape ecosystems. Physical, biological, and chemical processes. Nutrient cycling, diagnosis, and fertilization. Variability, geography, and landscape ecology.

826 International Development Theory and Practice
Fall. 3(3-0) Interdepartmental with Community, Agriculture, Recreation and Resource Studies and Anthropology and Political Science and Social Science. Administered by Community, Agriculture, Recreation and Resource Studies. SA: RD 826

827 Techniques in Cytogenetics
Fall of odd years. 1(0-3) Interdepartmental with Crop and Soil Sciences and Horticulture. Administered by Crop and Soil Sciences
Preparation of chromosomes from commercially important plants for cytogenetic analysis.
829 The Economics of Environmental Resources
Spring. 3(3-0) Interdepartmental with Community, Agriculture, Recreation and Resource Studies and Agricultural Economics and Economics and Fisheries and Wildlife and Recreation and Tourism Resources. Administered by Agricultural Economics. RB: Graduate Status
Economic principles related to environmental conflicts and public policy alternatives. Applications to water quality, land use, fish and wildlife, conservation, development, and global environmental issues.

842 Population Genetics, Genealogy and Genomics
Fall. 3(3-0) Interdepartmental with Animal Science and Crop and Soil Sciences and Fisheries and Wildlife and Genetics and Horticulture. Administered by Forestry. RB: Pre-calculus, basic genetics

852 Systems Modeling and Simulation
Fall of even years. 3(2-2) Interdepartmental with Biosystems Engineering and Fisheries and Wildlife and Resource Development. Administered by Fisheries and Wildlife. RB: STT 422 or STT 442 or STT 484 or GEO 463
General systems theory and concepts. Modeling and simulation methods. Applications of systems approach and techniques to natural resource management, and to ecological and agricultural research.

853 Applied Systems Modeling and Simulation for Natural Resource Management
Spring of odd years. 3(2-2) Interdepartmental with Biosystems Engineering and Fisheries and Wildlife and Resource Development and Zoology. Administered by Fisheries and Wildlife. RB: (FW 820 or BE 486 or ZOL 851) or or approval of department. R: Open only to seniors and graduate students

858 Gender, Justice and Environmental Change: Issues and Concepts
Fall. 3(3-0) Interdepartmental with Anthropology and Environmental Studies and Applications and Fisheries and Wildlife and Geography and Sociology. Administered by Fisheries and Wildlife. RB: Background in social science, environmental science, or natural resources.
Issues and concepts related to gender, ecology, and environmental studies. Key debates and theoretical approaches to addressing environmental issues from a gender and social justice perspective. Gender and environment issues and processes from a global perspective.

859 Gender, Justice, and Environmental Change: Methods and Application
Spring of even years. 3(3-0) Interdepartmental with Anthropology and Fisheries and Wildlife and Geography and Resource Development and Sociology. Administered by Anthropology. RB: Background in social science, environmental science, or natural resources.
Methods and case studies related to gender, ecology, and environmental studies. Methodological and fieldwork issues from a feminist perspective in international and intercultural contexts. Qualitative and quantitative methods for integrating social and environmental data.

866 Economics of Renewable Resources
Spring of odd years. 3(2-2) Interdepartmental with Resource Development. Administered by Forestry. RB: AEC 829 or EC 803 or EC 805
Applications of economic theory and analysis to renewable natural resources problems. Focus on renewable resource interactions, including multiple-use forestry and agroforestry.

870 Techniques of Analyzing Unbalanced Research Data
Spring. 4(4-0) Interdepartmental with Animal Science and Crop and Soil Sciences and Fisheries and Wildlife and Horticulture. Administered by Animal Science. RB: STT 464 R: Open only to graduate students in the College of Agriculture and Natural Resources. SA: AEC 944
Linear model techniques to analyze biological research data characterized by missing and unequal number of observations in classes. Simultaneous consideration of multiple factors. Prediction of breeding values and estimation of population parameters from variance and covariance components.

872 Parks and Protected Areas Policy and Management
Spring of even years. 3(3-0) Interdepartmental with Community, Agriculture, Recreation and Resource Studies. Administered by Community, Agriculture, Recreation and Resource Studies. SA: AEC 805
Historical and institutional approach to national park and wilderness policies and variations in policy implementation across United States natural resource management agencies. International protected areas policies and issues. Relationship between policy and resource management.

885 Leadership in Natural Resources and Environmental Management
Fall. 3(3-0) Interdepartmental with Agricultural Economics and Fisheries and Wildlife and Park, Recreation and Tourism Resources. Administered by Fisheries and Wildlife.
Theory and practice of leadership in natural resource and environmental management. Integration across disciplinary and jurisdictional divisions.

890 Special Problems
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 7 credits in all enrollments for this course. R: Approval of department; application required.
Advanced individual study in an area of forestry.

891B Selected Topics in Plant Breeding and Genetics
Fall, Spring, Summer. 1 to 2 credits. A student may earn a maximum of 6 credits in all enrollments for this course. Interdepartmental with Crop and Soil Sciences and Horticulture. Administered by Horticulture. R: Open only to graduate students in the Plant Breeding and Genetics major or Genetics major.
Selected topics in plant breeding.

892 Plant Breeding and Genetics Seminar
Fall, Spring, Summer. 1(1-0) A student may earn a maximum of 8 credits in all enrollments for this course. Interdepartmental with Crop and Soil Sciences and Horticulture. Administered by Horticulture.
Experience in review, organization, oral presentation, and analysis of research.

899 Master's Thesis Research
Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 99 credits in all enrollments for this course. Master's thesis research.

923 Advanced Environmental and Resource Economics
Fall. 3(3-0) Interdepartmental with Agricultural Economics and Economics and Park, Recreation and Tourism Resources and Resource Development. Administered by Agricultural Economics. RB: AEC 829 and EC 812A
Advanced economic theory of environmental management and policy. Treatment of externalities and market and non-market approaches to environmental improvement. Topics in conservation and sustainable economic growth. Applications to research and policy.

925 Advanced Natural Resource Economics
Spring. 3(3-0) Interdepartmental with Agricultural Economics and Economics and Park, Recreation and Tourism Resources and Resource Development. Administered by Agricultural Economics. RB: EC 812A and AEC 829 and FOR 886 SA: AEC 991H
Economic theory of managing nonrenewable and renewable resources, including optimal use, the incentives for use under decentralized markets, and public policy design. Analysis of the co-evolution of economic and ecological systems.

941 Quantitative Genetics in Plant Breeding
Spring of even years. 3(2-2) Interdepartmental with Crop and Soil Sciences and Horticulture. Administered by Crop and Soil Sciences. RB: AEC 991H
Theoretical and genetic basis of statistical analysis of quantitative traits using genetic markers. Computational tools for the study of quantitative traits.

999 Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to doctoral students in the Department of Forestry. Doctoral dissertation research.