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 Community Sustainability and Environmental Economics and Policy and Fisheries and Wildlife and Women's Studies. Administered by Fisheries and Wildlife.
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 (IBIO 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 (IBIO 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
Fall. 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 Biosystems Engineering and Fisheries and Wildlife and Geography. Administered by Fisheries and Wildlife. 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
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.

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. P: CSS 350 or IBIO 341 R: Open to juniors or seniors or graduate students.
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 Community Sustainability and Fisheries and Wildlife. Administered by Community Sustainability. P: CSUS 354 RB: Organic chemistry SA: RD 452, ESA 452
Watershed hydrology and management. The hydrologic cycle, water quality, aquatic ecosystems, and social systems. Laws and institutions for managing water resources.

457 Bioenergy Feedstock Systems Analysis
Fall. 3(2-2) Interdepartmental with Biosystems Engineering. Administered by Biosystems Engineering. P: FOR 404 or approval of department R: Open to juniors or seniors.
Equipment used for harvesting, pre-processing, and transporting woody biomass from natural forests and energy wood plantations; cost control and system optimization in woody biomass supply chain; environmental impact of woody biomass recovery.

461 Urban and Community Forestry
Spring. 3(3-0) P: HRT 213 and HRT 213L R: Not open to freshmen or sophomores.
Biological, physical, administrative, managerial, legal and social concepts unique to managing urban and community forests.

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.

465 Environmental and Natural Resource Law
Fall. 3(3-0) Interdepartmental with Community Sustainability and Environmental Economics and Policy. Administered by Community Sustainability. P: CSUS 200 or EEP 255 R: Open to juniors or seniors or graduate students. SA: ESA 430, RD 430
Legal principles and process related to the environment and natural resources. Common law, constitutional law, statutory and administrative law.

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 or MTH 133 or MTH 153H or LB 119 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.

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.

491 Special Topics in Forestry
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Not open to freshmen.
Selected topics of current interest and importance in 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.

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
Spring. 3(3-0) Interdepartmental with Anthropology and Community Sustainability and Political Science and Social Science. Administered by Community Sustainability. SA: ACR 826, 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 Economics of Environmental Resources
Spring. 3(3-0) Interdepartmental with Agricultural, Food, and Resource Economics and Community Sustainability and Economics and Fisheries and Wildlife. Administered by Agricultural, Food, and Resource Economics. RB: Undergraduate intermediate microeconomics, calculus, and statistics SA: AEC 829
Economic principles, theoretical models, and empirical methods related to environmental problems and policy interventions. Applications to air, land, water, forests, energy, fish and wildlife, and climate change, including in developing countries.

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
Spring. 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
Fall. 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.

840 Agroforestry Systems
Fall. 3(2-3) Interdepartmental with Horticulture. Administered by Forestry.
Agroforestry systems with a local and global perspectives, abbreviate biological and chemical processes in agroforestry ecosystems, effects and potential of agroforestry on forest dependent communities, climate change and ecosystem sustainability. Field trips required.

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: Precalculus, 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 Community Sustainability and Fisheries and Wildlife and Geography and Sociology and Women's Studies. Administered by Community Sustainability. 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.

867 Hierarchical Modeling and Computing for Spatio-temporal Environmental Data
Spring of odd years. 3(3-0) Interdepartmental with Geography. Administered by Forestry. RB: (FW 849 or concurrently) and (GEO 866 or concurrently)
Specification and application of modeling frameworks for spatial and temporal data. Emphasis on point-referenced data analysis using Bayesian statistics, uncertainty assessment, forecasting, and computing. Applied focus on the analysis of environmental data sets.

870 Spatial Ecology
Fall. 3(2-2) Interdepartmental with Fisheries and Wildlife. Administered by Forestry. RB: (ZOL 851 or concurrently) or Equivalent
Science of understanding and predicting ecological patterns in space.

875 R Programming for Data Sciences
Summer. 3(3-0) Interdepartmental with Statistics and Probability. Administered by Forestry.
Programming in R and use of associated open source tools. Addressing practical issues in documenting workflow, data management, and scientific computing.

885 Leadership in Natural Resources and Environmental Management
Fall of odd years. 3(3-0) Interdepartmental with 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.

898 Master's Professional Project
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Approval of department.
Master's project, non-thesis research, practicum or other professional development capstone experiences.

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, Food, and Resource Economics and Economics. Administered by Agricultural, Food, and Resource Economics. RB: (AFRE 829 or concurrently) and EC 812A SA: AEC 923
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.

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 36 credits in all enrollments for this course. R: Open to doctoral students in the College of Agriculture and Natural Resources or in the Department of Forestry or in the Forestry Major. Approval of department; application required.
Doctoral dissertation research.