

FOREST ENGINEERING (FE)

FE 101, INTRODUCTION TO FOREST ENGINEERING, 2 Credits

Introduction to the forest engineering discipline. Discussion of critical issues, available resources, career opportunities and professional opportunities. Overview of field instruments and analytical approaches.

FE 102, FOREST ENGINEERING PROBLEM SOLVING AND TECHNOLOGY, 3 Credits

A technology applications course designed to introduce students to formulating and implementing computational solutions to engineering analysis and design problems in a digital environment. Students will learn to evaluate engineering problems, formulate one or more solution techniques or algorithms, and code the solution using spreadsheet and/or programming software. Professionalism in completing and presenting laboratory exercises is emphasized. Laboratory examples draw from a variety of engineering topics. This course may be substituted for CE 102, Civil Engineering I: Problem Solving and Technology.

Equivalent to: FE 215

Recommended: Calculus

FE 206, ENGINEERING FOREST BIKING TRAILS, 2 Credits

Students will design trails that mitigate impact on the environment and other trail users, while still providing a fun experience for mountain bike riders. Topics include site classification, trail safety, water management, digital terrain models, and commercial road design software. This course will emphasize field and design work.

FE 208, FOREST SURVEYING, 4 Credits

Introduction to theory and practice of surveying methods and measurements as applied to the specifics of forestry problems and their solutions. This is the first of a four-course sequence (FE 208, 209, 310, 311). Together with FE 257 it is designed to prepare students for the Fundamentals of Land Surveying exam, which is necessary to become a professional land surveyor.

Prerequisite: MTH 112 with C or better or MTH 241 with C or better or MTH 251 with C or better or MTH 251H with C or better or MTH 252 with C or better or MTH 252H with C or better

Equivalent to: FE 308

Available via Ecampus

FE 209, FOREST PHOTOGRAMMETRY AND REMOTE SENSING, 4 Credits

Management and conservation of natural resources with the fundamentals of spatial data acquisition from airborne and spaceborne sensors. Introduction to theory of spectral reflectance properties of vegetation, the principles of photographic analysis and aerial photo-interpretation and new advances such as LIDAR.

Prerequisite: MTH 112 with C or better or MTH 241 with C or better or MTH 251 with C or better or MTH 251H with C or better or MTH 252 with C or better or MTH 252H with C or better

Equivalent to: FE 309

Available via Ecampus

FE 257, GIS AND FOREST ENGINEERING APPLICATIONS, 3 Credits

An introduction to the appropriate use and potential applications of geographic information systems (GIS) and related technologies (GPS and remote sensing) in forest management and operational planning and problem solving. Students are presented with lectures and exercises that cover a wide range of GIS and GIS-related topics and issues including spatial database creation, structure, analysis, and modeling. Lec/lab.

Equivalent to: FE 357

Available via Ecampus

FE 307, JUNIOR SEMINAR, 1 Credit

College is the time to develop the skills necessary for the transition between academics and career. In conjunction with the expertise already available on campus, this course will guide students through career planning, exploration, placement, and employer expectations. CROSSLISTED as FE 307/FOR 307.

Equivalent to: FOR 307

FE 310, FOREST ROUTE SURVEYING, 4 Credits

Route surveying and site surveying applied to forestry problems. Use of surveying equipment; traversing; computations; leveling; horizontal, vertical, compound, reverse and spiral curves; earthwork; construction staking as applied to new road and existing road P-line survey. Includes rapid survey techniques. Lec/lab.

Prerequisite: (FE 208 with C or better or FE 308 with C or better) or CE 361 with C or better or CEM 263 with C or better

FE 312, FORESTRY FIELD SCHOOL, 2 Credits

A hands-on experience in the major aspects of forestry, including regeneration surveys, silviculture, cruising, recreation, forest disturbances, logging site and mill visits, east and west of the Cascades Range. CROSSLISTED as FE 312/FOR 312.

Equivalent to: FOR 312

FE 315, SOIL ENGINEERING, 4 Credits

Use of soil in engineering and construction. Identification and classification. Engineering properties of soil: permeability, compressibility, and strength. Compaction principles and methods. Field control of soil engineering projects.

Prerequisite: ENGR 213 (may be taken concurrently) with D- or better

Recommended: CE 311 or CEM 311 or FE 330

FE 316, SOIL MECHANICS, 4 Credits

Soil strength and soil mechanics theories applied to analysis of slope stability, retaining structures, foundations, and pavements. Lec/lab.

Prerequisite: FE 315 (may be taken concurrently) with C- or better or CE 372 (may be taken concurrently) with D- or better

FE 330, FOREST ENGINEERING FLUID MECHANICS AND HYDRAULICS, 3 Credits

Fluid properties, pressure, fluid statics, continuity, energy equation, single and series pipe flow, open channel hydraulics, peakflow estimates for culvert design, stream crossing design. Lec/lab.

Prerequisite: ENGR 213 (may be taken concurrently) with D- or better and FE 102 (may be taken concurrently) [C-]

Equivalent to: FE 431

FE 370, HARVESTING OPERATIONS, 4 Credits

Timber harvesting and transport methods from the forest to the mill. Technical feasibility, economic, and environmental relationships in forestry operations. Junior standing in forestry required. For non-forest engineering students.

Prerequisite: PH 201 with C or better or PH 211 with C or better

FE 371, HARVESTING PROCESS ENGINEERING, 4 Credits

Timber harvesting equipment and systems. Harvesting process evaluation and decisions aided by forest engineering analysis. Lec/lab.

Prerequisite: ENGR 211 with C or better and FE 102 [C]

Recommended: Concurrent enrollment in FE 208 and FE 357

FE 403, THESIS, 1-16 Credits

PREREQ: Departmental approval required.

This course is repeatable for 16 credits.

FE 405, READING AND CONFERENCE, 1-16 Credits

This course is repeatable for 16 credits.

FE 406, PROJECTS, 1-16 Credits

This course is repeatable for 16 credits.

FE 407, SEMINAR, 1-16 Credits

This course is repeatable for 16 credits.

FE 415, FOREST ROAD ENGINEERING, 3 Credits

Location, surveying, design, cost estimation, and construction practices for forest roads. Lecture on principles, and laboratory field practice in locating, surveying, designing, and cost estimating.

Prerequisite: FE 310 with C- or better

FE 416, FOREST ROAD SYSTEM MANAGEMENT, 4 Credits

Structural characteristics of bridges, load rating, structural design of culverts, aggregate testing and evaluation, environmental assessment of forest road systems, road maintenance cycles and management.

Prerequisite: (ENGR 211 with D- or better or ENGR 211H with D- or better) and (ENGR 213 [D-] or ENGR 213H [D-]) and FE 316 [C-] and FE 415 [C-]

FE 423, UNMANNED AIRCRAFT SYSTEM REMOTE SENSING, 3 Credits

Unmanned Aircraft System (UAS) Geomatics presents techniques in UAS design and applications for remote sensing measurements of both natural and constructed landscapes.

Prerequisite: FE 309 with C or better or GEOG 480 with C or better or GEOG 481 with C or better or GEO 444 with C or better or GEO 466 with C or better

FE 430, WATERSHED PROCESSES, 4 Credits

Effects of land use practices on the physical hydrology (interception, infiltration, evapotranspiration, subsurface flow and surface runoff, water yields, and peak flows) of forested watersheds. Surface erosion, mass soil movements, stream temperatures, nutrient levels and effects of management activities upon riparian systems; forest practice rules. Lec/lab.

Available via Ecampus

FE 434, FOREST WATERSHED MANAGEMENT, 4 Credits

Physical hydrology, erosion processes, streams, and riparian areas of forested ecosystems. The material can be widely applied, but is applicable primarily to the humid, temperate rainforests of the Pacific Northwest.

Prerequisite: (CH 121 with C or better or CH 201 with C or better or CH 231 with C or better) and (SOIL 205 [C] or CSS 305 [C] or CSS 205 [C]) and (MTH 241 [C] or MTH 251 [C] or MTH 251H [C])

FE 436, FOREST DISTURBANCE HYDROLOGY, 3 Credits

Impacts of forest disturbance, including timber harvest, wildfire, insect outbreaks, and low frequency storms and floods on watershed hydrology and streams.

Prerequisite: FE 434 with C or better

Equivalent to: FE 435

FE 440, FOREST OPERATIONS ANALYSIS, 4 Credits

Identification and measurement of production components in harvesting systems. Methods analysis, productivity improvement and engineering economics. Report writing skills emphasized. Lec/lab.

Prerequisite: FE 102 with C- or better and (FE 370 [C-] or FE 371 [C-])

Recommended: Basic statistics

FE 444, FOREST REMOTE SENSING AND PHOTOGRAMMETRY, 4 Credits

Introduction to spectral reflectance, photogrammetry, image analysis, and point clouds. Fundamentals of data acquisition with passive and active sensors installed on airborne and spaceborne platforms. Radar and lidar in forestry. Lec/lab.

Prerequisite: FE 257 with C or better and (MTH 112 [C] or MTH 241 [C] or MTH 251 [C] or MTH 251H [C] or MTH 252 [C] or MTH 252H [C]) and (PH 201 [C] or PH 211 [C])

FE 456, *INTERNATIONAL FORESTRY, 3 Credits

An introduction to the biological, physical, and sociological factors that shape the world's forests and the activities used to manage those forests. What influence these factors have on forest policies, practices, and outcomes. CROSSLISTED as FE 456/FOR 456. (Bacc Core Course)

Attributes: CSGI – Core, Synth, Global Issues

Equivalent to: FOR 456

Recommended: Introductory course in biology.

FE 457, TECHNIQUES FOR FOREST RESOURCE ANALYSIS, 4 Credits

Use of linear programming, nonlinear programming, dynamic programming, and simulation to solve complex forest management problems, with emphasis on intertemporal multiple-use scheduling. Forestry transportation problems, multiple-use allocation, and investment analysis. Field trips required. CROSSLISTED as FE 457/FOR 457 and FE 557/FOR 557.

Prerequisite: FOR 329 with C or better and FOR 441 [C] and FOR 443 [C]

Equivalent to: FOR 457

FE 459, FOREST MANAGEMENT PLANNING AND DESIGN I, 4 Credits

Integration of environmental, economic, and social aspects of forestry in management planning. Development of strategic and tactical plans using diverse data types and sources. Senior capstone class projects. Lec/lab. CROSSLISTED as FE 459/FOR 459.

Prerequisite: FE 457 with C or better or FOR 457 with C or better

Equivalent to: FOR 459

FE 460, ^FOREST OPERATIONS REGULATIONS AND POLICY ISSUES, 3 Credits

Reviews regulations and other policies that affect timber harvesting and other forest practices, particularly policies that address concerns of environment, safety, employment and transportation. Discusses how such rules and other policies evolve, including the role of public perceptions, forestry professionals and other key policy players. (Writing Intensive Course)

Attributes: CWIC – Core, Skills, WIC

FE 469, FOREST MANAGEMENT PLANNING AND DESIGN II, 4 Credits

A team-based, project-centric course for integrated timber harvest planning. Establish tactical and operational planning goals and constraints, identify feasible harvesting and transportation systems, and design harvest units to meet objectives and constraints. Lec/lab. CROSSLISTED as FE 469/FOR 469.

Prerequisite: FE 459 with C or better or FOR 459 with C or better

Equivalent to: FOR 469

FE 470, LOGGING MECHANICS, 4 Credits

Relationship of torque, power, and thrust to the operation of cable and ground-based harvesting systems. On-highway and off-highway heavy truck performance.

Prerequisite: (ENGR 211 with D- or better or ENGR 211H with D- or better) and ENGR 213 [D-] and FE 371 [C-]

FE 471, HARVESTING MANAGEMENT, 3 Credits

Verification of harvesting assessment plans and operational planning/field layout. Practical logging skills related to harvest planning, operations monitoring, and designing worker training programs. Lec/lab.

Recommended: FE 371 and FE 470

FE 472, MECHANIZED HARVESTING AND SIMULATION, 2 Credits

Study of harvesters, forwarders, and processing of timber for maximizing stand value. The use of a harvesting simulator will provide for a hands-on approach to learning.

Recommended: FOR 321

FE 479, SLOPE AND EMBANKMENT DESIGN, 3 Credits

A comprehensive overview of evaluating stability and performance for natural and engineered slopes. Design aspects include construction of road embankments, slope remediation techniques and application of geosynthetics for slope stabilization, slope and wall construction, and drainage. CROSSLISTED as CE 479/FE 479 and CE 579/FE 579.

Prerequisite: CE 373 with C or better or FE 316 with C or better

Equivalent to: CE 479

FE 480, FOREST ENGINEERING PRACTICE AND PROFESSIONALISM, 1 Credit

Personal and professional skills, attributes, and issues in forest engineering practice. Includes topics such as ethics, land stewardship, media relations and risk management.

FE 499, SPECIAL TOPICS, 1-16 Credits

This course is repeatable for 8 credits.

FE 501, RESEARCH AND SCHOLARSHIP, 1-16 Credits

This course is repeatable for 16 credits.

FE 503, THESIS, 1-16 Credits

This course is repeatable for 999 credits.

FE 505, READING AND CONFERENCE, 1-16 Credits

This course is repeatable for 16 credits.

FE 506, PROJECTS, 1-16 Credits

This course is repeatable for 16 credits.

FE 507, SEMINAR, 1-16 Credits

Subject matter as required by graduate programs.

This course is repeatable for 16 credits.

FE 515, FOREST ROAD ENGINEERING, 3 Credits

Location, surveying, design, cost estimation, and construction practices for forest roads. Lecture on principles, and laboratory field practice in locating, surveying, designing, and cost estimating.

Recommended: Basic surveying

FE 516, FOREST ROAD SYSTEM MANAGEMENT, 4 Credits

Structural characteristics of bridges, load rating, structural design of culverts, aggregate testing and evaluation, environmental assessment of forest road systems, road maintenance cycles and management.

Recommended: FE 415 or FE 515

FE 523, UNMANNED AIRCRAFT SYSTEM REMOTE SENSING, 3 Credits

Unmanned Aircraft System (UAS) Geomatics presents techniques in UAS design and applications for remote sensing measurements of both natural and constructed landscapes.

Prerequisite: GEOG 580 with C or better or GEOG 581 with C or better or GEO 544 with C or better or GEO 566 with C or better or OC 678 with C or better

FE 530, WATERSHED PROCESSES, 4 Credits

Effects of land use practices on the physical hydrology (interception, infiltration, evapotranspiration, subsurface flow and surface runoff, water yields, and peak flows) of forested watersheds. Surface erosion, mass soil movements, stream temperatures, nutrient levels and effects of management activities upon riparian systems; forest practice rules. Lec/lab.

FE 532, FOREST HYDROLOGY, 4 Credits

Physical hydrology, erosion processes, and attributes of stream ecosystems for forested watersheds. Material can be widely applied, but is applicable primarily to the humid, temperate rainforests of the Pacific Northwest. Lec/rec.

Recommended: BEE 512 or introductory hydrology course

FE 536, FOREST DISTURBANCE HYDROLOGY, 3 Credits

Impacts of forest disturbance, including timber harvest, wildfire, insect outbreaks, and low frequency storms and floods on watershed hydrology and streams.

Recommended: FE 434

FE 540, FOREST OPERATIONS ANALYSIS, 4 Credits

Identification and measurement of production components in harvesting systems. Methods analysis, productivity improvement and engineering economics. Report writing skills emphasized. Lec/lab.

Recommended: FE 102 and (FE 370 or FE 371) and basic statistics.

FE 544, FOREST REMOTE SENSING AND PHOTOGRAMMETRY, 4 Credits

Introduction to spectral reflectance, photogrammetry, image analysis, and point clouds. Fundamentals of data acquisition with passive and active sensors installed on airborne and spaceborne platforms. Radar and lidar in forestry. Lec/lab.

Recommended: FE 257 and (MTH 112 or MTH 241 or MTH 251 or MTH 251H or MTH 252 or MTH 252H)

FE 545, SEDIMENT TRANSPORT, 4 Credits

Principles of sediment erosion, transportation and deposition in rivers, reservoirs, and estuaries; measurement, analysis, and computational techniques. Offered even years in winter term. CROSSLISTED as BEE 545/FE 545.

Equivalent to: BEE 545

Recommended: CE 313 or FE 330

FE 552, FOREST TRANSPORTATION SYSTEMS, 4 Credits

Analysis of interactions between harvesting and road systems. Advanced topics in road and landing spacing, determination of road standards, analysis of logging road networks, transfer and sort yard facility location. Simultaneous resource scheduling and transportation planning.

Recommended: FE 102 and (FE 440 or FE 540)

FE 555, FOREST SUPPLY CHAIN MGMT, 3 Credits

Develop and implement operational planning and logistics scheduling systems to manage a forestry supply chain for typical forest organizations in the Pacific Northwest. Once developed, these supply chain plans will be implemented using simulation software that will allow students to view the results of their forest operations plans.

Recommended: (CS 151 or FE 102) and FE 357 and FOR 457

FE 557, TECHNIQUES FOR FOREST RESOURCE ANALYSIS, 4 Credits

Use of linear programming, nonlinear programming, dynamic programming, and simulation to solve complex forest management problems, with emphasis on intertemporal multiple-use scheduling. Forestry transportation problems, multiple-use allocation, and investment analysis. Field trips required. CROSSLISTED as FE 457/FOR 457 and FE 557/FOR 557.

Equivalent to: FOR 557

Recommended: FOR 329 and FOR 441 and FOR 443

FE 560, FOREST OPERATIONS REGULATIONS AND POLICY ISSUES, 3 Credits

Reviews regulations and other policies that affect timber harvesting and other forest practices, particularly policies that address concerns of environment, safety, employment and transportation. Discusses how such rules and other policies evolve, including the role of public perceptions, forestry professionals and other key policy players.

FE 570, LOGGING MECHANICS, 4 Credits

Relationship of torque, power, and thrust to the operation of cable and ground-based harvesting systems. On-highway and off-highway heavy truck performance.

Recommended: ENGR 211 and ENGR 213 and FE 371

FE 571, HARVESTING MANAGEMENT, 3 Credits

Verification of harvesting assessment plans and operational planning/field layout. Practical logging skills related to harvest planning, operations monitoring, and designing worker training programs.

Recommended: FE 371 and FE 470

FE 579, SLOPE AND EMBANKMENT DESIGN, 3 Credits

A comprehensive overview of evaluating stability and performance for natural and engineered slopes. Design aspects include construction of road embankments, slope remediation techniques and application of geosynthetics for slope stabilization, slope and wall construction, and drainage. CROSSLISTED as CE 479/FE 479 and CE 579/FE 579.

Equivalent to: CE 579

Recommended: CE 373 or FE 316

FE 599, SPECIAL TOPICS, 1-16 Credits

This course is repeatable for 16 credits.

FE 601, RESEARCH AND SCHOLARSHIP, 1-16 Credits

This course is repeatable for 16 credits.

FE 603, THESIS, 1-16 Credits

This course is repeatable for 999 credits.

FE 605, READING AND CONFERENCE, 1-16 Credits

This course is repeatable for 16 credits.

FE 606, PROJECTS, 1-16 Credits

This course is repeatable for 16 credits.

FE 607, SEMINAR, 1-16 Credits

Subject matter is required by graduate programs.

This course is repeatable for 16 credits.

FE 640, SPECIAL TOPICS IN FOREST ENGINEERING, 1-3 Credits

Recent advances in logging engineering, forest engineering, and forest operations. Content will vary with instructor. May be retaken for credit.

This course is repeatable for 99 credits.