FORESTRY

Administered by the Department of Natural Resource Ecology and Management.

The forestry curriculum offers courses dealing with the management of forest ecosystems for multiple benefits including biodiversity, recreation, water, wilderness, wildlife, and wood and fiber. Conservation and preservation of natural resources are emphasized. The department offers work for the Bachelor of Science degree with a major in forestry and options in forest ecosystem management, interpretation of natural resources, urban and community forestry, or natural resource conservation and restoration. Students select at least one of these options, all of which lead to a professional degree in forestry (Bachelor of Science). The forestry major has been accredited by the Society of American Foresters (SAF) since 1935. The Council for Higher Education Accreditation recognizes SAF as the specialized accrediting body for forestry education in the United States. The primary goal of the undergraduate curriculum in forestry is to educate foresters to be capable of scientifically managing the nation's forest lands and related ecosystems - private and public.

Graduates understand and can apply scientific principles associated with forests, forest ecosystem management, and wood and non-wood products. Graduates are able to communicate effectively and work well in teams. They are capable of preparing and delivering effective oral and written communication of scientific and technical decisions to professional and lay audiences. They are proficient in technical skills such as measurements, computer usage, inventory, economic analysis, data and situation analysis, and ecosystem assessment. They recognize the importance of ethics in forestry and are sensitive to cultural diversity and broad environmental concerns.

Graduates of the forest ecosystem management option are skilled at understanding how forests function and how forests can be managed to produce desired goods (wood, fiber, recreation, wildlife habitat) and services (clean water, carbon sequestration, wilderness) in the long-run. They are skilled at interpretation of interactions and effects of abiotic and biotic factors in forests and quantification of bio-physical, social, and economic outputs from forest ecosystems. They are skilled at complex decision-making involving private and public forest resources where ethical, legal, social, economic, and ecological dimensions are explicitly considered.

Graduates of the interpretation of natural resources option are skilled at communicating with the public about the values associated with forest ecosystems and providing educational programs for all ages.

Graduates of the urban and community forestry option are able to combine biological, social, legal, and economic expertise to effectively manage trees or forests in an urban setting. They are skilled at decision-making related to site assessment, and long-term management of urban trees and forests to achieve multiple goals.

Graduates of the natural resource conservation and restoration option are skilled at assessing the natural functions of the environment and human impacts. They are skilled at interpretation of forest and other natural environments and making decisions relating to their conservation and preservation.

In consultation with their advisor, students can select elective courses related to the forest ecosystem management option to emphasize forest ecology; wildlife, wilderness, and recreation management; water quality and erosion protection; quantitative-analytical techniques; business and marketing; and other areas related to natural resource management. Elective courses in the urban and community forestry option can be selected to emphasize plant health, policy and planning, ecology, hydrology, sociology, business administration, or horticulture/ design. Elective courses related to the natural resource conservation and restoration option can be selected to emphasize, ecology, wildlife, recreation, nature interpretation, landscape design, sociology and ethics of conservation and preservation. Elective courses in the interpretation of natural resources option can be selected to emphasize natural history, animal ecology, and environmental education.

Many private firms as well as national, regional, state, and local agencies seek forestry graduates to fill positions in management of natural resources for commodity and non-commodity multiple benefits. Graduates in forestry are prepared to be involved with evolving forestry systems, such as agroforestry and urban forestry. Wood processing industries, such as composite products, plywood, particle board, lumber, and pulp and paper offer professional opportunities in fiber procurement and marketing.

With advanced graduate study, the range of professional job opportunities for a person with a B.S. in forestry is expanded. Opportunities include research and education as well as more specialized managerial and administrative positions with private firms and public agencies.

During fall semester of the second year of study (sophomore year, typically), forestry students are required to enroll in the department's integrated forestry modules consisting of:

FOR 201	Forest Biology	2
FOR 202	Sustainable Materials: Wood Utilization	2
FOR 203	Resource Measurements/Evaluation	2
FOR 204	Forest Ecosystem Decision-Making	2
FOR 205	Integrated Forestry Laboratory	3
FOR 206	Fall Forestry Camp	4

That semester, consisting entirely of forestry coursework, is designed to give students an early understanding of the many aspects of forestry and how they are interrelated. In addition to work in the classroom, students will spend time in laboratory and field work each week. A 3-week off-campus fall camp during the semester will reinforce concepts learned both in the classroom and during laboratory/field sessions. Transfer students should check with the department for counsel on timing their completion of the integrated forestry modules.

Student Learning Outcomes

Upon graduation, students should be able to:

1. Identify, explain and critically evaluate their own beliefs, values and actions in relation to professional and societal standards of ethics.

For any given situation, graduates identify, critically evaluate, and state their own beliefs and values as they relate to professional and societal ethical standards, for any given situation. They elaborate on how those values and beliefs impact their actions, and they explain which specific canons or principles of a professional code of ethics are applicable to a particular situation.

2. Anticipate, analyze and evaluate natural resource issues and opportunities, explaining the ecological, economic, and social consequences of natural resource actions at various scales and over time.

In the case of existing natural resource issues, graduates explain the ecological, economic, and social consequences that reasonably could be expected to occur as the result of actions taken to address the issue. The explanation includes considerations of the geographic area influenced by the issue as well as the time frame over which the consequences can be expected to occur. In the case of evolving circumstances, graduates predict natural resource issues that may arise as a result of the circumstances and explain the ecological, economic and social consequences of those issues.

3. Actively seek the input and perspectives of diverse stakeholders regarding natural resource problems and issues.

Graduates identify the comprehensive list of individuals or groups who may be impacted by particular natural resource problems and issues. They are well versed in techniques for seeking and incorporating input and perspectives from those people, and they incorporate those inputs and perspectives into the decision-making process.

4. Assess, analyze, synthesize, and evaluate information fairly and objectively.

Not all information is equally sound or applicable in a particular situation. Graduates evaluate the validity and importance of information obtained from any source. Once evaluated, they use the information appropriately in the solution of natural resource problems.

5. Work effectively, both individually and with others, on complex, value-laden natural resource problems that require holistic problem-solving approaches.

Effective solution of natural resource problems often involves input from diverse constituencies with diverse value scales. When working individually, graduates incorporate those values into the solution of problems. Graduates work effectively with diverse individuals and groups to reach consensus on problem solutions.

6. Formulate and evaluate alternative solutions to complex problems and recommend and defend best alternatives.

The natural resource base with which we deal is capable of providing numerous goods and services to numerous publics. Graduates formulate multiple alternatives, as well as action plans, to achieve stakeholder objectives. They evaluate each of the feasible alternatives in terms of biological possibility, economic feasibility and social acceptability. They recommend best alternatives based on the stakeholders' objectives, and they justify their recommendations on the basis of sound science.

7. Communicate clearly and effectively with all audiences using appropriate oral, visual, electronic, and written techniques.

Graduates utilize the best form, or forms, of communication for effectively conveying information to, or seeking input from, a particular audience. They are proficient in all forms of communication, and adjust their style or technique of communication to suit different audiences.

8. Recognize and interpret resource problems and opportunities across spatial scales from local to global.

Graduates recognize where resource problems and opportunities can or could exist, and they evaluate and interpret these for others. They, evaluate and interpret for individual landowners at a very local scale as well as for problems that span multiple ownerships, regions and ecosystems.

9. Appreciate cultural diversity and understand the impact of the global distribution of people and wealth on natural resource use and valuation.

Different cultures, population densities, and income classes value and use natural resources in very different ways. Because natural resources often are used simultaneously by different groups, it is important for graduates to be able to account for those differing uses and valuations when making management decisions about natural resources.

10. Exercise leadership skills as professionals and engaged citizens

Graduates organize, facilitate, and participate effectively in groups, teams, or organizations. They define problems or opportunities,

implement action planning processes, work toward goals and justify actions taken.

11. Demonstrate creativity and innovation in identifying and pursuing opportunities that produce environmental, social, or economic value.

Graduates display creativity in a variety of situations, and identify opportunities to promote understanding of natural resource issues. They demonstrate persistence when working with individuals who have diverse interests in order to build consensus and facilitate accomplishing stated objectives.

12. Exercise life-long learning skills developed before graduation.

Graduates articulate why life-long learning is important. Graduates find answers to their questions as they arise throughout life. They are capable of determining what they need to know to effectively deal with an issue or situation, and they know how to obtain the necessary knowledge. They have learned how to learn in the absence of teachers.

Curriculum in Forestry

Total Degree Requirement: 128 cr.

Only 65 cr. from a two-year institution may apply which may include up to 16 technical cr.; 9 P-NP cr. of free electives; 2.00 minimum GPA.

International Perspective: 3 cr.
U.S. Diversity: 3 cr.
Communications Proficiency (with a C or better):

English composition	6
Speech fundamentals	3
Total Credits	**9**

Communication/Library: 13 cr.

ENGL 150	Critical Thinking and Communication	3
ENGL 250	Written, Oral, Visual, and Electronic Composition	3
LIB 160	Introduction to College Level Research	1
SP CM 212	Fundamentals of Public Speaking	3
One course from:		3
ENGL 302	Business Communication	
ENGL 309	Proposal and Report Writing	
ENGL 312	Communicating Science and Public Engagement	
ENGL 314	Technical Communication	
Total Credits		**13**

Humanities and Social Sciences: 6 cr.
6 cr. from approved list.

Ethics: 3 cr.
3 cr. from approved list.

Mathematics, Physical and Life Sciences: 21-23 cr.

MATH 140	College Algebra	3
CHEM 163	College Chemistry	4
CHEM 163L	Laboratory in College Chemistry	1
AGRON 182	Introduction to Soil Science	3
BIOL 211	Principles of Biology I	3
BIOL 211L	Principles of Biology Laboratory I	1
One course from:		3-4
STAT 101	Principles of Statistics	
STAT 104	Introduction to Statistics	
One course from:		3-4
MATH 151	Calculus for Business and Social Sciences	
MATH 160	Survey of Calculus	
MATH 165	Calculus I	
NREM 240	Quantitative Problem Solving in Natural Resources	
STAT 301	Intermediate Statistical Concepts and Methods	
Total Credits		**21-23**

Forestry: 31 cr.

NREM 104	Practical Work Experience	R
NREM 110	Orientation in Natural Resource Ecology and Management	1
NREM 120	Introduction to Renewable Resources	3
NREM 211	Careers in Natural Resources	1
FOR 201	Forest Biology	2
FOR 202	Sustainable Materials: Wood Utilization	2
FOR 203	Resource Measurements/Evaluation	2
FOR 204	Forest Ecosystem Decision-Making	2
FOR 205	Integrated Forestry Laboratory	3
FOR 206	Fall Forestry Camp	4
FOR 302	Silviculture	4
FOR 451	Forest Resource Economics and Quantitative Methods	4
FOR 454	Forestry Practicum	3
Total Credits		**31**

Electives: Students majoring in forestry are required to choose one of the following options at the end of their sophomore year: forest ecosystem management; sustainable material science and technology; urban and community forestry; natural resource conservation and restoration; or interpretation of natural resources.

Forest Ecosystem Management

FOR 280	Wood Properties and Identification	4
FOR 356	Dendrology	3
PL P 416	Forest Insects and Diseases	3

FOR 442	Dynamics of Forest Stands	3
FOR 452	Ecosystem Management	3
NREM 301	Natural Resource Ecology and Soils	4
NREM 345	Natural Resource Photogrammetry and Geographic Information Systems	3
One course from:		3-4
A ECL 366	Natural History of Iowa Vertebrates	
A ECL 418	Stream Ecology	
ECON 380	Energy, Environmental and Resource Economics	
NREM 390	Fire Ecology and Management	
NREM 407	Watershed Management	
NREM 446	Integrating GPS and GIS for Natural Resource Management	
NREM 455	Stream restoration	
NREM 455L	Stream Restoration Lab	
NREM 471	Agroforestry Systems	
One course from:		3
NREM 385	Natural Resource Policy	
or NREM 460	Controversies in Natural Resource Management	
Total Credits		**29-30**

Interpretation of Natural Resources

A ECL 365	Vertebrate Biology	4
A ECL 366	Natural History of Iowa Vertebrates	3
BIOL 366	Plant Systematics	4
ENT 370	Insect Biology	3
FOR 452	Ecosystem Management	3
NREM 303	Internship	1-3
NREM 330	Principles of Interpretation	3
One course from:		3
BIOL 474	Plant Ecology	
FOR 356	Dendrology	
One course from:		3-4
AGRON 206	Introduction to Weather and Climate	
ASTRO 120	The Sky and the Solar System	
GEOL 100	How the Earth Works	
GEOL 101	Environmental Geology: Earth in Crisis	
GEOL 108	Introduction to Oceanography	
One course from:		3
NREM 385	Natural Resource Policy	
NREM 460	Controversies in Natural Resource Management	
Total Credits		**30-33**

Natural Resource Conservation and Restoration

A ECL 366	Natural History of Iowa Vertebrates	3
FOR 356	Dendrology	3
FOR 452	Ecosystem Management	3
NREM 301	Natural Resource Ecology and Soils	4
NREM 390	Fire Ecology and Management	3
NREM 407	Watershed Management	4
PL P 416	Forest Insects and Diseases	3
One course from:		3
NREM 345	Natural Resource Photogrammetry and Geographic Information Systems	
NREM 446	Integrating GPS and GIS for Natural Resource Management	
One course from:		3
NREM 385	Natural Resource Policy	
NREM 460	Controversies in Natural Resource Management	
Three credit hours from approved list of electives		3
Total Credits		**32**

Urban and Community Forestry

FOR 280	Wood Properties and Identification	4
C R P 201	The North American Metropolis	3-4
or C R P 301	Urban Analytical Methods	
HORT 342	Landscape Plant Installation, Establishment, and Management	3
FOR 356	Dendrology	3
FOR 452	Ecosystem Management	3
FOR 475	Urban Forestry	3
PL P 416	Forest Insects and Diseases	3
SOC 310	Community	3
or SOC 382	Environmental Sociology	
One course from:		3
NREM 385	Natural Resource Policy	
NREM 460	Controversies in Natural Resource Management	
Total Credits		**28-29**

Forestry, B.S. - Forest Ecosystem Management option

Freshman

Fall	Credits	Spring	Credits
NREM 110	1	CHEM 163	4
BIOL 211L	1	CHEM 163L	1
BIOL 211	3	STAT 101	4
ENGL 150	3	NREM 120	3
MATH 140[**]	3	Free Elective	3

Fall	Credits
LIB 160	1
Approved Social Science course	3
	15

Sophomore

Fall	Credits	Spring	Credits
FOR 201	2	SP CM 212	3
FOR 202	2	ENGL 250	3
FOR 203	2	FOR 280	4
FOR 204	2	NREM 211	1
FOR 205	3	FOR 302	4
FOR 206	4	Required Elective	3
	15		18

Junior

Fall	Credits	Spring	Credits
MATH 151, NREM 240, STAT 301, MATH 160, or MATH 165	3-4	FOR 451	4
FOR 356	3	Required Electives	6
NREM 301	4	NREM 345	3
NREM 345 or FOR 442	3	AGRON 182	3
Required Elective	3		
	16-17		16

Senior

Fall	Credits	Spring	Credits
FOR 442 or NREM 345	3	FOR 454	3
FOR 416	3	FOR 452	3
Communications Elective	3	Policy Elective	3
Free Elective	3	Required Elective	3
Free Elective	3	Free Elective	4
	15		16

*   To complete degree program in 4 years students must maintain an average of 16 credits per semester.

**   Initial math course is determined on the basis of high school math and placement test scores. A non-credit math course (MATH 10) may be required at additional course.

***   In scheduling coursework, students should pay particular attention to courses with limited offerings (e.g., offered only on alternate years) and to course sequences (i.e., where a course serves as a prerequisite for another course).

Note: In addition to coursework listed above, students must complete departmental requirements for Practical Work Experience requirement (NREM 104). See https://www.nrem.iastate.edu/workexperience (https://www.nrem.iastate.edu/workexperience/)

Forestry Minor

The department offers a minor in forestry which can be earned by completion of a minimum of 15 credits in forestry courses. The minor must include at least 9 credits that are not used to meet any other department, college, or university requirement. Students wishing to emphasize management and environmental aspects of forestry must select at least 15 credits from the following courses:

FOR 302	Silviculture	4
FOR 356	Dendrology	3
FOR 416	Forest Insects and Diseases	3
FOR 442	Dynamics of Forest Stands	3
FOR 451	Forest Resource Economics and Quantitative Methods	4
FOR 452	Ecosystem Management	3
FOR 475	Urban Forestry	3
NREM 120	Introduction to Renewable Resources	3
NREM 301	Natural Resource Ecology and Soils	4
NREM 345	Natural Resource Photogrammetry and Geographic Information Systems	3
NREM 390	Fire Ecology and Management	3
NREM 407	Watershed Management	4
NREM 446	Integrating GPS and GIS for Natural Resource Management	3