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.

201 Foundations of Forestry
Fall. 2(2-0) R: Open only to students in the Department of Forestry.
History, founding principles, and core concepts of forestry. Stewardship, conservation, professional ethics, and current forestry issues.

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. 4(3-3)
Nomenclature, classification, and identification of woody plants. Tree structure as it relates to growth and ecosystem dynamics.

211 Introduction to Gender and Environmental Issues
Spring. 3(3-0) Interdepartmental with Environmental Economics and Policy and Fisheries and Wildlife and Resource Development and Women's Studies. Administered by Fisheries and Wildlife. R: Not open to freshmen. SA: PRM 211
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.

220 Forests and the Global Environment
Fall. 3(3-0)
Relationships between forests, climatic and edaphic factors, and human influences upon forest resources. Deforestation, biodiversity, sustainable forest management and timber trade.

304 Wood Technology
Fall. 4(3-2) P:M: (CEM 141 and PHY 231) and (MTH 116 or MTH 104 or LBS 117) R: Not open to freshmen or sophomores.
Structure and identification of wood. Physical and mechanical characteristics. Major industrial timber utilization processes including manufacture of lumber, furniture, composites, and paper.

305 Wood Composites
Spring. 2(2-0) P:M: CEM 141 or CEM 151 or CEM 181H
Physical and chemical principles of wood adhesion. Wood gluing. Wood adhesives and their properties. Manufacturing principles of wood-based composites. Composite design, process unit operations, property evaluation, and applications. New wood-based composite developments.

306 Forest Biometry
Spring. 4(3-2) P:M: 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.

330 Social Applications in Forestry
Spring. 2(2-0) P:M: 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 forestry issues.

393 Forest Products Internship
Summer. 2 credits. RB: FOR 304 or FOR 305 R: Open only to juniors in the Forestry major.
Pre-professional educational employment experience in forest products industry, government, or public agency.

400 Forest Harvest Operations
Spring. 2(1-2) P:M: 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) Interdepartmental with Crop and Soil Sciences. Administered by Forestry. P:M: CSS 210 and (BOT 105 or BS 110) RB: ZOL 355
Ecological interactions crucial to the sustainable management of crop and forest ecosystems. Plant resources, competition, community development and dynamics, biodiversity, primary productivity, nutrient cycling, ecosystem structure and function, and impacts of global environmental change.

404L Forest and Agricultural Ecology Laboratory
Fall. 1(0-3) Interdepartmental with Crop and Soil Sciences. Administered by Forestry. P:M: CSS 210 and (BOT 105 or BS 110) and (FOR 404 or concurrently) RB: ZOL 355
Field studies and data analysis of ecological processes central to the sustainable management of forest and agricultural resources. Field exercises cover primary production, community structure, soil resources, biodiversity, succession, nutrient cycling, critiques of primary literature. Two weekend field trips required.

406 Silviculture
Spring. 4(3-3) P:M: FOR 204 and FOR 404 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.

408 Forest Resource Management
Spring. 3(2-2) P:M: FOR 406 and FOR 464 RB: Forestry major.
Management of forests to sustain ecological, economic, and social values. Management and administration of forestry organizations. Timber production in multiple-use and ecosystem management contexts.

410 Forest Conservation Thesis (W)
Fall, Spring. 3(3-0) P:M: Completion of Tier I writing requirement. RB: FOR 310 R: Open only to seniors in the Department of Forestry.
Selecting, researching, and evaluating a forest conservation issue and communicating findings in a thesis and a departmental seminar.

412 Wildland Fire
Fall. 2(2-0) P:M: FOR 404 or ZOL 355
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.

415 Forest Products Marketing
Spring. 2(2-0) P:M: EC 201 or EC 202
Global marketing of forest products. Domestic and international marketing, trade patterns and policies, resource base dynamics, pricing strategy, and marketing techniques.

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. RB: GEO 221 Not open to students with credit in GEO 425.
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. P:M: FOR 306 and FOR 406 R: Open only to juniors or seniors in the College of Agriculture and Natural Resources.
Ecological and silvicultural assessments and planning for multiple uses of forest lands. Forest management concepts including soils, biometry, harvesting and protection.

424 Forest Resource Modeling
Spring of even years. 2(1-2) P:M: 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.

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:M: 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.

450 Forestry in International Development
Fall. 3(3-0) Interdepartmental with Sociology. Administered by Forestry. RB: FOR 404 R: Open only to seniors or graduate students.
Biophysical, social and economic factors influencing design and implementation of farm, village and community level forestry and agroforestry projects.

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.

460 Arboriculture
Fall. 3(2-2) P:M: BOT 105 and (FOR 204 or HRT 211) R: Not open to freshmen or sophomores.
Tree selection and planting to fit climatic, space and edaphic conditions. Diagnosing tree abnormalities. Cultural practices used in the care and maintenance of shade and ornamental trees.

461 Urban Forestry
Spring. 3(3-0) P:M: FOR 204 or HRT 211 R: Not open to freshmen or sophomores.
Trees in improving the urban environment. Principles of urban forest management: legal, economic, organizational, and cultural. Street tree planning and inventory systems. Utility forestry and commercial arboriculture.

464 Forest Resource Economics (W)
Fall. 3(2-2) P:M: (EC 201 or EC 202) and completion of Tier I writing requirement. R: Not open to freshmen or sophomores.
Basic economic principles that govern human use and production of forest resources. Application of financial and economic analysis techniques to forest resource allocation.

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:M: (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 agroecosystems. Classification of insect biological control agents.

480 Woody Plant Physiology
Spring. 3(3-0) Interdepartmental with Horticulture. Administered by Horticulture. P:M: PLB 105 or BS 110 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:M: BOT 105 or BS 111 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 only to juniors or seniors. Approval of department.
Special problems course for students qualified for advanced study in some phase of 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.

810 Forest Hydrology
Spring. 3(2-2) RB: ((CSS 210) or familiarity with forestry, agriculture or natural landscapes. Computer literacy including spreadsheets.) and (MTH 116 or LBS 117)
Water inputs, outputs, storage and internal fluxes of forest, rural and wetland ecosystems. Ecological and environmental interpretation of precipitation, soil water, evaporation, leaching, groundwater and stream hydrographs. Quantitative modeling.

819 Advanced Plant Breeding
Fall. 3(3-0) Interdepartmental with Crop and Soil Sciences and Horticulture. Administered by Horticulture. RB: CSS 450 and STT 422
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.

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 and Sustainability
Fall. 3(3-0) Interdepartmental with Anthropology and Political Science and Resource Development and Social Science. Administered by Resource Development.
Environmental, economic, political, legal, management, and cultural components of sustainable development.

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
Fall. 3(3-0) Interdepartmental with Agricultural Economics and Economics and Park, Recreation and Tourism Resources and Resource Development. Administered by Agricultural Economics.
Economic principles related to environmental conflicts and public policy alternatives. Applications to water quality, land use, conservation, development, and global environmental issues.

830 Wetlands Law and Policy
Spring of odd years. 3(3-0) Interdepartmental with Agricultural Economics and Fisheries and Wildlife and Resource Development. Administered by Resource Development. RB: (RD 801) or prior exposure to environmental and natural resource economics, management, policy, or law. An ability to do legal and other library-based research.
Origin and development of wetlands law and policy. Wetland functions, mitigation, and banking. Legal, economic, political, and administrative perspectives. Cases, statutes and regulations.

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.

852 Systems Modeling and Simulation
Fall of even years. 3(3-0) Interdepartmental with Biosystems Engineering and Fisheries and Wildlife and Resource Development. Administered by Fisheries and Wildlife. RB: STT 422 or STT 442 or STT 464 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
Mathematical models for evaluating resource management strategies. Stochastic and deterministic simulation for optimization. System control structures. Team modelling approach.

858 Gender, Justice and Environmental Change : Issues and Concepts
Spring of odd years. 3(3-0) Interdepartmental with Anthropology and Fisheries and Wildlife and Geography and Resource Development 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: ANS 943
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.

881 Building and Implementing Watershed Management Plans
Fall, Spring, Summer. 3(3-0) Interdepartmental with Fisheries and Wildlife and Resource Development. Administered by Resource Development. RB: RD 324 and ZOL 355 and RD 452 Not open to students with credit in RD 824.
Problem definition. Data collection. Public consultation. Program evaluation. Case studies include watershed planning in the Great Lakes region.

882 Watershed Assessments and Tools
Fall, Spring, Summer. 3(3-0) Interdepartmental with Fisheries and Wildlife and Resource Development. Administered by Resource Development. RB: RD 452 and RD 881
Techniques for assessing and predicting physical, chemical, biological, and socioeconomic conditions within a watershed. Water quality monitoring. Bioassessment protocols. Pollutant loading models.

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. 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 and Park, Recreation and Tourism Resources and Resource Development. Administered by Agricultural Economics. RB: EC 812A and AEC 829 and 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.