

# Forestry (FOR)

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## **FOR 150 Critical Thinking and Data Analysis** (2 credit hours)

Exploration and practical experience with basis for making resource management decisions. Learning to pose questions that drive research and analysis. Discovering differences between found and built answers. Examining spreadsheet structure and functionality for manipulating data. Establishing solid grounds for conclusions and actions in natural resources contexts. Experiencing thinking processes from posing questions to articulating well-founded answers in coherent, persuasive discourse.

*Typically offered in Spring only*

## **FOR 172 Forest System Mapping and Mensuration I** (2 credit hours)

Concepts and application of basic forest and land resource measurement techniques used in forestry and related fields. Measuring distances and areas; orienteering; basic air photo and topographic map interpretation; introduction to GPS; measuring tree characteristics; introduction to forest sampling. Application of spreadsheets and word processing to analyze and summarize resource characteristics. Field trip required.

*Typically offered in Fall only*

## **FOR 204 Silviculture** (2 credit hours)

Silvical characteristics and growth requirements of forest trees; dynamics of stand growth, species-site relationships, site productivity, forest pest interactions, hydrology and nutrient cycling in forest ecosystems; emphasis on understanding and applying ecological principles to the production of multiple benefits at the forest community level.

*Typically offered in Summer only*

## **FOR 248 Forest History, Technology and Society** (3 credit hours)

Examining forest resource use and issues throughout history. Tracing developments and concepts that created the context for today's issues concerning global forest resources. Examining how wood resource availability shaped civilization's development, and examining consequences on forest resources of civilization's scientific, social, and technological progress.

*GEP Interdisciplinary Perspectives*

*Typically offered in Spring only*

## **FOR 250 Professional Development II: Communications in Natural Resources** (1 credit hours)

Development of written and oral communication skills for forestry and natural resources management. Discussion topics include interactive communication, writing to a target audience, common pitfalls in technical writing, various kinds of technical writing, poster and oral presentations, reviewing and revising writing, and responding to questions in a professional manner.

*Typically offered in Spring only*

## **FOR 252 Introduction to Forest Science** (3 credit hours)

Integration of biological principles into studies of tree growth, reproduction, establishment, survival, and disturbance. Discussions of regional silviculture and of effects of humans on forest ecosystems. Instruction in forest sampling and forest communities. Not open to Forest Management majors. Includes one Saturday field trip; details in syllabus.

Not open to Forest Management Majors (15FOMND, 15FORMTBS, 15FGM)

*Typically offered in Spring only*

## **FOR 260 Forest Ecology** (4 credit hours)

Introduction to forest ecosystems, their structure and functions, and the processes that regulate them including: radiation, temperature, water, and biogeochemistry; productivity; plant populations; forest communities; succession; natural disturbances; and human influences. Must have a strong love of trees.

*Typically offered in Spring only*

## **FOR 261 Forest Communities** (2 credit hours)

Study of the species composition, distribution, site requirements, succession, and forest health threats of the principal forest communities of southeastern North America. Identification of important member plant species, plant communities, insect and disease signs and symptoms. Overnight field trips to typical examples.

Prerequisite: FOR 339 or PB 220 or PB 403

*Typically offered in Summer only*

## **FOR 264 Forest Wildlife** (1 credit hours)

Diversity of fauna that inhabits forest communities in the Piedmont of North Carolina. Inventory terrestrial and aquatic habitats and identify various vertebrate and invertebrate species. Insect collection initiated. The life histories of representative species are presented.

*Typically offered in Summer only*

## **FOR 265 Fire Management** (1 credit hours)

Effects of wildfire and prescribed fire on forest ecosystem components and processes; fire behavior and the ecosystem and meteorologic factors that affect it; silvicultural uses of fire; organization, equipment, and tactics for wildfire suppression; fire suppression exercises on the North Carolina Division of Forest Resources' Forest Fire Simulator.

*Typically offered in Summer only*

## **FOR 273 Forest System Mapping and Mensuration II** (2 credit hours)

Procedures and instruments for measuring various tree and stand characteristics. Determination of stem volume and taper. Planning and implementation of forest resource samples to provide population estimates using fixed-radius and variable-radius sampling. Detailed coverage of land measurements and mapping of boundary surveys. Use of aerial photography, topographic maps, and GPS to aid in resource assessment. Incorporation of inventory data into a GIS. Statistical and mathematical concepts applied to resource measurements. Taught off campus at Hill Forest.

Prerequisite: FOR 172

*Typically offered in Summer only*

## **FOR 293 Independent Study in Forest Management** (1-6 credit hours)

Independent Study for Forest Management students at the freshman and sophomore level developed under the direction of a faculty member. Individualized/Independent Study and Research courses require a "Course Agreement for Students Enrolled in Non-Standard Courses" be completed by the student and faculty member prior to registration by the department.

*Typically offered in Fall, Spring, and Summer*

**FOR 294 Independent Study in Forest Management** (1-6 credit hours)

Independent Study for Forest Management students at the freshman and sophomore level developed under the direction of a faculty member. Individualized/Independent Study and Research courses require a "Course Agreement for Students Enrolled in Non-Standard Courses" be completed by the student and faculty member prior to registration by the department.

*Typically offered in Fall, Spring, and Summer*

**FOR 295 Special Topics in Forestry** (1-6 credit hours)

Study of forestry topics not covered in existing courses at the introductory level. Development of a new course on a trial basis.

*Typically offered in Fall, Spring, and Summer*

**FOR 303 Silvics and Forest Tree Physiology** (3 credit hours)

Ecological and physiological processes influencing establishment, growth, and development of forest stands with particular emphasis on forest types of Southeastern United States; influence of resource availability on forest stand productivity; physical and biochemical processes associated with tree function, including water relations, mineral nutrition, transport and translocation, photosynthesis, respiration; internal and environmental factors regulating tree growth and development.

P: CH 101 and FOR 261 and FOR 204

*Typically offered in Fall only*

**FOR 304 Theory of Silviculture** (4 credit hours)

Ecological processes affecting the establishment and growth of forest stands with particular emphasis on forest types of the Southeastern United States. Forest stand productivity, how productivity is influenced by site, stand, climatic factors, and the application of site specific prescriptions to establish and manipulate the composition, growth, and health of forest stands.

Prerequisite: FOR 260 or PB 360 or AEC 360

*Typically offered in Spring only*

**FOR 318/PP 318 Forest Pathology** (3 credit hours)

Major diseases of forest trees and deterioration of wood products emphasizing principles of plant pathology; diagnosis; nature, physiology, ecology, and dissemination of disease-causing agents; mechanisms of pathogenesis; epidemiology and environmental influences; principles and practices of control.

Prerequisite: PB 200

*GEP Natural Sciences*

*Typically offered in Fall and Spring*

**FOR 319 Forest Economics** (3 credit hours)

Economic approaches for evaluating the production and costs of forest management, timber harvesting activities, and nontimber forest products. Estimating the financial returns of long-term investments in timber or other forest resources, including discounted cash flow analysis and capital budgeting techniques. Property taxes and income tax treatment of timber and their effects on investment returns. Demand estimation and timber supply analyses.

Prerequisite: ARE 201 or EC 205 or EC 201

*Typically offered in Fall only*

**FOR 330 North Carolina Forests** (3 credit hours)

An introduction and overview of forests in North Carolina with emphasis on the importance of forests in the 21st century. Topics include: history and distribution of forests, soils-site relationships, forestry practices, non-conventional management objectives. Two required Saturday field trips.

*Typically offered in Fall only*

**FOR 334 Operations Research Applications in Natural Resources** (1 credit hours)

Introduction to the application and use of management science in forestry and natural resources. The course will introduce decision and information theory and mathematical programming techniques including linear, non-linear and integer programming concepts. The emphasis is on problem formulation and solution using computer programs. Half semester course.

*Typically offered in Spring only*

**FOR 350 Professional Development III: Ethical Dilemmas in Natural Resource Management** (1 credit hours)

Study of ethical issues confronting natural resource management professionals, including: biodiversity conservation, private property rights, traditional religion and ecological values, community rights, environmental racism, hunting and animal rights, business ethics, and the purpose and content of professional codes of ethics.

Prerequisite: Junior standing.

*Typically offered in Spring only*

**FOR 353 GIS and Remote Sensing for Environmental Analysis and Assessment** (3 credit hours)

This course provides a survey of topics targeting the processing and analysis of remotely sensed and other geospatial data collected in forestry, environmental, and natural resource inventory and analyses. Students develop a fundamental understanding of analysis techniques and data requirements that include aerial and photogrammetry applications, geostatistical and 3D image analyses, DEM and hydrologic modeling, image enhancement techniques, land cover classifications and accuracy assessment.

Restriction: Juniors & Seniors Only

*Typically offered in Spring only*

**FOR 401/FOR 501 Dendrology** (4 credit hours)

Identification and elementary silvics of woody plants of eastern North America with studies of their classification, characteristics, and habitats. Consideration of important trees and forest types across North America. Field identification emphasis with trips to forest communities.

*Typically offered in Fall only*

**FOR 402/ENT 402 Forest Entomology** (3 credit hours)

Fundamentals of morphology, classification, biology, ecology and control of insects attacking trees, with emphasis on silvicultural practices.

Prerequisite: Junior standing.

*GEP Natural Sciences*

*Typically offered in Spring only*

**FOR 405/FOR 505 Forest Management** (4 credit hours)

Fundamental principles and analytical techniques necessary in the planning, management and optimization of forest operations. Formulation of objectives and constraints, yield forecasting, forest regulation, procurement and marketing, inventory methods, and management plan preparation. Written and oral reporting.

Prerequisite: FOR 304, FOR 319, FOR 374

*Typically offered in Fall only*

**FOR 406 Forest Inventory, Analysis and Planning** (4 credit hours)

Independent project in designing and implementing a multi-resource survey; analyze stand conditions; forecast growth, yield and revenue of timber and forest products; use programming to prepare a long-term management plan subject to economic, social, and ecological constraints; assess economic and environmental impacts of potential actions; and report results orally and in writing.

Prerequisite: FOR 374 and FOR 405 and NR 460

*Typically offered in Spring only*

**FOR 408/FOR 508 Hardwood Management: Natural Forest Silviculture** (4 credit hours)

This course presents a complement to FOR Theory of Silviculture course, but with an emphasis on natural forest management rather than production forestry. The course teaches the ecological principles forming the scientific basis for silviculture and techniques of controlling, protecting, and restoring regeneration, composition, and growth of natural forest vegetation. We will use examples from woodlands and forests, as well as analog systems such as urban forests, agroforestry ecosystems, and indigenous systems worldwide. Students will learn to assess the biological and socio-economic problems affecting a range of forest types, and to evaluate the suitability of silvicultural strategies to meet ecological, social, and economic aims. We will discuss applications of ecological silviculture for management of wildlife habitat, water resources, climate mitigation and carbon sequestration, timber and non-timber forest products, urban green space, landscape design, restoration, and more.

Prerequisite: FOR 204 or Junior Standing

*Typically offered in Spring only*

**FOR 411 Forest Tree Genetics and Biology** (3 credit hours)

Genetics as it is applied in forest management for both conifers and hardwoods. The variation, evolution and genetics of forest trees. Methods for selection, breeding, seed production, and vegetative propagation. Exotics, wood properties, and tree improvement as a forest management tool.

Prerequisite: Junior standing

*Typically offered in Spring only*

**FOR 414 World Forestry** (3 credit hours)

Management of global forest resources; distribution and trends in forest cover; role of forests in economic development; international production and trade of forest products; current policy issues, including tropical deforestation, certification, and carbon sequestration; social forestry and non-timber forest products; international institutions and aid for conservation and development; identification and evaluation of sources of current information on global forestry issues.

*GEP Global Knowledge, GEP Interdisciplinary Perspectives*

*Typically offered in Spring only*

**FOR 415 World Forestry Study Tour** (1 credit hours)

Field trip to Mexico and/or Central America for seven days over spring break. Examine tropical forestry issues through field visits to timber concessions, plantations, nurseries, wood products firms, protected areas, and agroforestry projects; meetings with representatives of forest research institutes, government agencies, timber industry, cooperatives, and environmental organizations; and interaction with local people. Fee for field trip determined annually. Offered during spring break, as a one week field trip to Mexico and/or Central America.

Corequisite: FOR 414

*Typically offered in Spring only*

**FOR 419/FOR 519 Forest Economics** (3 credit hours)

Economic approaches for evaluating the production and costs of forest management, timber harvesting activities, and nontimber forest products. Estimating the financial returns of long-term investments in timber or other forest resources, including discounted cash flow analysis and capital budgeting techniques. Property taxes and income tax treatment of timber and their effects on investment returns. Demand estimation and timber supply analyses.

Prerequisite: Graduate Standing

*Typically offered in Fall only*

*This course is offered alternate years*

**FOR 420/NR 420/FOR 520/NR 520 Watershed and Wetlands Hydrology** (4 credit hours)

Principles of hydrologic science; classification and assessment of watersheds and stream networks; hydrologic, erosion, and water quality processes in natural and managed watersheds; wetlands hydrology; hydrologic measurements and data analysis; applications of hydrology and water quality management for forest agriculture, and urban ecosystems; watershed restoration. Emphasis field study of watersheds and hydrologic measurements. Two weekend field trips are required. Credit will not be given for both FOR(NR)420 and FOR(NR)520.

Prerequisite: SSC 200 and (FOR 260 or PB 360 or AEC 360)

*Typically offered in Spring only*

**FOR 422/FOR 522 Consulting Forestry** (3 credit hours)

Forest land acquisition and ownership: ownership, appraisal, legal considerations, financial management and planning. Producing forest resources: timber, wildlife, recreation, farm products, water, minerals, specialty products, and development. Marketing forest resources: timber, recreation, farm leases, minerals, specialty products, and developed property. Forest resources consulting: forms of organization, pricing of services, consultant client relationships (Law of Agency), professional ethics and continuing education.

Prerequisite: Senior standing in Forest Management

*Typically offered in Fall only*

**FOR 430 Forest Health and Protection** (3 credit hours)

This course will introduce students to the major insect and disease problems of North American forests, both native and introduced, with an emphasis on the recognition and management of pests and the damage they cause. Wild land fire, invasive plants, and climate change and their interactions with forest insect and diseases will also be covered.

Prerequisite: PB 200 or BIO 181 or BIO 183 or FOR 260 or BIO 360 or PB 360 (or other Biology or Plant Biology course).

*Typically offered in Fall only*

**FOR 434/FOR 534 Forest Operations and Analysis** (3 credit hours)  
Management science and operational techniques in forestry. Logging road layout and construction, and machine systems: harvesting machine optimization and selection. Harvesting, production and forest planning. Decision and inventory theory, and other techniques for solving problems typically encountered in forest operations management. Required overnight weekend field trip.

Junior standing or above

*Typically offered in Spring only*

**FOR 472 Forest Soils** (4 credit hours)

The course will evaluate how forest soils form in the natural environment, but also their relations to forest management and sustainability. Coursework includes soil physical, chemical, and biological properties, and also special topics such as soil fertility, soil formation, soil taxonomy and classification, soil organic matter management, and soil C and N cycles. There are many factors that contribute to forest soils differing from traditional cultivated soils. These factors will be explored in addition the variation in management styles for forest soils. The goal of this course is to gain an understanding of the basic properties and processes of forest soils as well as evaluate the role of these soils in sustainable forest management. Two Saturday Labs will be required.

Prerequisites: CH 101 & CH 102 and PB 200 or BIO 181

*Typically offered in Spring only*

**FOR 474 Forest Measurement, Modeling, and Inventory** (3 credit hours)

Mathematical and statistical foundations for the analysis of natural resource data. Statistical sampling designs, implementation, and analysis of forest inventory data. Linear and nonlinear regression techniques and their applications in allometric equations. Models for quantifying growth and yield of timber and non-timber products under different management and disturbance regimes. Application of modern software for efficient forest inventory workflows.

Prerequisite: FOR 273; Corequisite: ST 311 or equivalent

*Typically offered in Fall only*

**FOR 491/NR 491 Special Topics in Forestry and Related Natural Resources** (1-4 credit hours)

Independent (or group) study or research of a forestry or related natural resources topic with a faculty supervisor of the student's choice. Also courses offered on a trial basis.

*Typically offered in Fall and Spring*

**FOR 493 Independent Study in Forest Management** (1-6 credit hours)

Independent Study for Forest Management students at the advanced level developed under the direction of a faculty member. Individualized/Independent Study and Research courses require a "Course Agreement for Students Enrolled in Non-Standard Courses" be completed by the student and faculty member prior to registration by the department.

*Typically offered in Fall, Spring, and Summer*

**FOR 494 Independent Study in Forest Management** (1-6 credit hours)

Independent Study for Forest Management students at the advanced level developed under the direction of a faculty member. Individualized/Independent Study and Research courses require a "Course Agreement for Students Enrolled in Non-Standard Courses" be completed by the student and faculty member prior to registration by the department.

*Typically offered in Fall, Spring, and Summer*

**FOR 501/FOR 401 Dendrology** (4 credit hours)

Identification and elementary silvics of woody plants of eastern North America with studies of their classification, characteristics, and habitats. Consideration of important trees and forest types across North America. Field identification emphasis with trips to forest communities.

*Typically offered in Fall only*

**FOR 502 Forest Measurements** (1 credit hours)

One-third semester mini-course. Forest measurements covering principles, terminology, and practical field applications. Land area measurement, units of timber measure (cubic feet, cords, weight, board feet), estimating volume of standing trees, sampling techniques for forest inventory (strips, plots, points), measures of site quality and stand density, methods for projecting future timber volumes.

*Typically offered in Fall only*

**FOR 504 The Practice of Silviculture** (3 credit hours)

The theory and practice of stand regeneration, controlling composition, intermediate treatments and growth; application of the knowledge of silvics in the management of stands. Emphasis on forest communities of North America. Co-requisite course is FOR 506: Silviculture Laboratory (Optional)

*Typically offered in Spring only*

**FOR 505/FOR 405 Forest Management** (4 credit hours)

Fundamental principles and analytical techniques necessary in the planning, management and optimization of forest operations. Formulation of objectives and constraints, yield forecasting, forest regulation, procurement and marketing, inventory methods, and management plan preparation. Written and oral reporting.

Prerequisite: FOR 304, FOR 319, FOR 374

*Typically offered in Fall only*

**FOR 506 Silviculture Laboratory** (1 credit hours)

Development of site specific prescriptions to establish stands for a wide variety of objectives, including fiber, water, wildlife, recreation and health. Emphasis on forest communities of North America.

Corequisite: FOR 504

*Typically offered in Spring only*

**FOR 507 Silviculture Mini Course** (1 credit hours)

One-third semester mini-course. A condensed version of silviculture. Ecological processes affecting establishment and growth of forest stands with particular emphasis on forest types of southeastern United States. Forest stand productivity, how productivity influenced by site, stand, climatic factors, and application of site specific prescriptions to establish and manipulate composition, growth, and health of forest stands.

*Typically offered in Spring only*



**FOR 508/FOR 408 Hardwood Management: Natural Forest Silviculture** (4 credit hours)

This course presents a complement to FOR Theory of Silviculture course, but with an emphasis on natural forest management rather than production forestry. The course teaches the ecological principles forming the scientific basis for silviculture and techniques of controlling, protecting, and restoring regeneration, composition, and growth of natural forest vegetation. We will use examples from woodlands and forests, as well as analog systems such as urban forests, agroforestry ecosystems, and indigenous systems worldwide. Students will learn to assess the biological and socio-economic problems affecting a range of forest types, and to evaluate the suitability of silvicultural strategies to meet ecological, social, and economic aims. We will discuss applications of ecological silviculture for management of wildlife habitat, water resources, climate mitigation and carbon sequestration, timber and non-timber forest products, urban green space, landscape design, restoration, and more.

Prerequisite: FOR 204 or Junior Standing

*Typically offered in Spring only*

**FOR 509 Forest Resource Policy** (1 credit hours)

One-third semester mini-course. Principles of forest policies and processes. Political processes, institutional and interest group participation, forestry laws and programs, current issues, and policy analyses.

*Typically offered in Spring only*

**FOR 510 Introduction to GPS** (1 credit hours)

One-third semester mini-course. Introduction to collection and use of mapping grade global positioning satellite systems data. Includes review of cartographic properties, mission planning, hands-on collection of GPS points, lines, and areas, differential correction, editing, and exporting GPS files to a GIS.

*Typically offered in Fall only*

**FOR 513 Silviculture for Intensively Managed Plantations** (3 credit hours)

This course provides an up-to-date understanding of the ecological and physiological bases of forest stand productivity and a silvicultural systems framework to use this knowledge for making site specific prescriptions that are cost effective and environmentally sustainable.

Prerequisite: FOR 507

*Typically offered in Spring only*

**FOR 514 Woodland Stewardship** (3 credit hours)

An introduction and overview of non-industrial private forestry in the Southeast United States with emphasis on active forest management. Topics include history of human impact on forests, evolution of forest, forestry practices, timber and non timber management objectives, financial aspects of forest land management, and management planning. One required all day field trip.

*Typically offered in Fall only*

**FOR 515/ECG 515 Environmental and Resource Policy** (3 credit hours)

Application of price theory and benefit-cost analysis to public decisions related to resources and environment. Emphasis on evaluation of water supply and recreation investments, water quality management alternatives, public-sector pricing, common property resources and optimum management of forest and energy resources.

Prerequisite: EC(ARE) 301 or 401

*Typically offered in Spring only*

*This course is offered alternate years*

**FOR 519/FOR 419 Forest Economics** (3 credit hours)

Economic approaches for evaluating the production and costs of forest management, timber harvesting activities, and nontimber forest products. Estimating the financial returns of long-term investments in timber or other forest resources, including discounted cash flow analysis and capital budgeting techniques. Property taxes and income tax treatment of timber and their effects on investment returns. Demand estimation and timber supply analyses.

Prerequisite: Graduate Standing

*Typically offered in Fall only*

*This course is offered alternate years*

**FOR 520/NR 520/FOR 420/NR 420 Watershed and Wetlands Hydrology** (4 credit hours)

Principles of hydrologic science; classification and assessment of watersheds and stream networks; hydrologic, erosion, and water quality processes in natural and managed watersheds; wetlands hydrology; hydrologic measurements and data analysis; applications of hydrology and water quality management for forest agriculture, and urban ecosystems; watershed restoration. Emphasis field study of watersheds and hydrologic measurements. Two weekend field trips are required. Credit will not be given for both FOR(NR)420 and FOR(NR)520.

Prerequisite: SSC 200 and (FOR 260 or PB 360 or AEC 360)

*Typically offered in Spring only*

**FOR 522/FOR 422 Consulting Forestry** (3 credit hours)

Forest land acquisition and ownership: ownership, appraisal, legal considerations, financial management and planning. Producing forest resources: timber, wildlife, recreation, farm products, water, minerals, specialty products, and development. Marketing forest resources: timber, recreation, farm leases, minerals, specialty products, and developed property. Forest resources consulting: forms of organization, pricing of services, consultant client relationships (Law of Agency), professional ethics and continuing education.

Prerequisite: Senior standing in Forest Management

*Typically offered in Fall only*

**FOR 531 Wildland Fire Science** (3 credit hours)

Physical, chemical, biological, and ecological processes associated with wildland fire, particular emphasis on fire behavior, fuels, weather, climate and the associated effects on ecology, management, fire suppression, prescribed fire, and smoke emissions and exposure. Fire's effect on national policy, social and natural history of North America. In-depth exercises in fire and smoke modeling using established predictive systems.

*Typically offered in Spring only*

**FOR 532 Wildland Firefighter** (3 credit hours)

National Wildfire Coordination Group Firefighter Type II Certification, including study of the National Incident Command Systems (ICS-100), Human Dimensions in the Wildland Fire Service (L-180) Introduction to Wildland Fire Behavior (S-190), Firefighting Safety and Training (S-130). Weekly reading seminar, lectures and problem sessions. Last 4 weeks of semester will be prescribed fire planning and field implementation of methodologies learned in course.

*Typically offered in Fall only*

**FOR 533 Fire Ecology** (3 credit hours)

Principles and methodology associated with wildland fire, including the importance of historic fire regimes in shaping current plant and animal communities, plant and animal species adaptations to fire, and development of plans to restore and maintain fire-adapted communities.

*Typically offered in Fall only*

**FOR 534/FOR 434 Forest Operations and Analysis** (3 credit hours)

Management science and operational techniques in forestry. Logging road layout and construction, and machine systems: harvesting machine optimization and selection. Harvesting, production and forest planning. Decision and inventory theory, and other techniques for solving problems typically encountered in forest operations management. Required overnight weekend field trip.

Junior standing or above

*Typically offered in Spring only*

**FOR 540 Advanced Dendrology** (3 credit hours)

Identification and life histories of native and naturalized woody plants. Use of taxonomic manuals and literature. Identification of problematic groups. Concentration on North America, with discussion of other continents. Overnight field trips to natural forest communities.

Prerequisite: BO 403 or FOR 339

*Typically offered in Spring only*

*This course is offered alternate odd years*

**FOR 561 Forest Communities of the Southeastern Coastal Plain** (1 credit hours)

Species composition, distribution, site requirements, and succession of principal forest communities of southeastern Coastal Plain. Identification of important member plant species. Overnight field trips to typical examples.

Prerequisite: FOR 212, FOR 501

*Typically offered in Summer only*

**FOR 562 Forest Communities of the Southern Appalachians** (1 credit hours)

Species composition, distribution, site requirements, and succession of principal forest communities of southern Appalachians. Identification of important member plant species. Overnight field trips to typical examples.

Prerequisite: FOR 212, FOR 501

*Typically offered in Summer only*

**FOR 565 Plant Community Ecology** (4 credit hours)

Consideration of structure and function of terrestrial vascular plant communities, with emphasis on both classical and recent research. Measurement and description of community properties, classification, ordination, vegetation pattern in relation to environment, ecological succession and a survey of vegetation of North America.

Prerequisite: Undergraduate Ecology Course

*Typically offered in Spring only*

**FOR 575 Advanced Terrestrial Ecosystem Ecology** (3 credit hours)

Views organisms and physical environment as integrated system. Outlines processes governing assimilation and cycling of energy, carbons, nutrients, and water. Evaluates ecosystem responses to intensive management, global climate change, air pollution, biofuels production, fragmentation, large-scale land use change. Illustrates application of ecosystem science approach to important regional and global questions through scaling of empirical, ecosystem-level data, ongoing research. Provides experience in hypothesis testing and experimental design, data analysis and interpretation, proposal development, and publication for research professionals. Graduate Standing.

*Typically offered in Spring only*

*This course is offered alternate odd years*

**FOR 583 Tropical Forestry** (3 credit hours)

Principles of tropical ecology, dendrology and agroforestry. Primary emphasis on establishment and management of tropical plantations with lesser emphasis on natural stands. Operation and management of tropical nurseries.

Prerequisite: Senior standing

*Typically offered in Fall only*

*This course is offered alternate odd years*

**FOR 595 Special Topics** (1-6 credit hours)

Individual students or groups of students, under direction of a faculty member, may explore topics of special interest not covered by existing courses. Format may consist of readings and independent study, problems or research not related to thesis. Also used to develop and test new 500-level courses.

*Typically offered in Fall, Spring, and Summer*

**FOR 601 Graduate Seminar** (1 credit hours)

Weekly seminar in which students registered for course present the results of research and special projects. Invitation to all graduate students and faculty in department to attend and join discussion.

*Typically offered in Fall and Spring*

**FOR 603 Research Methods in Forestry and Environmental Resources** (1 credit hours)

Philosophy and objectives of scientific research and steps in the research process. Basic and applied research, inductive and deductive reasoning and need for hypothesis development and testing as a basis for scientific research. Special emphasis on preparation of study plans, graduate theses, published articles and technical presentations.

Prerequisite: Graduate standing

*Typically offered in Fall and Spring*

**FOR 610 Special Topics In Forestry** (1-6 credit hours)

Individual students or groups of students, under direction of a faculty member, may explore topics of special interest not covered by existing courses. Format may consist of readings and independent study, problems or research not related to thesis. Also used to develop and test new 500-level courses. Credits Arranged.

*Typically offered in Fall, Spring, and Summer*

**FOR 630 Independent Study in Forestry** (1 credit hours)

Independent study in Forestry under the supervision of a Forestry and Environmental Resources faculty member. Restricted to graduate students in the Department of Forestry and Environmental Resources with consent of the supervising faculty. May not be taken in the first semester of graduate study.

*Typically offered in Fall, Spring, and Summer*

**FOR 685 Master's Supervised Teaching** (1-3 credit hours)

Teaching experience under the mentorship of faculty who assist the student in planning for the teaching assignment, observe and provide feedback to the student during the teaching assignment, and evaluate the student upon completion of the assignment.

Prerequisite: Master's student

*Typically offered in Summer only*

**FOR 688 Non-Thesis Masters Continuous Registration - Half Time Registration** (1 credit hours)

For students in non-thesis master's programs who have completed all credit hour requirements for their degree but need to maintain half-time continuous registration to complete incomplete grades, projects, final master's exam, etc.

Prerequisite: Master's student

*Typically offered in Spring only*

**FOR 689 Non-Thesis Master Continuous Registration - Full Time Registration** (3 credit hours)

For students in non-thesis master's programs who have completed all credit hour requirements for their degree but need to maintain full-time continuous registration to complete incomplete grades, projects, final master's exam, etc. Students may register for this course a maximum of one semester.

Prerequisite: Master's student

*Typically offered in Fall and Spring*

**FOR 693 Master's Supervised Research** (1-9 credit hours)

Instruction in research and research under the mentorship of a member of the Graduate Faculty.

Prerequisite: Master's student

*Typically offered in Fall, Spring, and Summer*

**FOR 695 Master's Thesis Research** (1-9 credit hours)

Thesis research.

Prerequisite: Master's student

*Typically offered in Fall, Spring, and Summer*

**FOR 696 Summer Thesis Research** (1 credit hours)

For graduate students whose programs of work specify no formal course work during a summer session and who will be devoting full time to thesis research.

Prerequisite: Master's student

*Typically offered in Summer only*

**FOR 713 Advanced Topics In Silviculture** (3 credit hours)

Critical examination of selected silvicultural topics, with special emphasis on concepts and phenomena distinguishing forests from other biotic communities and silviculture from other fields of applied biology. Emphasis on intensive silviculture in United States and selected international locations. A required written research proposal.

Prerequisite: FOR 304

*Typically offered in Fall only*

**FOR 725/GN 725 Forest Genetics** (3 credit hours)

Application of genetic principles to silviculture, management and wood utilization. Emphasis on variation in wild populations, the bases for selection of desirable qualities and fundamentals of controlled breeding.

*Typically offered in Spring only*

**FOR 726/CS 726/ANS 726 Advanced Topics In Quantitative Genetics and Breeding** (3 credit hours)

Advanced topics in quantitative genetics pertinent to population improvement for quantitative and categorical traits with special applications to plant and animal breeding. DNA markers - phenotype associations. The theory and application of linear mixed models, BLUP and genomic selection using maximum likelihood and Bayesian approaches. Pedigree and construction of genomic relationships matrices from DNA markers and application in breeding.

Prerequisite: ST 511, Corequisite: ST 512

*Typically offered in Spring only*

**FOR 727 Tree Improvement Research Techniques** (3 credit hours)

Research methods involved in forest tree breeding and genetics programs. Emphasis on laboratory, greenhouse and field research techniques. Stress also on summary and presentation of research results.

Prerequisite: FOR 411 or GN 411

*Typically offered in Spring only*

*This course is offered alternate years*

**FOR 728 Quantitative Forest Genetics Methods** (3 credit hours)

Applications of basic quantitative genetic methods in forest tree breeding and genetic research. Principles and procedures for partitioning experimental variance, estimating genetic parameters from different mating and test designs. Predicting breeding value and gain and developing breeding strategies.

Prerequisite: GN 703, ST 701

*Typically offered in Fall only*

*This course is offered alternate odd years*

**FOR 734 Advanced Forest Management Planning** (3 credit hours)

History, principles, structures and use of modern forest management planning and decision-making techniques. Emphasis on optimization procedures and public forest management.

Prerequisite: FOR 405 or FOR 434 or OR 501, Corequisite: FOR 772

*Typically offered in Spring only*

*This course is offered alternate years*

**FOR 753 Environmental Remote Sensing** (3 credit hours)

Principles and applications of remote sensing technology to earth resources and environmental studies. Electromagnetic energy, data acquisition platforms, sensors and scanners, processing of digital remotely sensed data, error analysis and accuracy assessments, and integration of remotely sensed data with other data types used in natural resource management.

Prerequisite: FOR 353

*Typically offered in Fall only*

*This course is offered alternate years*

**FOR 795 Advanced Special Topics in Forestry** (1-6 credit hours)

Individual students or groups of students, under direction of a faculty member, may explore topics of special interest not covered by existing courses. Format may consist of readings and independent study, problems or research not related to thesis. Also used to develop and test new 700-level courses.

*Typically offered in Fall and Spring*

**FOR 801 Seminar** (1 credit hours)

Weekly seminar in which students registered for course present the results of research and special projects. Invitation to all graduate students and faculty in department to attend and join discussion.

*Typically offered in Fall and Spring*

**FOR 803 Research Methods in Forestry and Environmental Resources** (1 credit hours)

Philosophy and objectives of scientific research and steps in the research process. Basic and applied research, inductive and deductive reasoning and need for hypothesis development and testing as a basis for scientific research. Special emphasis on preparation of study plans, graduate theses, published articles and technical presentations.

Prerequisite: Grad. standing

*Typically offered in Fall only*

**FOR 810 Special Topics In Forestry** (1-6 credit hours)

Individual students or groups of students, under direction of a faculty member, may explore topics of special interest not covered by existing courses. Format may consist of readings and independent study, problems or research not related to thesis. Also used to develop and test new 800-level courses.

*Typically offered in Fall, Spring, and Summer*

**FOR 885 Doctoral Supervised Teaching** (1-3 credit hours)

Teaching experience under the mentorship of faculty who assist the student in planning for the teaching assignment, observe and provide feedback to the student during the teaching assignment, and evaluate the student upon completion of the assignment.

Prerequisite: Doctoral student

*Typically offered in Fall and Spring*

**FOR 893 Doctoral Supervised Research** (1-9 credit hours)

Instruction in research and research under the mentorship of a member of the Graduate Faculty.

Prerequisite: Doctoral student

*Typically offered in Fall, Spring, and Summer*

**FOR 895 Doctoral Dissertation Research** (1-9 credit hours)

Dissertation research.

Prerequisite: Doctoral student

*Typically offered in Fall, Spring, and Summer*

**FOR 896 Summer Dissertation Research** (1 credit hours)

For graduate students whose programs of work specify no formal course work during a summer session and who will be devoting full time to thesis research.

Prerequisite: Doctoral student

*Typically offered in Summer only*