

**FORESTRY**

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**COLLEGE OF AGRICULTURAL SCIENCES**

**Aubertin, Gerald M.**, Associate Professor, *Emeritus*, Ph.D., Pennsylvania State University, 1964; 1976.

**Budelsky, Carl A.**, Assistant Professor, *Emeritus*, Ph.D., University of Arizona 1969; 1967.

**Burde, John H. II**, Professor, Ph.D., University of Arizona, 1974; 1974.

**Carver, Andrew**, Associate Professor, Ph.D., Purdue University, 1998; 1998.

**Chilman, Kenneth C.**, Associate Professor, *Emeritus*, Ph.D., University of Michigan, 1972; 1973.

**Davenport, Mae A.**, Assistant Professor, Ph.D., University of Minnesota, 2003; 2004.

**Fralish, James S.**, Associate Professor, *Emeritus*, Ph.D., University of Wisconsin, 1970; 1969.

**Groninger, John W.**, Associate Professor, Ph.D., Virginia Polytechnic Institute and State University, 1995; 1997.

**Kung, Fan H.**, Professor, *Emeritus*, Ph.D., Michigan State University, 1968; 1970.

**Mangun, Jean C.**, Associate Professor, Ph.D., Purdue University, 1991; 1996.

**McCurdy, Dwight R.**, Professor, *Emeritus*, Ph.D., Ohio State University, 1964; 1965.

**Phelps, John E.**, Professor and *Chair*, Ph.D., University of Missouri, 1980; 1990.

**Roth, Paul L.**, Professor, *Emeritus*, Ph.D., Kansas State University, 1968; 1967.

**Ruffner, Charles M.**, Assistant Professor, Ph.D., Pennsylvania State University, 1999; 1999.

**Williard, Karl W. J.**, Assistant Professor, Ph.D., Pennsylvania State University, 1999; 1999.

**Zaczek, James J.**, Associate Professor, Ph.D., Pennsylvania State University, 1994; 1997.

The Department of Forestry offers advanced courses for the Master of Science degree with a major in forestry. In addition, curricula are available which permit graduate students with an interest in forestry to pursue their interest in Doctor of Philosophy degree programs in other departments.

**Admission**

In addition to requirements set forth by the Graduate School, the Department of Forestry requires the following:

1. A minimum grade point average of 2.7 is required for admission ( $A = 4.0$ ). A grade point average of 2.7 or higher is required for stipend eligibility when available.
2. The student is required to provide proof of proficiency in technical writing. Normally an expository essay is required to evaluate whether the student should have remedial grammar or writing courses.
3. Three letters of recommendation from former professors, employers, or other responsible individuals are required.
4. Each applicant must complete the statement of interest form. This form indicates the student's area of interest in forestry and the faculty member with whom the student desires to study. All correspondence should be directed to the chair of the Department of Forestry.
5. A non-refundable application fee of \$25.00 must be submitted with the application. Attach your check or money order, payable to Southern Illinois University Carbondale (SIUC), to the top of the application form. Do not send cash. Only checks or money orders for U.S. dollars, payable to United States banks will be accepted.

**Retention and Completion Requirements**

Upon the graduate student's arrival on campus, an advisory committee of 3–5 members of the graduate faculty will be formed to guide the student's work. The same committee will be responsible for preparation and administration of thesis exams and also for the review and evaluation of the thesis. The advisory committee chair and at least one other member of the committee shall be members of the Department of Forestry. The other members may be selected from any academic unit including forestry.

*Summary of Events.*

1. The deadlines for receipt of applications and official transcripts in the office of the Graduate School are (a) the second Saturday in July for admission to the fall semester (b) the last Saturday in November for admission to the spring semester (c) the last Saturday in March for admission to the summer term.
2. Letters of recommendation should reach the Department of Forestry chair by the same dates as above.
3. Acceptance by department and Graduate School should be announced one month or earlier than the desired matriculation date. A thorough review will be made by a screening committee of Department of Forestry graduate faculty and the departmental adviser. Students rejected for admission will also be notified.
4. Registration for first semester's work after student's acceptance by the department.
5. Appointment of advisory committee chair, written plan for course work, and selection of tentative thesis areas all within first 2 months of residence.
6. Preparation of formal written thesis outline and preparation of research proposal by the eighth week of the second semester.
7. Completion of final, typed or reproduced review copies of thesis and submission of advisory committee at least 3 weeks in advance of oral defense of thesis.

8. Oral exam to be followed by completion of required approval forms. If thesis requires modifications, this should be accomplished immediately to reach the graduate dean's office in due time set by the Graduate School. One bound copy of the thesis will be provided for the department, one for the chair of the advisory committee in addition to two copies required for the Graduate School and a copy for the author. Additional copies may be required for projects sponsored by outside agencies.

### **Master of Science Programs**

The Department of Forestry offers Master of Science students the opportunity to tailor their program to address their interests and career aspirations. Individual programs of study and research are developed by students in consultations with their faculty advisor to ensure timeliness and feasibility. Concentrations included forest resource management, outdoor recreation resource management, and wood science and technology. In addition, recent programs have incorporated further specialization in ecological restoration, forest recreation, human dimensions of natural resource management, riparian forest management, watershed management, and others. Interdisciplinary research is encouraged. Prospective students should review the description of departmental graduate courses described later in this document. Also, please visit the Department's web site for a current description of faculty interests and expertise.

*Assistantships and Fellowships.* Research assistantships are sponsored each year by the McIntire-Stennis Cooperative Forest Research Act and through several externally funded research projects. Teaching assistantships funded by the College of Agricultural Sciences are also available.

In addition to general awards made through the Graduate School, stipends for research studies are available from the U.S.D.A. Forest Service, the U.S. Department of Interior, other federal and state agencies, and private corporations.

### **Requirements**

Since the normal minimum requirement for graduation is 32 semester hours, the completion of degree work for students holding assistantships should be accomplished within four semesters (including summer) which is also the normal maximum span for financial aid.

The student must attain a grade of *B* or better for all courses specifically required in the student's academic program and which are offered by the Department of Forestry.

To gain teaching experience, graduate students are expected to assist in the classroom or laboratory for at least 1 academic semester (20 hours per week) during their tenure with the Department of Forestry. The remaining semesters will also involve either research or teaching at the rate of 20 hours a week. All graduate students are required to enroll in Seminar (FOR 501) during each semester of residency for which they will receive 1 semester hour of credit.

### **Staff**

In addition to the faculty listed in the Graduate School Catalog, several adjunct professors also hold appointments with the Department of Forestry. These professors are assigned to various natural resource agencies and can serve on graduate guidance committees.

*Research Facilities Land.* SIUC is well endowed with a number of different forest types which are available to the Department of Forestry for teaching and research purposes. In particular, we are conducting or planning research and demonstration programs on forest plots and experimental fields of the 3000 acres of the University and its experimental farms. We also have access to wooded lands of the 600 acres of the Touch of Nature Environmental Center, 400 acres at the Pine Hills Field Research Station, and other forests.

Through various memoranda of understanding and special use permits we have use of forested lands and plots on the 43,000 acres of the Crab Orchard Wildlife Refuge, the 270,000 acres of the Shawnee National Forest, and the 4000 acres of the Trail of Tears State Forest, all of which are within an hour's drive of Carbondale. A number of research projects are also ongoing on private lands in southern Illinois. Graduate research has also been conducted throughout the country through agreements with the U.S. Forest Service Experiment Stations and the U.S. Department of Interior, as well as internationally.

*Physical Facilities.* A variety of laboratories are housed within the department, including those specializing in historical ecology and fire, GIS, human dimensions, and water quality. A research greenhouse operated at the Tree Improvement Center on the western side of the campus is in operation for research and graduate teaching. Greenhouses and growth chamber facilities in the agriculture greenhouses in conjunction with the Department of Plant, Soil, and General Agriculture are also available.

### **Courses (FOR)**

Courses in this department may require the purchase of supplemental materials. Field trips are required for certain courses.

**401-3 Fundamentals of Environmental Education.** (Same as Agriculture 401 and Recreation 401.) A survey course designed to help education majors develop an understanding of environmental education principles and teaching

both inside and outside the classroom. Requires field trip transportation fee not to exceed \$25 per course registration. Prerequisite: ten hours of biological sciences or ten hours of recreation and/or education, or consent of instructor.

**402-3 Wildland Hydrology.** Fundamentals of hydrology as related to forest and wildland water resources will be emphasized. Considerations will include the hydrologic cycle with emphasis on soil and groundwater regimes, evapotranspiration, surface and subsurface runoff and the quantity and timing of water yield. Offered Spring semester, odd years.

**403-3 Agroforestry.** This introductory, lecture-discussion course will examine the various agroforestry concepts, systems, technologies and practices. Focus will be on the potential use and benefits of agroforestry, which involves the deliberate combining of woody perennials with herbaceous/agronomic crops and/or animals, on the same land management units, in some form of spatial arrangement and/or temporal sequence to produce desirable ecological and economical interactions among the different components. Prerequisite: junior standing or consent of instructor.

**405-2 Forest Management for Wildlife.** Interrelations between forest practices and wildlife populations. Emphasis is on habitat requirements of different wildlife species and ways to manipulate the forest to improve wildlife habitats. Prerequisite: forestry major, or consent of instructor.

**408-4 Introduction to Remote Sensing and GIS.** Introduction to the important characteristics of platforms and sensor systems used in modern remote sensing applications to forestry and the storage, analysis and display of this information by micro computers using vector and raster GIS configurations. Prerequisite: 414 and advance standing.

**409-3 Forest Resources Decision-Making.** Examines management planning decision-making for multiple-use forests particularly in the public sector. Reviews concepts useful for analyzing flow-resource problems, emphasizing systems approaches, introduces use of modern quantitative methods to evaluate resource use alternatives. Case studies. Prerequisite: 411, Mathematics 140.

**410-3 Forest Resources Administration and Policy.** Nature of administrative organizations and influences on behavior of organization members. Society influences causing changes in forestry related organizations. Policy formation and implementation, including roles of special interest groups.

**411-3 Forest Resources Economics.** Introduction to forest economics: Application of micro- and macro-economic principles to forest timber and non-timber production; capital theory; benefit-cost analysis; and economics of conservation. Prerequisite: Economics 240 or Agribusiness Economics 204; and Mathematics 140.

**412-2 Tree Improvement.** Basic theories and techniques of obtaining genetically superior trees for forest regeneration. Prerequisite: senior standing.

**414-3 Information Management.** The collection of physical, biological, and social variables in the field of forestry through sampling survey. The procedures of data manipulation and calculation and the presentation of graphs and tables.

**416-3 Forest Resource Management.** The application of business procedures and technical forestry principles to manage forest properties. Emphasis on integrated resource management for tangible and intangible benefits. Requires field trip transportation fee and supplemental expenditures not to exceed \$40 per course registration. Prerequisite: completion of forest resource summer camp or consent of instructor.

**417-2 Forest Land-Use Planning.** Principles of location theory as a basis for determining land use; supply of forest land; population pressure and demand; conservation principles; determination of forest land values; institutional factors influencing forest land-use; forest taxation; special taxes, and capital gains. Taught in alternate years. Prerequisite: 411 or consent of instructor.

**418-2 Marketing of Forest Products.** The role of marketing in the forest industries; review of economic principles; product policy, planning the product line, pricing, marketing channels, marketing programs, marketing organization and marketing research as influences on the marketing of lumber, wood products, pulp and paper. Taught in alternate years. Prerequisite: 411 or consent of instructor.

**420-3 Park and Wildlands Management.** The management of state and federal parks and recreation areas. A systems approach toward management and decision-making will be emphasized. Requires field trip transportation fee and supplemental expenditures not to exceed \$40 per course registration. Prerequisite: 320c.

**421-3 Recreation Land-Use Planning.** Principles and methods for land-use planning of park and recreation environments with emphasis on human dimensions of natural resource research. Focus on planning process and types of information to gather and organize. Application in group field projects. Requires field trip transportation fee not to exceed \$25 per course registration. Prerequisite: 220, 420 or consent of instructor.

**422C-4 Park and Wildlands Management Camp.** A study of park conditions, visitors, and management practices at selected county, state, and federal park systems in the United States, including the federal wilderness preservation system. Offered as summer camp only. Requires field trip and supplemental expenditures not to exceed \$450 per course registration. Summer camp fees and cost are outlined in the Forestry Major-Outdoor Recreation Resource Management Specialization. Prerequisite: 220 and 320c and consent of instructor.

**423-3 Environmental Interpretation.** (Same as Agriculture 423 and Recreation 423.) Principles and techniques of natural and cultural interpretation. Two hours lecture, three hours laboratory. Requires field trip transportation fee not to exceed \$40 per course registration. Prerequisite: ten hours biological science or ten hours of recreation.

**428-2 Community Forestry.** An introduction to principles and practices useful in the management of trees and forests in populated settings. Emphasis is placed on the development of comprehensive management strategies consistent with the biological, physical, economic and social constraints of the urban environment. Prerequisite: junior or senior standing or permission of the instructor.

**429-3 Watershed Management Field Laboratory.** A field intensive laboratory course focused on hydrological and biological methods used to manage watersheds and assess watershed health. Laboratory topics include stream gauging, soil water and ground water sampling, channel morphology, stream benthos measurements and water quality analysis of stream and lake ecosystems. Requires field trip transportation fee not to exceed \$30 per course registration.

**430-3 Wildland Watershed Management.** Emphasis is placed on the principles, technical problems, procedures, alternatives and consequences encountered in managing wildland watersheds for the production of quality water in harmony with other uses. Prerequisite: 331.

**431-3 Regional Silviculture.** Designed to evaluate the various silvicultural practices as they are commonly employed in various regions of the United States. Offered alternate years. Prerequisite: 310.

**451-2 Natural Resources Inventory.** Theory and practical problems in biometrics to obtain estimates of natural resource populations. Use of computers and other advanced techniques. Case studies of inventory procedures. Requires field trip transportation fee not to exceed \$25 per course registration. Prerequisite: 351 or consent of instructor.

**452-2 Forest Soils.** Characterization and fundamental concepts of forest soils and their relationships to forest communities and forest management practices. Emphasis is on the chemical, biological and physical properties of soils as related to forests and forest management. Requires field trip transportation fee not to exceed \$25 per course registration. Prerequisite: Plant and Soil Science 240.

**452L-2 Forest Soils Laboratory.** Companion laboratory for 452. Emphasis is on methods to characterize and evaluate the chemical, physical, and biological properties of forest soils. Prerequisite: Plant and Soil Science 240 and concurrent registration in Forestry 452. Spring semester even years.

**453-2 Environmental Impact Assessment in Forestry.** Methods of assessing the environmental impact of land-use systems on forest resources and assessing the impact of forest management systems on environmental quality are presented. Case studies culminating in the preparation of environmental impact statements are emphasized. Requires field trip transportation fee not to exceed \$25 per course registration. Prerequisite: senior standing in a natural resource major.

**454-2 to 8 Forest Ecology Field Studies.** A study of forest communities, soils and site conditions in one of the following ecosystems: (a) Boreal; (b) Lake states; (c) Southern Appalachians; (d) Southern pine. Course requires a field trip of about 10 days. Each trip is worth two semester credits; a maximum of 6 credits may be applied toward graduate credit. Required field trip transportation fee not to exceed \$300 per course registration (a,b,c, or d). Prerequisite: senior standing in natural resources or biological sciences, courses in tree identification, forest ecology and soils and consent of instructor.

**460-2 Forest Industries.** Analysis of raw material requirements, the processes and the products of forest industries. The environmental impact of each forest industry will also be discussed.

**470-2 Wilderness Management, Policy, and Ethics.** Study of current management philosophy and practice in America's wilderness. Analysis of current wilderness policy and its historical evolution. Discussion of the evolution of the wilderness idea and the individuals that have influenced it. Weekend field trip required. Required field trip transportation fee not to exceed \$50 per course registration. Prerequisite: 220 or consent of instructor.

**480-3 Natural Resource Advocacy.** Examines the role and methods of interest groups in influencing natural resource policies. Emphasis on applied methods, techniques and strategies for achieving interest group objectives in conflict resolution and persuasion theory. Prerequisite: junior standing or consent of instructor.

**485-3 Social Influences on Forestry.** Study of, and practice in, methods used for effecting social change in forestry and allied natural resource fields. Case studies, readings and survey research methodology are used to develop an understanding of the role of public opinion in ecologically sound natural resource decision making. Prerequisite: senior standing, and a course in statistics.

**494-1 to 6 Practicum.** Supervised practicum in a professional setting. Emphasis on administration, supervision, teaching and program leadership in community, school, park, forest, institution and public or private agencies. Students should enroll according to their curriculum specialization: (a) Forest environmental assessment, (b) Outdoor recreation resource management, (c) Forest resources management. Prerequisite: consent of instructor.

**500-2 Principles of Research.** Research philosophy, approaches to research; theory, hypotheses inference, and predicting; problem identification, project development and organization; methods of data collection, analysis and presentation; drawing conclusions and organizing results. Prerequisite: four hours in statistical methods or consent of instructor.

**501-1 Graduate Seminar.** Presentation and critiques of current research project of faculty, graduate student and selected resource persons.

**502-3 Advanced Watershed Hydrology and Management.** A study of current issues relating to hydrology and the management of water resources in forested and mixed land-use watersheds. Readings, discussions and projects will focus on research and management topics in water quality and quantity at regional, national and international levels. Prerequisite: 402 or 430 or equivalent or consent of instructor.

**504-2 Tree Physiology Concepts and Applications.** A study of physiological concepts and attributes of trees that underlies growth, ontogeny, and reproduction in the context of genotype, environment, and their interaction. Physiological concepts will be presented and discussed in a framework that relates their influence on forest stand management applications and activities such as regeneration, tree planting, silvicultural activities in native forests

and plantations, and stand response to disturbance, and the development and maintenance of old growth. Prerequisite: Plant Biology 200, Forestry 331 or a plant physiology course.

**508-2 Historical Ecology.** Introduction to the basic concepts and foundations of historical ecology, a discipline which joins traditional ecology with an investigation of human landscape transformation. Emphasis is placed on the interdisciplinary approach to historical ecology with readings in pollen analysis, dendrochronology, land-use history, archival and historical sources, and traditional vegetation surveys and reconstructions. Field trip cost approximately \$35. Offered alternate years. Prerequisite: 300 level plant ecology course or equivalent or consent of instructor.

**510-2 Advanced Silviculture.** Current and emerging silvicultural issues and their underlying biological principles are discussed. Experimental methodologies and their application to forest management problems are critiqued. Prerequisite: undergraduate courses in forest ecology and silviculture or consent of the instructor.

**511-2 Advanced Forest Resources Economics.** Application of microeconomic, macroeconomic and capital theory to forest resource problems; introductory econometric methods; long range supply and demand projections; international forest economics and policy problems decision theory in forest resource management. Offered alternate years. Prerequisite: 411 or equivalent or consent of instructor.

**512-2 Tree Selection and Breeding.** Quantitative methods of describing variation patterns of trees, testing genetic and environmental effects and interactions and evaluations of tree improvement program. Prerequisite: 412 or consent of instructor.

**516-2 Advanced Forest Management.** Case studies in forest land management, management planning, utilizing computer programming, CFI and TSI role in long range management planning. Offered alternate years—odd. Prerequisite: 416, 331 and summer camp or consent of instructor.

**520-2 Advanced Park Planning.** Study of nature and functions of the recreation environmental planning process in theoretical and policy terms. Types of plans at local, regional and state levels. Evaluation of different types of planning approaches and their utility in particular situations. Offered alternate years. Prerequisite: 421 or consent of instructor.

**521-2 Recreation Behavior in Wildlands Environments.** Review of sociological and psychological theories relevant to outdoor recreation planning; management alternatives. Review of current behavior research in outdoor recreation. Application of behavioral concepts to recreation planning and administration. Offered alternate years.

**523-2 Advanced Resource Interpretation.** Survey of theories and methods relating to resource interpretation planning and practice resulting from research in communication, education and marketing. Examines case studies and existing issues current to the profession of interpretation. Stresses relationship between theory and application. Prerequisite: 423 or consent of instructor. Offered alternate years.

**530-2 Forest Site Evaluation.** A discussion of the factors affecting site quality and their use in present site evaluation methods. Lectures will draw upon recently published scientific literature as well as forest research data collected and analyzed for southern Illinois forests. Laboratories will include sampling of forest sites and stands with subsequent analysis of data using graphic and statistical techniques and a computer to develop site evaluation models. Cost \$20. Prerequisite: 300, Biology 307 or consent of instructor.

**531-2 Disturbance Ecology.** Provide a historical overview and current perspective on major topics in forest ecology including natural disturbance, gap and patch dynamics, and relevant restoration ecology techniques. This is accomplished through a critical examination of the literature through reading, group discussions, and field trips. Two to three field trips will be organized during the semester to observe the effects of natural disturbance with an approximate total cost of \$25 per student. Offered alternate years. Prerequisite: 300 level plant ecology course (or equivalent) or consent of instructor.

**585-3 Human Dimensions of Natural Resource Management.** Multidisciplinary study of influences and constraints on human-renewable natural resource interactions. Readings, discussion and problem solving designed to enhance appreciation of human dimensions as an integral component of natural resource management. Emphasis on diverse perspectives on forests, fisheries and wildlife; conceptual frameworks and research methodologies. Prerequisite: course in statistics or consent of instructor. Offered alternate (odd) years.

**588-1 to 6 International Graduate Studies.** University residential graduate program abroad. Prior approval by the department is required both for the nature of program and the number of hours of credit.

**590-1 to 4 Readings in Forest Resources.** Intensive consideration is given to current practices and problems in forestry. Prerequisite: consent of instructor.

**591A-G 1 to 4 Directed Studies in Forest Resources.** Intensive study of disciplines fundamental to forestry. **(a)** Dendrology. Study of the identification of native and exotic trees. **(b)** Forest Autecology. Study of the physiology of individual tree species in relation to their environment. **(c)** Forest Community Ecology. Study analysis and integration of tree growth, forest structure and classification in relation to climate/edaphic factors as an ecological basis for forest management. **(d)** Forest Measurements. Study of measurement, statistical and data processing concepts; volume, growth, yield of forest products and methods of sampling forest resources. **(e)** Forest Recreation. Study of principles and methods for land-use planning of park and recreation environments. **(f)** Silviculture. Study of concepts and techniques utilized in the silvicultural treatment of forests. **(g)** Wildland Fire Management. Study of all aspects of fire as a phenomenon in wildland management. Prerequisite: consent of instructor.

**593-1 to 4 Individual Research.** Directed research in selected fields of forestry.

**599-1 to 6 Thesis.** Maximum of five hours to be counted toward a Master's degree.

**601-1 per semester Continuing Enrollment.** For those graduate students who have not finished their degree programs and who are in the process of working on their dissertation, thesis, or research paper. The student must

have completed a minimum of 24 hours of dissertation research, or the minimum thesis, or research hours before being eligible to register for this course. Concurrent enrollment in any other course is not permitted. Graded *S/U* or *DEF* only.