

## FORESTRY

## FOR

**Department of Forestry  
College of Agriculture  
and Natural Resources**

**101 Michigan's Forests**

Spring. 3(3-0)

Ecological, social and economic roles of Michigan's forests in historic and contemporary context. Geographic similarities and differences in forest resources.

**110 Seminar on Contemporary Issues in Forests and the Environment**

Fall. 1(1-0)

Role of forests in environmental quality and human well-being.

**202 Introduction to Forestry**

Fall, Spring. 3(3-0)

Historical development of forestry. Forest growth, protection, management, and products. Relationship of national and world economy and policy to forestry. Emphasis on multiple uses of forests.

**204 Forest Vegetation**

Fall. 3(2-3)

Identification of common forest trees, shrubs, and herbaceous plants. Field trip required.

**211 Introduction to Gender and Environmental Issues**

Spring. 3(3-0) Interdepartmental with Criminal Justice and Environmental Economics and Policy and Environmental Studies and Agriscience and Fisheries and Wildlife and Women's Studies. Administered by Fisheries and Wildlife. R: Not open to freshmen.

The concept of gender. Overview of environment and habitat. Historical gender roles in environmental management. Gender-based theoretical perspectives. Case studies on developing and developed countries. Environmental management with emphasis on fisheries, wildlife and wetlands. Women environmental professionals.

**222 Forestry Field Methods**

Fall. 2(1-3)

Basic field techniques including forest survey methods, tree and forest measurements, GPS land navigation and orienteering.

**330 Human Dimensions of Forests**

Spring. 3(3-0) P: (ISS 210 or ISS 215 or ISS 220 or ISS 225) and completion of Tier I writing requirement R: Not open to freshmen.

Social factors underlying human decisions about and conflicts over forest resources. Societal and citizen values, knowledge and behavior with respect to forest resources. Forest governance, public participation, collaboration, conflict management and communication.

**404 Forest Ecology**

Fall. 3(3-0) P: ((CSS 210) and completion of Tier I writing requirement) and (PLB 105 or BS 162 or LB 144) RB: ZOL 355

Ecological interactions crucial to the sustainable management of forest ecosystems. Plant resources, species interactions, succession, biodiversity, productivity, nutrient and carbon cycling, ecosystem structure and function, exotic species, global environmental change.

**404L Forest Ecology Laboratory**

Fall. 1(0-3) P: ((CSS 210) and completion of Tier I writing requirement) and (FOR 404 or concurrently) and (PLB 105 or BS 162 or LB 144) RB: ZOL 355

Field studies and data analysis of ecological processes central to the sustainable management of forest ecosystems. Field exercises cover primary production, community structure, soil resources, biodiversity, succession, nutrient cycling, critiques of primary literature. Weekend field trips required.

**405 Forest Ecosystem Services**

Spring. 3(3-0) P: ((MTH 124 or MTH 132) and completion of Tier I writing requirement) and EC 201 RB: FOR 202 and FOR 404 R: Not open to freshmen or sophomores.

Ecosystem services and their quantification and valuation. Sustainable management of forest ecosystem services. Global overview of non-timber forest products. Field trips required.

**406 Applied Forest Ecology: Silviculture**

Fall. 3(3-0) P: ((FOR 404 or concurrently) or (ZOL 355 or concurrently)) and completion of Tier I writing requirement R: Not open to freshmen or sophomores.

Ecophysiology of tree growth and reproduction. Stand structure, composition and growth. Intermediate stand treatments. Natural and artificial reproduction. Silvicultural techniques.

**406L Applied Forest Ecology: Silviculture Laboratory**

Fall. 1(0-3) P: (FOR 204 and FOR 222 and (FOR 406 or concurrently)) and completion of Tier I writing requirement R: Not open to freshmen or sophomores.

Experiential learning about forest dynamics and their management. Field trips required.

**412 Wildland Fire**

Spring. 2(2-0) P: (FOR 404 or concurrently) or (ZOL 355 or concurrently) R: Not open to freshmen or sophomores.

Fire in wildland forest and grassland communities as a physical and ecological process. Fire history, culture, and management. Global perspectives, strategies for prevention and suppression of wildfires. Techniques for using prescribed fire. Field trips required.

**414 Renewable Wood Products**

Spring. 3(2-2) P: (CEM 141) and completion of Tier I writing requirement R: Not open to freshmen or sophomores.

Renewable wood products with focus on wood and wood based products. Tree growth and production of woody tissues, wood structure and identification, wood processing and utilization as timber, fiber and pulp product, composites and biofuel for energy. Physical and mechanical properties of wood and relations with practical applications.

**419 Applications of Geographic Information Systems to Natural Resources Management**

Spring. 4(2-4) Interdepartmental with Community, Agriculture, Recreation and Resource Studies and Biosystems Engineering and Fisheries and Wildlife and Geography. Administered by Fisheries and Wildlife. P: 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**

Summer. 3 credits. Summer: Huron-Manistee National Forest. P: FOR 204 and FOR 222 and FOR 404 and FOR 406 and CSS 210 R: Open to juniors or seniors in the College of Agriculture and Natural Resources.

Integration of tree biology, forest ecology, soil science, silviculture, forest mapping and inventory methods in a variety of forest ecosystems in Michigan. Quantitative and qualitative assessments of forests, defining silvicultural alternatives and executing a stand management plan. Field trips required.

**430 Environmental and Natural Resource Law**

Fall. 3(3-0) Interdepartmental with Environmental Economics and Policy and Environmental Studies and Agriscience. Administered by Environmental Studies and Agriscience. P: ESA 200 or EEP 255 or approval of department R: Open to juniors or seniors or graduate students. SA: 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 of even years. 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.

**451 Biotechnology Applications for Plant Breeding and Genetics**

Spring. 3(2-2) Interdepartmental with Crop and Soil Sciences and Horticulture. Administered by Crop and Soil Sciences. RB: (CSS 350 or ZOL 341) and CSS 441

Principles, concepts, and techniques of agricultural plant biotechnology. Recombinant DNA technology, plant molecular biology and transformation in relation to plant improvement.

**452 Watershed Concepts**

Fall, Spring, Summer. 3(3-0) Interdepartmental with Biosystems Engineering and Crop and Soil Sciences and Environmental Studies and Agriscience and Fisheries and Wildlife. Administered by Environmental Studies and Agriscience. P: ESA 324 and ZOL 355 RB: organic chemistry SA: RD 452

Watershed hydrology and management. The hydrologic cycle, water quality, aquatic ecosystems, and social systems. Laws and institutions for managing water resources.

**462 Forest Resource Economics and Management**

Fall. 4(3-2) P: ((EC 201) and completion of Tier I writing requirement) and (MTH 124 or MTH 132) and (STT 201 or STT 224 or STT 231 or STT 421) R: Not open to freshmen or sophomores.

Economic concepts, analytical techniques, computer simulation/forecasting models, and geographic information systems to assess economic and ecological impacts of resource management decisions at a range of spatial and temporal scales. Geospatial tools, multiple ownerships. Individual forest stands to complex multi-use landscape scales.

## Forestry—FOR

- 466 Natural Resource Policy**  
Spring. 3(3-0) Interdepartmental with Environmental Studies and Agriscience and Fisheries and Wildlife. 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.
- 467 BioEnergy Feedstock Production**  
Fall. 3(3-0) Interdepartmental with Biosystems Engineering and Crop and Soil Sciences. Administered by Crop and Soil Sciences. P: MTH 103 or MTH 116 or MTH 124 or MTH 132 or LB 118 or MTH 152H RB: CSS 101 and CSS 210  
Agronomic, economic, technological, and environmental principles involved in bioenergy feedstock production. Cultivation, harvest, transportation, and storage of agricultural and forest biomass.
- 472 Ecological Monitoring and Data Analysis**  
Fall. 3(2-2) Interdepartmental with Geography. Administered by Forestry. P: ((MTH 124 or MTH 132) and completion of Tier I writing requirement) and (STT 201 or STT 224 or STT 231 or STT 421)  
Design of ecological monitoring systems and analysis of resulting ecological data sets. Monitoring system design, model specification and implementation, and computational considerations from both a design- and model-based perspective. Hands-on introduction to statistical software.
- 478 Integrated Pest Management (W)**  
Spring of odd years. 3(3-0) Interdepartmental with Crop and Soil Sciences and Entomology and Horticulture. Administered by Entomology. P: (ENT 404 or ENT 470 or PLP 405 or CSS 302) and completion of Tier I writing requirement  
Theory, philosophy and application of pest management focusing on agricultural and natural systems.
- 480 Woody Plant Physiology**  
Spring. 3(3-0) Interdepartmental with Horticulture. Administered by Horticulture. P: BS 162 or PLB 105 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.
- 486 Biotechnology in Agriculture: Applications and Ethical Issues**  
Fall of even years. 3(3-0) Interdepartmental with Crop and Soil Sciences and Horticulture and Philosophy. Administered by Horticulture. P: BS 161 or PLB 105 RB: CSS 350 or ZOL 341 R: Not open to freshmen or sophomores.  
Current and future roles of biotechnology in agriculture: scientific basis, applications. Environmental, social, and ethical concerns.
- 490 Independent Study in Forestry**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open to seniors. Approval of department.  
Special problems course for students qualified for advanced study in some phase of forestry.
- 493 Professional Internship in Forestry**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 3 credits in all enrollments for this course. P: Completion of Tier I Writing Requirement R: Open to juniors or seniors in the Department of Forestry. Approval of department; application required.  
Supervised professional experiences in agencies, organizations and businesses related to forestry.
- 802 Forest Science Research**  
Fall. 2 credits.  
The philosophy, nature, and procedures of research in the forestry sciences.
- 804 Forest Ecology**  
Fall of odd years. 3(3-0) RB: FOR 404  
Processes controlling population, community, ecosystem, landscape, and global ecology of forested systems. Extrapolation across scales, succession, spatial models of forest dynamics, causes and consequences of biodiversity, nutrient cycling, sustainability of managed ecosystems and human-accelerated environmental change.
- 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.
- 821 Crop Evolution**  
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  
Cultural and biological aspects of the evolution of domestic plants.
- 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.
- 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  
Evolution of international development theory across disciplines. Changing conceptualizations, measurements, processes and effects of development and poverty. Ethnicity, social class, gender, and community influences on socioeconomic processes. Current issues, concerns, and strategic alternatives.
- 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. Administered by Agricultural Economics.  
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.
- 831 Forest Biogeochemistry and Global Climate Change**  
Fall. 3(3-1) RB: Background course in ecology  
Biogeochemical cycling of carbon and nutrients within forest ecosystems. Disturbance, harvesting and forest management effects on the exchange of greenhouse gases between forest ecosystems and the atmosphere.
- 833 Human Dimensions of Forest Carbon Management**  
Fall. 3(3-0)  
Social dimensions associated with the development and implementation of forest-based climate change mitigation projects, including: valuation of trees and forests by local communities vs. international community; community decision making; public participation; community engagement.
- 835 Forest Carbon Policy, Economics and Finance**  
Spring. 3(3-0)  
Policy, economic and financial dimensions of the development and implementation of forest-based climate change mitigation projects, including: the role of forests in international agreements and policy, finance and investment approaches to forest carbon sequestration; emissions trading; biofuels; and valuation of ecosystem services.
- 837 Measurement and Monitoring of Forest Carbon**  
Spring. 3(2-2)  
Skill-based training in forest carbon inventory and carbon accounting methods. National and international monitoring of forest carbon stocks. Applications of remote sensing and geospatial technologies to forest carbon inventory.
- 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  
Population genetic processes underlying patterns of molecular genetic variation. Genealogical approaches to the study of genomic diversity, phylogenetic reconstruction, and molecular ecology.
- 858 Gender, Justice and Environmental Change : Issues and Concepts**  
Fall. 3(3-0) Interdepartmental with Anthropology and Criminal Justice 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.
- 872 Parks and Protected Areas Policy and Management**  
Spring of odd years. 3(3-0) Interdepartmental with Community, Agriculture, Recreation and Resource Studies. Administered by Community, Agriculture, Recreation and Resource Studies. SA: PRR 842  
Historical and institutional approach to national park and wilderness policies. 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 of even years. 3(3-0) Interdepartmental with Agricultural Economics and Fisheries and Wildlife. 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. Approval of department.  
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. Administered by Agricultural Economics. RB: ((EC 812A) and EC 812A and AEC 829 and FOR 866) and (AEC 829 or FOR 866) 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: CSS 819 and STT 464  
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.