

FORESTRY (FORS)

FORS 130 - Intro Forestry Field Skills. 2 Credits.

Offered autumn. This course is focused on developing introductory forestry field skills through experiential learning at the College's Lubrecht Experimental Forest. Classroom lecture and experiences that introduce students to orienteering, map reading, GPS, tree measurements, fire and fuels management, recreation, human dimensions, hydrology, wood products, and the careers possible with a Forestry degree.

FORS 140 - Urban Forestry. 2 Credits.

Offered spring. An introduction to urban forestry principles and practices. Benefits of the urban forest. Topics covered include plant species selection, site design, site assessment, planting, watering, fertilization, insects and diseases, pruning and tree care, inventory of property values, and community forestry development.

FORS 191 - Special Topics. 1-6 Credits.

(R-6) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

FORS 192 - Independent Study. 1-3 Credits.

(R-3) Offered every term. Prereq., consent of instr. Problems course designed to allow individual research at the undergraduate level.

FORS 201 - Forest Biometrics. 3.000 Credits.

Offered autumn. Prereq., M 115 or M 121 or M 122 or M 151 or M 162 or M 171 or M 172. Introduction to probability and statistical methods for forestry and environmental sciences covering natural resource applications of common probability distributions, data analysis, hypothesis testing, and regression.

FORS 202 - Forest Mensuration. 3.000 Credits.

Offered spring. Prereq., FORS 201 or STAT 216 or SOCI 202 or WILD 240; and M 121 and M 122 or M 151 or M 162 or M 171 or M 172. The theory and practice of timber inventory and growth projection, including field measurements, sampling procedures, statistical methods, inventory compilation, and stand growth simulation under specified management prescriptions. Stand growth under specified management prescriptions.

FORS 230 - Fire Management & Environmental Change. 3 Credits.

Offered Spring. Introduction to wildland fire and its role as a transformative process in the environment. Topics include pyrogeography, fire behavior, fire ecology, fire policy, and fire management. Examines the role of fire in shaping ecological and social systems, with a focus on societal issues of natural resources, human health, land use, climate change, and economics. Provides foundational understanding of first principles. Serves as a stepping off point for further study of fire.

FORS 232 - Forest Insects & Diseases. 2 Credits.

Offered spring. Identification, significance of and remedies for insect infestations and infectious and non-infectious diseases of forests and forest products.

FORS 240 - Tree Biology. 2 Credits.

Offered autumn and spring. Suggested coreq., FORS 241N. The physical and biological requirements for the growth and development of trees. Discussions of: identification, classification, range, and economic importance of the major tree species of North America.

FORS 241N - Dendrology. 3.000 Credits.

Offered autumn and spring. Suggested coreq., FORS 240. Methods and techniques for identifying the major families of North American trees, based on gross morphological and anatomical features. Building and use of identification keys. Gen Ed Attributes: Natural Science Lab Course (N) Gen Ed Attributes: Natural Science Course (N)

FORS 250 - Intro to GIS for Forest Mgt. 3.000 Credits.

Offered every term. Open to sophomores or juniors or with consent of instructor. This course is designed as a practical introduction to the use of Geographic Information Systems (GIS) for storing, retrieving, analyzing and displaying spatial data. It will also cover the history of cartography and the conventions of the modern map-making process.

FORS 291 - Special Topics. 1-6 Credits.

(R-6) Offered intermittently. Experimental offerings of visiting professors; new courses or one-time offerings of current topics.

FORS 292 - Independent Study. 1-3 Credits.

(R-3) Offered every term. Prereq., consent of instr. Individual research at the undergraduate level.

FORS 308 - Fire Ecology Field Studies. 3 Credits.

This course introduces students to all aspects of forest demography and forest community ecology in the field. Particular attention is given to the agents of woody plant mortality, including beetle gallery identification, pathogenic fungi, density-dependent mortality, fire, and the effects of landscape position. Students learn how data are collected to maximize information used to answer scientific questions, including the relationships between accuracy, precision, uncertainty, and cost (in time and money). Students learn how to measure fuel loading at landscape scales according to federal standards. In addition to specific measurements in ponderosa pine and larch/mixed-conifer forest types, students visit and compare Engelmann spruce/subalpine forests and riparian cottonwood forests. Students will also study forest-river interactions and the modification thereof by fire.

FORS 310 - Field Methods in Forest Ecology. 3 Credits.

This course introduces students to all aspects of forest demography and forest community ecology in the field. Particular attention is given to the agents of woody plant mortality, including beetle gallery identification, pathogenic fungi, spatially explicit density-dependent mortality, fire, and the effects of landscape position. Students learn how data are collected to maximize information used to answer scientific questions, including the relationships between accuracy, precision, uncertainty, and cost (in time and money). Students then collect tree demography data within the Yosemite Forest Dynamics Plot. Students learn how to measure fuel loading at landscape scales according to federal standards. In addition to specific measurements in one forest type (white fir/sugar pine), students visit and compare the other principal forest types of the Sierra Nevada and White Mountains (ponderosa pine, red fir, Jeffrey pine, lodgepole pine, whitebark pine, pinyon/juniper, and bristlecone pine).

FORS 320 - Forest Environmental Economics. 3 Credits.

Offered spring. Prereq. M 121 and M 122 or M 151 or M 162 or M 171 or M 172. Economic techniques to support decision making about the allocation of scarce resources in relation to the management of forests for timber and other ecosystem services.

FORS 330 - Forest Ecology. 3.000 Credits.

Offered autumn and spring. Prereq., FORS 210 or ENSC 245N or NRSM 210N; and BIOC 105N or BIOB 170N or BIOE 172 or BIOB 160N or FORS 240; and FORS 201 or STAT 216 or SOCI 202 or WILD 240 or PSYX 222. Examination of physical and biological factors affecting forest structure, composition, and function, including biodiversity, disturbance, and nutrient cycling. Field labs throughout Northern Rockies including developing skills in field observation, data interpretation and problem solving.

FORS 331 - Wildland Fuel Management. 3 Credits.

Offered spring. Prereq., FORS 230 or consent of instr. The fire ecology of some western vegetation types is discussed. Elements of the principles of wildland fuel management are presented. Prescribed fire use and mechanical manipulation are matched to historic ecosystem processes. Smoke management considerations and health issues are also presented.

FORS 333 - Fire Ecology. 3 Credits.

Offered autumn. Prereq., one of the following ecology courses (FORS 330 or BIOE 370 or BIOE 342 or NRSM 462), or FORS 230. A detailed analysis of fire ecology in terrestrial ecosystems with a focus on the Rocky Mountains, including fire history, fire effects, landscape patterns, land use legacies, management implications, and current topics. Includes at least one required all-day field trip.

FORS 340 - Forest Product Manufacturing. 3.000 Credits.

Offered autumn. Survey of the manufacture of wood-based products generated from timber harvest. Laboratory exercises focused on hands-on student learning of product manufacture and testing as well as field trips to several wood products manufacturing facilities.

FORS 341 - Timber Harvesting & Roads. 3.000 Credits.

Offered spring. An overview of harvesting system capabilities and selection for multiple resource objectives. Fundamentals of forest road management. Best management practices as they apply to forest operations in Montana and the western United States.

FORS 342 - Wood Anatomy, Properties, & ID. 3 Credits.

Offered spring. Prereq., BIOC 105N or FORS 240 or FORS 241N. Lecture and laboratory investigation of the structure, identification and physical and mechanical properties of the commercial tree species of North America.

FORS 347 - Multiple Resource Silviculture. 3.000 Credits.

Offered spring. Prereq., FORS 330 or BIOE 370. Credit not allowed for both FORS 347 and 349. An introduction to the concepts and application of silvicultural techniques to forest ecosystems to meet multiple resource objectives.

FORS 349 - Practice of Silviculture. 3.000 Credits.

Offered autumn. Prereq., FORS 202 or FORS 302 and FORS 241N and either prereq or coreq FORS 330. Practice of Silviculture is designed primarily for Forestry majors (open to others with appropriate prerequisites), and will consider the conceptual foundations behind various silvicultural practices and techniques, as well as and their application in forest ecosystems to meet multiple resource objectives. The course will cover natural stand dynamics, stand assessment and site classification schemes, even- and uneven-aged silvicultural systems, thinning/stand density concepts, regeneration practices, stand diagnosis and prescription development, vegetative management strategies for diverse objectives, along with quantitative assessment and modeling of alternative prescriptions.

FORS 350 - Forestry Apps of GIS. 3.000 Credits.

Offered spring. Prereq., FORS 250 or FORS 284 or GPHY 284. Introduction to the basic concepts and techniques of computerized spatial data management and analysis systems and application to natural resource management.

FORS 351 - Env Remote Sensing. 3 Credits.

Offered spring. The theory and application of photo- and electro-optical remote sensing for mapping resources and developing information systems.

FORS 391 - Special Topics. 12.000 Credits.

(R-12) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

FORS 392 - Independent Study. 1-3 Credits.

(R-10) Offered every term. Prereq., consent of instr. Individual study or research problems.

FORS 398 - Internship. 1-6 Credits.

Offered every term. Prereq., consent of department. Extended classroom experience that provides practical application of classroom learning during placements off campus. Prior approval must be obtained from the faculty supervisor and the Internship Services office. A maximum of 6 credits of Internship (198, 298, 398, 498) may count toward graduation.

FORS 434 - Advanced Forest Roads. 3 Credits.

Offered autumn. Prereq., FORS 341. The purpose of this course is to help students understand the principles and skills of forest road design and the concepts of forest transportation planning. The course will cover the basic topics of road location, design, construction, and maintenance and provide students with techniques to identify the combination of roads, facilities and transport systems which minimize costs and negative environmental impacts.

FORS 435 - Advanced Timber Harvesting. 3 Credits.

Offered autumn. Prereqs., FORS 341. This course covers the fundamentals of logging feasibility and cost analyses of various timber harvesting systems including the characteristics and performance of ground vehicles, cable and aerial systems; cost factors and cost analysis procedures; safety issues; and environmental impacts of harvesting systems.

FORS 436 - Project Appraisal. 3 Credits.

Offered autumn. Prereq., FORS 320 or consent of instructor. A suite of techniques, collectively referred to as project appraisal methods, facilitate evaluation of alternative projects. In this applied, computer laboratory-based course, students will become familiar with the use of discounted cash flow analysis and mathematical programming to evaluate proposed courses of action and recommend the economically efficient alternative. Skills will be developed applying these techniques to problems faced by natural resource managers and policy-makers.

FORS 440 - Forest Stand Management. 3 Credits.

Offered autumn. Prereq., FORS 202 or 302; FORS 341; FORS 347 or 349. The management and manipulation of forest stands to reach multiple objectives, with a focus on the planning of forest operations for a community partner.

FORS 444 - Applied Methods in Forest Restoration and Utilization. 1-3 Credits.

(R-9) Offered every term. Meeting all day on Saturdays, and some Sundays, this course involves training students to safely and efficiently identify forest stands to be restored through appropriately-planned management activities including both live and dead timber felling operations, manufacture of sawlogs and pulpwood, proper management of slash and residuals, grapple skidding and the production of lumber using both circular sawmill and bandsaw mill.

FORS 481 - Forest Planning. 3 Credits.

Offered spring. Prereq., FORS 320; FORS 347 or FORS 349 or consent of instr. Integrated multiple use planning at the forest-wide level: defining multi-resource management goals, generating management alternatives, projecting outcomes, assessing environmental impacts, and implementing preferred option.

FORS 491 - Special Topics. 1-12 Credits.

(R-12) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

FORS 492 - Independent Study. 1-3 Credits.

(R-10) Offered every term. Prereq., consent of instr. Individual study or research problems.

FORS 495 - Wildland RxFire Practicum. 3 Credits.

Offered wintersession. Co-convened with FORS 544. Prereq. Fire experience and Consent of Instructor. An intensive field course providing students with technical training, practical applications, and theoretical foundations in ecological burning for restoration purposes. Class is typically held in southeastern United States.

FORS 498 - Internship. 1-6 Credits.

Offered every term. Prereq., consent of instr. Extended classroom experience which provides practical application of classroom learning during placements off-campus. Prior approval must be obtained from faculty advisor and Internship Services office. A maximum of 6 credits of Internship (198, 298, 398, 498) may count toward graduation.

FORS 499 - Senior Thesis. 1-3 Credits.

Offered autumn and spring. Prereq., senior standing and consent of instr. Preparation of a major paper based on study or research in a field selected according to the needs and objectives of the student.

FORS 505 - Sampling Methods. 3 Credits.

Offered spring. Prereq., consent of instr. Fundamentals of statistical sampling emphasizing natural and environmental resource applications. Principles of inferences and alternative estimators are studied in the context of simple random, systematic, unequal probability, stratified, and 3P/Poisson designs. Variable radius plot sampling, line intersect sampling, and other probability proportional to size designs used in forest and ecological inventories are also covered. Level: Graduate

FORS 521 - Heur. Opt. for For. Plan.. 3 Credits.

Offered spring even-numbered years. Prereq. FORS 481 or equiv. and consent of instr. Modern heuristic optimization techniques and their applications to solving spatially explicit forest planning problems. Level: Graduate

FORS 533 - Use Fire Wildland Mgmt. 3 Credits.

Offered autumn. Prereq., consent of instr. Evolution of federal fire policy is discussed. Western fire ecology and the planned use of fire for wildlife, range, and forest applications of prescribed fire are presented. Fire behavior and a fire science vocabulary are introduced. Students review literature, present seminars, and lead discussions. Level: Graduate

FORS 535 - Applied Forest Ecology. 3 Credits.

Prereq., graduate status or consent of instructor. This course covers the use of ecological theory and data in the design of silvicultural treatments to achieve multiple management objectives, with particular emphasis on forest restoration and climate change adaptation. We examine methods of silvicultural design, including use of historical and contemporary reference conditions, and climate adaptation strategies. Analysis exercises use the open source statistical program and language R for data analysis, visualization, and modeling, especially of spatial point pattern data. Introduction to monitoring and adaptive management of silvicultural treatments.

FORS 538 - Ecological Statistics. 3 Credits.

Offered in the Fall. Prerequisites: STAT451/452 or equivalent. This is an applied course covering advanced statistical modeling techniques using examples from forestry, ecology, and the environmental sciences. Covers data management, visualization, and scripting with R, an open source data analysis and statistics platform. Explores various parametric and semi-parametric modeling strategies that allow for non-linear response functions and/or non-Gaussian response distributions. Estimation and inference in the context of generalized linear models, generalized additive models, and classification and regression trees are discussed using examples from the scientific literature. Lays the foundation for subsequent graduate-level analytic coursework. Level: Graduate

FORS 540 - Disturbance Ecology. 3 Credits.

Prereq., graduate status or consent of instructor. This course covers foundational disturbance ecological concepts; examines important and influential disturbance ecology theories; and introduces important disturbance agents and processes operating in temperate and boreal forest ecosystems.

FORS 544 - Adv. Wildland RXFire Practicum. 3 Credits.

Offered wintersession. Co-convened with FORS 495. Prereq. Consent of Instructor. An intensive field course providing students with technical training, practical applications, and theoretical foundations in ecological burning for restoration purposes. Students will practice leadership skills by supervising and training fire personnel in application of prescribed fire. Class typically held in southeastern United States. Credit is not allowed for both FORS495 Wildland Prescribed Fire Practicum and FORS544 Prescribed Fire Practicum. Level: Graduate

FORS 545 - Silviculture Research. 1 Credit.

(R-6) Offered intermittently. Prereq., consent of instr.; prereq. or coreq., FOR 347 or equiv. Reading and discussion of scientific literature related to silvicultural practice and science. Different topic each semester. Students become familiar with silviculture literature, develop skills for scrutinizing scientific literature, and examine silvicultural topics in detail. Level: Graduate

FORS 551 - Digital Image Processing. 4 Credits.

Offered intermittently. Prereq., FORS 351 or consent of instr. Fundamentals of electro-optical digital remote sensors, data compilation, preprocessing, and pattern recognition. Level: Graduate

FORS 558 - Landscape Ecology. 3 Credits.

Offered Spring semester even years. Prereq., FORS 538 or equivalent. The purpose of this course is to provide students with an introduction to the discipline of landscape ecology with a focus on applications within ecology and natural resource management. In addition to studying the fundamentals of landscape ecology through reading primary literature, students will gain exposure to a range of tools used in the analysis of geo-spatial data including raster analysis, environmental remote sensing, state transition models and species distribution models. Another objective is to engage students in student-directed learning within an inter-disciplinary environment to improve and refine student's oral and written communication skills. Level: Graduate

FORS 594 - Graduate Seminar. 1 Credit.

(R-12). Offered autumn. Prereq. graduate standing. Presentations by students, faculty, and professionals on issues and topics in their field. Level: Graduate

FORS 595 - Special Topics. 1-12 Credits.

(R-12) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics. Level: Graduate

FORS 596 - Independent Study. 1-3 Credits.

(R-10) Offered every term. Prereq., consent of instr. Individual study or research problems. Level: Graduate

FORS 598 - Internship. 1-15 Credits.

(R-15) Offered every term. Prereq., consent of instr. Extended classroom experience which provides practical application of classroom learning during placements off campus. Prior approval must be obtained from the faculty supervisor and the Internship Services office. Level: Graduate

FORS 599 - Professional Paper. 1-15 Credits.

(R-15) Offered autumn and spring. Preparation of Master of Ecosystem Management professional paper. Level: Graduate

FORS 697 - Graduate Research. 1-15 Credits.

(R-15) Offered every term. Independent graduate research in forest management, wood science, soils, wildlife management, silviculture, recreation and other topic areas. Level: Graduate

FORS 699 - Thesis. 1-15 Credits.

(R-15) Offered every term. Preparation of thesis/dissertation. Level: Graduate