

# SUSTAINABLE FOREST MANAGEMENT GRADUATE MAJOR (MF, MS, PHD)

## Graduate Areas of Concentration

*Engineering for sustainable forestry; forest biometrics and geomatics; forest operations planning and management; forest policy analysis and economics; forest soil and watershed processes; silviculture, fire, and forest health*

## Professional Master of Forestry Programs

*Forest business for private landowners; spatial science and analysis; silviculture, fire, and forest health*

The Sustainable Forest Management (SFM) graduate program emphasizes the conservation of forest-dominated landscapes to meet a defined set of ecological, economic and social criteria over long time frames. The program follows the sustainable principles outlined by the Montreal Process Criteria and Indicators. These principles have been adopted by the state of Oregon.

The program provides a strong grounding in the principles and techniques of active management of forests to improve forest health and condition while producing a full range of products and ecosystem services. It consists of a common core in the principles and criteria of sustainable forest management; statistics for design and interpretation of experiments; and specialization in one of six areas of concentration. The MF degree requires a project, MS a thesis, and PhD a dissertation.

## Areas of Concentration

**Engineering for Sustainable Forestry**—Designing forest operations to achieve sustainable forest management objectives; ecological restoration operations; road design and construction. Supporting course work often draws from slope and embankment, industrial systems optimization, watershed impacts of forest disturbance, GIScience II: analysis and applications, forest transportation systems, forest hydrology, forest geomatics, forest road engineering, forest road system management, water quality and forest land use, forest operations analysis, advanced logging mechanics, harvesting management, advanced silviculture, heuristics for combinatorial optimization, economics of the forest resource, and human factors engineering. **Contacts:** Belart, Chung, Leshchinsky, Lyons, Olsen, Segura, Sessions, Wing

**Forest Biometrics and Geomatics**—Modeling tree and stand development; forest data sampling and monitoring methods; forest measurements and assessments; mapping and data management technologies. Supporting course work often draws from forest biometrics, forest geomatics, geospatial data and analysis, digital terrain modeling, GIScience II: analysis and applications, geodesy, spatio-temporal variation in ecology and earth sciences, remote sensing, advanced landscape and seascape ecology, generalized regression modeling, scientific visualization, forest models, statistical methods, forest policy analysis, advanced silviculture, quantitative ecology, GIS in water resources, ecological sampling, theory of statistics, applied multivariate design, advanced experimental design, remote sensing I, time series **Contacts:** Hailemariam, Kiser, Maguire, Strimbu, Wing

**Forest Operations Planning and Management**—Planning, organizing, and executing forest plans; enhancing supply chain efficiency and improving international competitiveness. Supporting course work often draws from tactical and operational planning, geospatial data and analysis, forest policy analysis, industrial systems optimization, advanced silviculture, harvesting management, organization leadership and management, marketing and innovation in renewable materials forestry supply chain management, forest geomatics, forest transportation systems, forest operations regulations and policy issues, heuristics for combinatorial optimization, forest wildlife habitat management, industrial systems optimization, statistical methods, forest biometrics, unmanned aircraft system remote sensing, forest transportation systems, techniques for forest resource analysis, forest operations analysis, operations regulations and policy issues, mathematical statistics **Contacts:** Belart, Chung, Lyons, Sessions, Strimbu

**Forest Policy Analysis and Economics**—Analyzing tradeoffs in the forest and resource policy decision process; public land use policy; interpretations of regulations; markets for forest products; forest certification; theoretical and applied research related to ecosystem services. Supporting course work often draws from natural resource policy and law, microeconomic theory, environmental policy and law interactions, forest policy analysis, economics of the forest resource, applied and advanced econometrics, heuristics for combinatorial optimization, global context of the forest sector, techniques for forest resource analysis, economics and policy of forest wildland fire, silvicultural influences on forest ecosystem dynamics, wildland fire science management, time series; and work in other fields to support thesis or dissertation research. This area of concentration is jointly sponsored by FERM, the Applied Economics Graduate Program and the Applied Economics Department. **Contacts:** Cushing, Huntington, Kuusela, Souder

**Forest Soil and Watershed Processes**—Understanding watershed conditions and processes in forested ecosystems and the effects of management activities; evaluating and improving soil and water quality and related practices and policies for forest operations. Supporting course work often draws from forest hydrology, soil physics, environmental soil chemistry, geomorphology and landscape ecology, geospatial data analyses, principles of fluid mechanics, stream ecology, nutrient cycling, snow hydrology, river engineering, natural resources and forest ecosystems analysis, mineral organic matter interactions, open channel flow, managing forest nutrition, GIS in water resources, ecological restoration stream ecology, mineral-organic matter interactions, limnology, design and analysis of planned experiments, statistical methods, sediment transport, principles of stable isotopes, advanced forest soils, watershed processes, forest hydrology, principles of stable isotopes, environmental soil chemistry, properties and functions of soils, regional hydrologic modeling, mineral organic matter interactions, soil morphology and classification. **Contacts:** Bladon, Hatten, Segura, Souder

**Silviculture, Fire, and Forest Health**—Manipulating vegetation to achieve management objectives, from restoration to intensive timber production; fire ecology and fire management; forest ecosystem health. Supporting course work often draws from advanced silviculture, geospatial data analysis, forest Pathology, forest entomology, environmental policy and law interactions, natural resource policy and law, plant pathology, community structure and analysis, wildland fire science and management, ecological restoration, forest policy analysis, statistical methods, sampling methods, forest hydrology, water quality and forest land use, natural resource data analysis, advanced forest community ecology, wildland fire ecology, biology of invasive plants,

forest wildlife habitat management, global change ecology, weed management, advanced landscape and seascape ecology, quantitative ecology, and ecological sampling. **Contacts:** Bailey, Davis, Fitzgerald, Gonzalez-Benecke, Kiser, LeBoldus, Maguire, Powers, Shaw

## **Professional Pathway Foci**

**Forest Business for Private Landowners**—Applying business techniques to assist management decisions for private forest landowners. **Contact:** Cushing

**Spatial Science and Analysis**—Application of spatial science and tools for managing natural resources. **Contact:** Wing

**Silviculture, Fire, and Forest Health**—Managing forest vegetation dynamics and ecosystem processes to achieve a range of management objectives. **Contact:** Powers

**Major Code: 1090**