FORESTRY

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. All options 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 adviser, students can select elective courses related to elective courses in 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.

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 416L	Forest Insects and Diseases Laboratory	1
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

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	Information Literacy	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	Biological Communication	
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
PL P 416L	Forest Insects and Diseases Laboratory	1
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	
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	
One course from:		3
NREM 385	Natural Resource Policy	
or NREM 460	Controversies in Natural Resource Management	
Total Credits		**30-31**

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
PL P 416L	Forest Insects and Diseases Laboratory	1
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		**33**

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 Maintenance	3
FOR 356	Dendrology	3
FOR 452	Ecosystem Management	3
FOR 475	Urban Forestry	3
PL P 416	Forest Insects and Diseases	3
PL P 416L	Forest Insects and Diseases Laboratory	1
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		**29-30**

Forestry, B.S. - Forest Ecosystem Management option

Freshman

Fall	Credits	Spring	Credits
NREM 110	1	MATH 150	3
BIOL 211L	1	CHEM 163	4
BIOL 211	3	CHEM 163L	1
ENGL 150	3	STAT 101	4
MATH 140**	3	LIB 160	1
NREM 120	3	Free Elective	3
Approved Social Science course	3		
	17		**16**

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	AGRON 182	3
FOR 206	4	Required Elective	3
	15		**17**

Junior

Fall	Credits	Spring	Credits
MATH 151 or NREM 240 or STAT 301 or MATH 160 or MATH 165	3-4	FOR 302	4
FOR 356	3	FOR 451	4
NREM 301	4	Required Electives	6
NREM 345 or FOR 442	3	NREM 345	3
Required Elective	3		
	16-17		**17**

Senior

Fall	Credits	Spring	Credits
FOR 342 or NREM 345	3	FOR 454	3
FOR 442 or Free Elective		FOR 452	3
FOR 416	3	Policy Elective	3
FOR 416L	1	Required Elective	3
Communications Elective	3	Free Elective	3
Free Electives	3		
	13		**15**

* 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/)

Courses primarily for undergraduates:

FOR 201: Forest Biology

(2-0) Cr. 2. F.

Prereq: Concurrent enrollment in FOR 202, FOR 203, FOR 204, FOR 205, and FOR 206

Discussion of ecological concepts, individual tree structure and growth, variation and diversity in tree populations. Physical environment of trees and forests, ecological processes in forest communities, and introduction to different regional forest communities.

FOR 202: Sustainable Materials: Wood Utilization

(2-0) Cr. 2. F.

Prereq: Concurrent enrollment in FOR 201, FOR 203, FOR 204, FOR 205, and FOR 206

Basis for use of wood as an industrial raw material for lumber, composites, pulp and paper, energy and chemicals. Implications of use of alternative renewable and non-renewable materials for societal infrastructure and consumer goods.

FOR 203: Resource Measurements/Evaluation

(2-0) Cr. 2. F.

Prereq: Concurrent enrollment in FOR 201, FOR 202, FOR 204, FOR 205, and FOR 206; MATH 140

Survey techniques involved in quantification, valuation, and evaluation of tree and stand growth and other variables in the forest environment (e.g., recreational use, wildlife habitat value, biomass, and solid wood).

FOR 204: Forest Ecosystem Decision-Making
(2-0) Cr. 2. F.
Prereq: Concurrent enrollment in FOR 201, FOR 202, FOR 203, FOR 205, and FOR 206
Methods of decision-making related to forest ecosystems including communications, teams and conflict resolution. Current issues relating to public, private, and urban forests; quantification of processes, services, and goods produced by the forest and expected by the public such as wildlife, water, range, recreation, wilderness, biodiversity, as well as wood and fiber products.

FOR 205: Integrated Forestry Laboratory
(0-8) Cr. 3. F.
Prereq: Concurrent enrollment in FOR 201, FOR 202, FOR 203, FOR 204, and FOR 206
Field and laboratory exercises integrating the evaluation and management of forest goods, services, and the processing of wood products.

FOR 206: Fall Forestry Camp
Cr. 4. F.
Prereq: Concurrent enrollment in FOR 201, FOR 202, FOR 203, FOR 204, and FOR 205
Three-week field camp to address topics and issues covered in 201, 202, 203, 204, and 205.

FOR 280: Wood Properties and Identification
(3-3) Cr. 4. S.
Properties of wood and how they relate to its successful use. Comparative anatomical characteristics, scientific nomenclature, and hand lens identification of commercially important North American woods.

FOR 283: Pesticide Application Certification
(Cross-listed with AGRON, ENT, HORT). (2-0) Cr. 2. S.
Core background and specialty topics in agricultural, and horticultural pesticide applicator certification. Students can select certification categories and have the opportunity to obtain pesticide applicator certification at the completion of the course. Commercial pesticide applicator certification is emphasized.

FOR 290: Special Problems
Cr. 1-4. Repeatable.
Prereq: Freshman or Sophomore classification, permission of instructor

FOR 290A: Special Problems: Leadership in Forestry Teams (LIFT) Learning Community
Cr. 1-4. Repeatable.
Prereq: Freshman or Sophomore classification, permission of instructor

FOR 290B: Special Problems: Forest Ecosystem Management
Cr. 1-4. Repeatable.
Prereq: Freshman or Sophomore classification, permission of instructor

FOR 290C: Special Problems: Natural Resource Conservation
Cr. 1-4. Repeatable.
Prereq: Freshman or Sophomore classification, permission of instructor

FOR 290D: Special Problems: Urban and Community Forestry
Cr. 1-4. Repeatable.
Prereq: Freshman or Sophomore classification, permission of instructor

FOR 290E: Special Problems: Wood Science and Technology
Cr. 1-4. Repeatable.
Prereq: Freshman or Sophomore classification, permission of instructor

FOR 302: Silviculture
(3-3) Cr. 4. S.
Prereq: FOR 201, FOR 356, NREM 301
Manipulation of forest vegetation based on ecological principles for the production of goods and services.

FOR 356: Dendrology
(Cross-listed with BIOL). (2-2) Cr. 3. F.
Prereq: BIOL 211
Identification and ecology of North American woody plant species. Importance of woody plants in timber production and wildlife habitat. Historical conditions of North American forest regions will also be addressed.

FOR 358: Forest Herbaceous Layer: Ecology and Identification.
(Cross-listed with NREM). (0.5-1) Cr. 1. S.
Prereq: BIOL 212
Survey of the major plant families, general, and representative species of the forest herbaceous layer. Functional ecology and restoration.

FOR 416: Forest Insects and Diseases
(Cross-listed with PL P). (3-0) Cr. 3. F.
Prereq: 8 credits in biological sciences, including BIOL 211 or equivalent.
Nature of insects and pathogens of forest and shade trees; their role in the dynamics of natural and managed forest ecosystems; and the management of indigenous and exotic pests.

FOR 416L: Forest Insects and Diseases Laboratory
(Cross-listed with PL P). (0-3) Cr. 1. F.
Prereq: 8 credits in biological sciences, including BIOL 211 or equivalent. Credit or enrollment in Pl P 416.
Laboratory experience working with insect and fungal pests of trees.

FOR 442: Dynamics of Forest Stands
(Dual-listed with FOR 542). (2-3) Cr. 3. Alt. F., offered even-numbered years.
Prereq: NREM 301, FOR 302, STAT 101 or their equivalents
Change in forest species composition and structure at the stand and landscape scales resulting from site quality, tree growth, competition, succession, and disturbance. Methods for assessing tree growth and reconstructing past stand development. Applications to forest and savanna management.

FOR 451: Forest Resource Economics and Quantitative Methods
(3-3) Cr. 4. S.
Prereq: FOR 203, MATH 150
Application of economic principles to forest resource management considering both market and non-market goods and services. Methods of identifying and specifying problems in the management and use of forest resources. Application of mathematical and statistical models to the solution of managerial problems.

FOR 452: Ecosystem Management
(Dual-listed with FOR 552). (Cross-listed with NREM). (2-3) Cr. 3. S.
Prereq: Senior classification, and NREM 120 or its equivalent
Principles of planning, regulating, and decision-making associated with public and private lands, with consideration of forest, grassland, wetland, and freshwater aquatic ecosystems. Integrated natural resources management within ecological, social, economic and policy constraints.

FOR 454: Forestry Practicum
(1-4) Cr. 3. S.
Prereq: 20 credits in student's major at 300 level or above
Integrated decision-making related to the conservation, management, and preservation of private and public forests, wildlands, urban/community forests, and/or the production and utilization of wood products. Student teams work with a client and develop management plans that incorporate ecological, social, economic, ethical, and institutional/political factors. Effective teamwork, written/oral/visual communication, and problem-solving stressed. Multiple trips to project site and client.

FOR 475: Urban Forestry
(Cross-listed with HORT). (2-3) Cr. 3. F.
Prereq: Junior or senior classification, 3 credits in biology
Discussion of establishment and management of woody perennials in community-owned urban greenspaces, consideration of urban site and soil characteristics, plant physiology, plant culture, urban forest valuation, inventory methods, species selection, and urban forest maintenance (health care and pest management).

Courses primarily for graduate students, open to qualified undergraduates:

FOR 542: Dynamics of Forest Stands
(Dual-listed with FOR 442). (2-3) Cr. 3. Alt. F., offered even-numbered years.
Prereq: NREM 301, FOR 302, STAT 101 or their equivalents
Change in forest species composition and structure at the stand and landscape scales resulting from site quality, tree growth, competition, succession, and disturbance. Methods for assessing tree growth and reconstructing past stand development. Applications to forest and savanna management.

FOR 552: Ecosystem Management
(Dual-listed with FOR 452). (Cross-listed with NREM). (2-3) Cr. 3. S.
Prereq: Senior classification, and NREM 120 or its equivalent
Principles of planning, regulating, and decision-making associated with public and private lands, with consideration of forest, grassland, wetland, and freshwater aquatic ecosystems. Integrated natural resources management within ecological, social, economic and policy constraints.

FOR 599: Creative Component
Cr. 1-12. Repeatable, maximum of 12 credits.

FOR 599A: Creative Component: Forest Biology
Cr. 1-12. Repeatable, maximum of 12 credits.

FOR 599B: Creative Component: Forest Biometry
Cr. 1-12. Repeatable, maximum of 12 credits.

FOR 599C: Creative Component: Forest and Recreation Economics
Cr. 1-12. Repeatable, maximum of 12 credits.

FOR 599D: Creative Component: Forest Management and Administration
Cr. 1-12. Repeatable, maximum of 12 credits.

FOR 599E: Creative Component: Wood Science
Cr. 1-12. Repeatable, maximum of 12 credits.

Courses for graduate students:

FOR 696: Research Seminar
(Cross-listed with AGRON, BBMB, GDCB, HORT, PLBIO). Cr. 1. Repeatable. Research seminars by faculty and graduate students. Offered on a satisfactory-fail basis only.

FOR 699: Research
Cr. 1-12. Repeatable, maximum of 12 credits.

FOR 699A: Research: Forest Biology - Wood Science
Cr. 1-12. Repeatable, maximum of 12 credits.

FOR 699B: Research: Forest Biometry
Cr. 1-12. Repeatable, maximum of 12 credits.

FOR 699C: Research: Forest Economics
Cr. 1-12. Repeatable, maximum of 12 credits.

FOR 699D: Research: Forest Management and Administration
Cr. 1-12. Repeatable, maximum of 12 credits.

FOR 699E: Research: Wood Science

Cr. 1-12. Repeatable, maximum of 12 credits.

FOR 699F: Research: Plant Physiology

Cr. 1-12. Repeatable, maximum of 12 credits.