

2007-09 Cal Poly Catalog

Updated Course Descriptions.

See catalog pages as printed for [original descriptions](#).

[Natural Resources Management Department](#)

FNR–FORESTRY AND NATURAL RESOURCES

FNR 101 Natural Resources Management and Society (3)

Integrated development, utilization and management of the nation's and world's natural resources for the continuous benefit of humankind and the conservation of the resources. Discussion of natural resources management practices and technologies which may provide a more flexible range of societal benefits for the wise use of our natural resources. 3 lectures.

FNR 112 Parks and Outdoor Recreation (3)

Introduction to national, state, county, city and private park systems. History, philosophy, policy and principles of the formation, administration and functioning of wildland recreational units at the park, county, regional, national, and international levels. 3 lectures.

FNR 140 Careers in Forestry and Environmental Management (1) (CR/NC)

Analysis and development of career goals in natural resources. Acquainting students with potential career options and preparation of academic plans at Cal Poly. Credit/No Credit grading. 1 activity.

FNR 201 Introduction to Forest Ecosystem Management (3)

Fundamentals of forestry including basic silviculture, forest protection, measurement and policy. Integrated resource management of forest lands for water production, forage, recreation, wildlife, and timber. 3 lectures.

FNR 202 Environmental Management (3)

Environmental management as a process within functioning societies seeking a harmonious balance between human activities and intrinsic behavior of the natural environment. Major components of the natural environment and the political and social activities that impact that environment. 3 lectures.

FNR 203 Resource Law Enforcement (3) (Also listed as REC 203)

Law enforcement applied to natural resource conservation on public and private lands. Examination of state and federal laws related to fish and wildlife management. Problems associated with implementation of resource laws examined. 3 lectures.

FNR 204 Wildland Fire Control (3)

Fire control techniques used on various wildland fuels. Elementary fire physics, fuels, weather, fire behavior, tactics and fire suppression techniques, line construction, "mop-up", fire line safety, air operations and fire organization. Meets basic wildland fire fighter certification requirements for the USDA Forest Service. Partially meets California Department of Forestry Firefighter I requirements. 2 lectures, 1 laboratory.

FNR 208 Dendrology (4)

Identification, classification, silvical characteristics, distribution, environmental requirements and economic importance of woody plants in shrub, woodland, and forest ecosystems of the United States. Emphasis on species located in the Pacific Coastal, Sierran, and Cascade ecosystems. 2 lectures, 2 laboratories. Recommended prerequisite: BOT 121 or BIO 152.

FNR 215 Land and Resource Measurements (2)

Introduction to land and resource measurement technology and methods – field instruments, property description, map and photograph reconciliation, data accuracy and precision. Trigonometric functions and fundamental identities especially as applied to natural resources applications. Course may be offered at Swanton Pacific Ranch during week prior to beginning of fall quarter, or weekend field trips. 1 lecture, 1 laboratory.

FNR 220 Forest Resources Enterprise Project (1–4) (CR/NC)

Selection and completion of a forest management/production project under faculty supervision. Project participation is voluntary and subject to approval by the department head and the Cal Poly Corporation. Degree credit limited to 8 units. Credit/No Credit grading only. Prerequisite: FNR 201 or equivalent.

FNR 247 Forest Surveying (2) (Also listed as BRAE 247)

Use and care of tapes, staff compass, abney levels, theodolites, and GPS receivers. Keeping field notes, measurements by tape. Closed and open traverse by compass and theodolite. Turning angles and determining directions of lines. Map reading and public land description. GPS measurements. Weekend field trips required. 1 lecture, 1 laboratory. Prerequisite: MAPE Score 8, prerequisite or concurrent: FNR 215. *Corrected effective Summer 2007.*

FNR 260 Forest Practices and Environmental Protection (4)

Relationships between forest ecosystem management, forest practices, harvesting methods, timber harvest planning, components of forest harvesting, harvesting effects; cost analysis of harvesting methods; safety management; value-added forest utilization; environmental protection; and road location. Overnight or weekend field trips required. 3 lectures, 1 laboratory. Prerequisite: FNR 201. Recommended: FNR 247.

FNR 290 Intercollegiate Forestry Activities (1) (CR–NC)

Beginning through advanced skills in the event areas of college forestry activities. Instruction in use of specialized equipment and safety. Minimum of 4 hours of laboratory per week. Total credit limited to 8 units. Credit/No Credit grading only. Prerequisite: Enrollment limited to those qualified to compete in intercollegiate forestry activities and consent of instructor.

FNR 300 Computer Applications in Resource Management (2) (Also listed as REC 300)

Resource management applications of microcomputers. Software programs include forest and natural resource management planning, forecasting, analysis of systems, and resource data base management for multiple use objectives. Use of forestry and natural resource examples. 1 lecture, 1 laboratory. Prerequisite: Consent of instructor.

FNR 306 Natural Resource Ecology and Habitat Management (4)

Resource ecology and management implications in the major ecosystems of North America. Importance of maintaining the natural dynamics of energy flow and nutrient cycles at the community and ecosystem level for the benefit of society. Humanity's role as a principal factor of change of the resources in natural systems. 3 lectures, 1 laboratory. Prerequisite: BIO 162 or BOT 121 or equivalent.

FNR 307 Fire Ecology (3)

Effects of wildland fires on shrub, woodland, and forest environments to include fuels, plants, soil, water, wildlife, and air. Emphasis on western U.S. forest and shrub ecosystems. 2 lectures, 1 laboratory. Prerequisite: FNR 201; recommended: FNR 306.

FNR 308 Fire and Society (4) (Also listed as ES 308)

GE D5

Prehistorical and historical record of human use of and attitude toward fire. Mythology and religion of fire. Traditional, cultural and ethnic variations and their influence on modern U.S. institutions involved in managing fire. 3 lectures, 1 activity. Prerequisite: Completion of GE Areas A, D1 and D3.

FNR 311 Environmental Interpretation (4) (Also listed as REC 311)

Interpretation of the biological, physical and aesthetic values of the natural elements of our environment; organization and presentation of interpretive materials by oral, written, and display methods of communication. 3 lectures, 1 laboratory. Prerequisite: COMS 101 or COMS 102.

FNR 312 Technology of Wildland Fire Management (4) GE Area F

Models and technology to solve complex land management problems. Historic, current and future perspectives of wildland fire in California. Sustainability and ecosystem health. Assumptions and limitations of fire behavior and suppression models. 3 lectures, 1 activity. Prerequisite: Completion of GE Area B, and junior standing.

FNR 315 Measurements and Sampling in Forested Environments (4)

Principles and methods of sampling and measurement for forest and natural resource quantities and qualities. Modeling and estimation for tree volumes, stand structure and composition, and related forest vegetation. Applications in sampling, statistical and inventory techniques. 2 lectures, 2 laboratories. Overnight, weekend field laboratories required. Prerequisite: STAT 217/218, BRAE/FNR 247; recommended: MATH 161 or MATH 221 or equivalent.

**FNR 317 The World of Spatial Data and Geographic Information Technology (4) GE Area F
(Also listed as BIO/GEOG/LA 317)**

Basic foundation for understanding the world through geographic information and tools available to utilize spatial data. Application of Geographic Information Systems (GIS) and related technologies, including their scientific basis of operation. Not open to students with credit in FNR 318. 3 lectures, 1 activity. Prerequisite: A course in computer science, completion of Area B, and junior standing.

FNR 318 Applications in GIS (3) (Also listed as LA 318)

ARC/INFO and ArcView Geographic Information System (GIS) computer software to explore environmental, natural resource, social and economic issues using spatial data. Develop and apply data base and software management competencies. 1 lecture, 2 laboratories. Prerequisite: Junior standing, computer literacy or consent of instructor.

FNR 319 Natural Resource Ecology, Theories and Applications (4) (Also listed as HNRS 319) GE B5

Scope and nature of "ecology" in modern society, including resource terminology and classifications systems; dynamics of natural systems (energy exchange and cycles); man's role as a principle agent of change; environmental impacts; historical perspective including people (ethnicity); and the future environment. 3 lectures, 1 laboratory. Prerequisite: Completion of GE Area B2.

**FNR 320 Watershed Management and Restoration (4)
(formerly FNR 419)**

Hydrologic cycle concepts and measurement. Analysis and measurement of watershed processes. Watershed management including restoration, erosion, and review of forest practice rules. Saturday and/or weekend field trip required. 3 lectures, 1 laboratory. Prerequisite: SS 121, FNR 306, FNR/LA 318.

FNR 321 Water Systems Technology, Issues and Impacts (4) GE Area F

Sustainable strategies and technologies to enhance freshwater supplies and marine habitats. Systems treated include artificial wetlands, stormwater, drinking water, agricultural and industrial waste water. 3 lectures, 1 activity. Prerequisite: Completion of GE Area B, and junior standing.

FNR 323 Human Dimensions in Natural Resources Management (4) GE D5

Social, economic, political and ecological conditions and institutions that influence decisions affecting the environment; examination of human-caused environmental impacts and how they in turn influence social institutions. 4 lectures. Prerequisite: Completion of GE Area A and two courses from Areas D1, D2, D3. Forestry and Natural Resources majors will not receive GE Area D5 credit.

FNR 326 Natural Resources Economics and Valuation (4)

Theory of efficient use of renewable and nonrenewable natural resources, including methods for attaching value to marketable and non-market natural resources. Environmental economic theories and techniques to address allocation of water, timber, wildlife/fisheries, open space, and recreation. 3 lectures, 1 activity. Prerequisite: MATH 161 or MATH 221 or equivalent, GE Area D2 (ECON 201 recommended), AGB 212 or consent of instructor.

FNR 335 Conflict Management in Natural Resources (4)

Application of behavioral science principles and techniques in the management of natural resource systems. Management of internal and external human resource issues and concerns in natural resources

organizations is emphasized. 3 lectures, 1 laboratory. Prerequisite: FNR 201 or FNR 202; PSY 201 or PSY 202 recommended.

FNR 339 Internship in Forest and Natural Resources (1-12) (CR/NC)

Selected students will spend up to 12 weeks with an approved firm or agency engaged in forest or natural resources management. Applying and developing managerial skills and abilities. One unit of credit may be allowed for each full week of completed and reported internship. Credit/No Credit grading. Prerequisite: Consent of instructor.

FNR 340 Wildland Fire Management (3)

Wildland fuels, fire weather, and fire danger ratings in chaparral, grassland, and forested areas. Advanced modeling of surface and crown fire behavior. Fire management strategies and implications, policies and objectives of fire management organizations. Saturday field trips may be required. 3 lectures. Prerequisite: FNR 204 or consent of instructor.

FNR 350 Urban Forestry (3)

Establishment and management of municipal forests, wildland-urban interface, wildlife habitat, and pollution abatement. Management of forest areas requiring special attention because of heavy recreational use, fire hazard, watershed, and societal values. Full-day field trips may be required. 2 lectures, 1 laboratory. Prerequisite: FNR 208.

**FNR 360 Ethnicity and the Land (4) GE C4 USCP
(Also listed as ES 360)**

A comparative study of the ethnic, cultural and gender influences that shape people's perceptions, attitudes and behavior toward terrestrial and aquatic resource values and uses. 4 lectures. Prerequisite: Completion of GE Area A and one course from Area C1, C2, or C3. Junior standing. Recommended: one lower division Ethnic Studies course and an introductory natural resources course.

FNR 362 Survey and Management of Mediterranean Ecosystems (4)

Woody vegetation found in worldwide Mediterranean ecosystems. Distribution, historical development and uses of these ecosystems. Emphasis on chaparral management techniques and effects of management on fire, water production, biomass potential. 3 lectures, 1 laboratory. Prerequisite: FNR 306 or equivalent.

FNR 365 Silviculture and Vegetation Management (4)

Applied forest ecology and prescriptions for achieving forest ecosystem management; dynamic relations among trees, biological communities, environmental factors, and land use. Vegetation manipulation and reforestation methods. Overnight and/or weekend field trips required. 3 lectures, 1 laboratory. Prerequisite: FNR 208, FNR 315; recommended: FNR 306.

FNR 400 Special Problems for Advanced Undergraduates (2-4)

Individual investigation, research, studies or surveys of selected problems. Total credit limited to 4 units. Prerequisite: Consent of department head.

FNR 402 Forest Health (4)

Impact and losses to forested areas caused by physical and biotic agents (such as insects and diseases) other than fire; relation of direct and indirect control practices to forest management. Saturday field trips required. 3 lectures, 1 laboratory. Prerequisite: FNR 208 or equivalent, FNR 306 or equivalent.

FNR 404 Environmental Law (3) (Also listed as CRP 404)

Detailed examination of the law governing use and protection of natural resources with focus on the legal institutions entrusted with the public duty of protecting the environment. 3 lectures. Prerequisite: Senior standing, or graduate standing, or consent of instructor. [Changed effective Fall 2008.](#)

FNR 408 Water Resource Law and Policy (3) (Also listed as CRP 408)

Detailed examination of the various legal systems of water use, regulation and management in California and the United States. Discussion on the key concepts and principles of state, federal and interstate water quantity and quality control; focusing on issues and problems, why conflicts occur and how solutions evolve. 3 lectures. Prerequisite: FNR 306 or equivalent or instructor approval, senior standing or graduate standing. [Changed effective Fall 2008.](#)

FNR 410 Resource Recreation Management (4)
(Also listed as REC 410)

Practices of management of resource recreation on private and public lands. Consideration of the following management systems: biophysical, user/visitor, facilities, equipment, fiscal, personnel will be made in the provision of resource recreation services. Case studies in mass recreation and wilderness areas will be examined. 3 lectures, 1 laboratory. Some weekend labs necessary. Prerequisite: FNR 112 or consent of instructor.

FNR 412 Forest and Natural Resources Senior Assessment Project (3)

Principles and practices of integrated sampling and inventory of natural resource values in terrestrial ecosystems, culminating in a student project report. 2 lectures, 1 laboratory. Prerequisite: FNR 306 or equivalent, and FNR 326.

FNR 414 Sustainable Forest Management (4)

Biophysical, economic, social and political influences on optimal forest management for purposes of providing sustained yields of goods and services. Growth and yield modeling; forest investment analysis; sustainable forest production; harvest schedule modeling. Day field trip required. 3 lectures, 1 laboratory. Prerequisite: FNR 326, FNR 365.

FNR 416 Environmental Impact Analysis and Management (4)

National Environmental Policy and California Environmental Quality Acts as applied to environmental and natural resource management problems and projects. Intent, purpose and history of the laws; differences between laws identified. Request for proposals and preparation of environmental assessment documents covered. 3 lectures, 1 laboratory. Prerequisite: FNR 306 or equivalent, and FNR 335 or equivalent.

FNR 417 Resource Recreation Planning (3) (Also listed as REC 417)

Development and analysis of resource recreation plans. Planning theory, types of plans, scheduling techniques, projecting supply and demand, application of models, and economic evaluations. Basic recreation planning skills examined. Examples emphasize planning for parks and recreation. 2 lectures, 1 laboratory. Prerequisite: FNR 112 or consent of instructor.

FNR 418 Applied GIS (3)

Acquisition, organization and analysis of spatial data from diverse sources using Geographic Information System (GIS) software. GIS modeling applications and validation techniques used in development and preparation of client-driven projects. 1 lecture, 2 activities. Prerequisite: FNR/LA 318.

FNR 420 Advanced Watershed Hydrology (4)

Sources of streamflow and processes by which watersheds undergo change from natural and anthropogenic processes. Fluvial processes, sediment transport and channel restoration techniques. Influences of forest and range management on water resources including water quality and analytical techniques. Weekend field trips required. 3 lectures, 1 laboratory. Prerequisite: FNR 320 or equivalent or graduate standing.

FNR 421 Wetlands (4) (Also listed as BIO/SS 421)

The formation, characteristics, and functions of wetlands. Genesis of hydric soils. Plant adaptations to saturated soils. Wetlands as wildlife habitat. Policies and social issues associated with wetlands. The procedures of wetland delineations. 3 lectures, 1 laboratory. Prerequisite: CHEM 128, BOT 313, SS 321.

FNR 425 Applied Resource Analysis (4)

Environmental impacts in responses to resource management, projects, programs and activities. Preparation, implementation, and coordination of environmental plans. Criteria for measurements, interpretation, and evaluation. Resource inventories, analysis, synthesis, evaluation, environmental assessment writing and preparation. 3 lectures, 1 laboratory. Prerequisite: FNR 416.

FNR 434 Wood Properties and Products (4)

Principles of wood properties and efficient use of renewable wood resources including methods for using wood as an energy source. Weekend or full-day field trips required. 3 lectures, 1 laboratory. Prerequisite: FNR 201 and FNR 260 or consent of instructor.

FNR 435 Natural Resources Policy Analysis (4)

Policy process approach to understanding the efforts to resolve natural resource problems in the public and private sector. Principles and techniques used to analyze the effects of environmental policies. Analysis of major federal and state environmental laws. 4 lectures. Prerequisite: FNR 326, FNR 335.

FNR 450 Community Forestry (3)

Development and management of the urban/wildland interface. Socio-economic problems related to forest tree establishment, care, and removal utilization. International implications also covered. Weekend or full-day field trips required. 2 seminars, 1 laboratory. Prerequisite: FNR 350 or consent of instructor.

FNR 455 Wildland-Urban Interface Fire Protection (3)

Social, economic, political, and technological issues affecting fire management in urbanized landscapes where fire continues its ecological role. Fire risk analysis; needs assessment, legislative codes, standards and policies; liability issues; evacuation; incident response planning. 2 lectures, 1 laboratory. Prerequisite: FNR 340 or consent of instructor.

FNR 461, 462 Senior Project I, II (3) (3)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 180 hours total time.

FNR 465 Ecosystem Management (4)

Applied integration of biophysical, economic and socio-political sciences. Principles, concepts and techniques designed to utilize resources while sustaining ecosystem health within acceptable limits of change. Ecosystem assessment, planning, management and monitoring project. 3 lectures, 1 laboratory. Prerequisite: FNR 326, FNR 416 and consent of instructor.

FNR 470 Selected Advanced Topics (1-4)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list topic selected. Total credit limited to 8 units. 1-4 lectures. Prerequisite: Consent of instructor.

FNR 471 Selected Advanced Laboratory (1-4)

Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list topic selected. Total credit limited to 8 units. 1-4 laboratories. Prerequisite: Consent of instructor.

FNR 472 Leadership Practice (1) (Also listed as REC 472)

Leadership styles used in the natural resources management and recreation administration professions. Study and practice in setting goals and objectives; developing, evaluating and implementing an entrepreneurial project plan; decision making and problem-solving. Total credit limited to 4 units. 1 laboratory. Prerequisite: Junior standing or consent of instructor.

FNR 475 Sustainable Forest and Environmental Practices (15)
(Also listed as HNRS 475)

Typical modules related to sustainable resource management: ecosystem sampling and inventory methods, photo interpretation, hydrologic resources, road condition, project impact analysis, best management practices. Topics covered vary from term to term depending on the priority for learning modules. Residency at Swanton Pacific and extended field trips required. 10 lectures, 5 activities. Prerequisite: Completion of Area B and consent of instructor.

FNR 500 Individual Study (1-3)

Advanced independent study planned and completed under the direction of a member of the department faculty. Open only to graduate students who have demonstrated ability to do independent work. Total credit limited to 4 units. Prerequisite: Graduate standing.

FNR 502 Resource Conservation (3)

Conservation, planning and administration for broad treatment of land, water, mineral, forest, range, and wildlife resources. 3 seminars. Prerequisite: Graduate standing and consent of instructor.

FNR 503 Tropical Forest Ecosystem Management (3)

Tropical forest ecosystem classification, function and limitations. Applied tropical forest management systems; tropical problems, management, and political strategies; over-grazing and desertification; overcutting and fuelwood shortages. 3 seminars. Prerequisite: Graduate standing or consent or instructor.

FNR 504 Agroforestry Systems (2)

Principles and practical applications of tree crop systems which are managed to provide fuel, fiber, fodder, and food. Tree crop identification and tree product uses. Plantation design, establishment, and cultural practices. Soil management. Integration of forest, and range management practices and values. Special applications to tropical forest ecosystems. 2 lectures. Prerequisite: Graduate standing or consent of instructor.

FNR 521 Natural Resources Management for Educators (3)

Philosophy (theoretical and applied) of natural resource management strategies functioning in today's environment. Ecological principles applicable to specific resource components as they relate to the present perception of today's resource base, use demands and projected utilization. 3 seminars. Prerequisite: Graduate standing.

FNR 530 Social Systems in Natural Resources Management (3)

Theories and methods for incorporating community in the management of forest resources. Approaches to conflict resolution between resource owners and community stakeholders using tools such as GIS. 2 lectures, 1 laboratory. Prerequisite: Graduate standing or consent of instructor.

FNR 532 Applications in Biometrics and Econometrics (4)

Parametric and semi-parametric statistical methods in modeling biological and economic phenomena. Biometric modeling of stand growth and inventory. Econometric modeling of market and environmental values. 3 lectures, 1 laboratory. Prerequisite: One course in undergraduate statistics, graduate standing, or consent of instructor.

FNR 534 Forest Ecosystem Modeling (3)

Methods and modeling approaches used in quantifying ecological processes and conditions associated with forested ecosystems, such as fire behavior, hydrologic processes, terrestrial and aquatic habitat condition using GIS and other models. The Schedule of Classes will list topic selected; sections not repeatable. 2 lectures, 1 laboratory. Prerequisite: One course in undergraduate statistics, graduate standing, or consent of instructor.

FNR 539 Graduate Internship in Forest Resources(1-9)

Application of theory to the solution of problems of forest resources or related businesses in the field. Analyze specific management problems and perform general management assignments detailed in a contract between the student, the firm or organization, and the faculty advisor before the internship commences. Degree credit limited to 6 units. Prerequisite: Consent of internship instructor.

FNR 570 Selected Topics in Forest Resources (1-4)

Directed group study of selected topics for advanced students. The Schedule of Classes will list topic selected. Total credit limited to 12 units. 1-4 seminars. Prerequisite: Graduate standing or consent of instructor.

FNR 571 Selected Topics in Forest Resources Laboratory (1-4)

Directed group laboratory of selected topics for advanced students. The Schedule of Classes will list topic selected. Total credit limited to 12 units. 1-4 laboratories. Prerequisite: Graduate standing or consent of instructor.

FNR 575 Applications in Advanced Watershed Hydrology (2)

Techniques and applications in watershed hydrology to real-world projects. Projects could include water quality or quantity assessments, water quality or channel morphology monitoring, and structural and non-structural enhancements for channel and upland watersheds, culminating in a final report and presentation. 2 laboratories. Prerequisite: FNR 420 and graduate standing, or consent of instructor.

FNR 581 Graduate Seminar in Forestry and Environmental Sciences (3)

Student study and presentation of selected developments, trends and problems in the field of forest and natural resources. 3 seminars. Prerequisite: Graduate standing or consent of instructor.

FNR 599 Thesis (1-9)

Individual research in forest or natural resources management under the general supervision of faculty, leading to a graduate thesis. Degree credit limited to 9 units. Prerequisite: Graduate standing and consent of instructor.