

FOREST ECOSYSTEM MANAGEMENT

2020-21 Student Handbook

Ecosystem Science and Management
College of Agricultural Sciences
The Pennsylvania State University



ecosystems.psu.edu



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Academic Resources

University Bulletin	Resource for academic information, course descriptions, and program requirements	bulletins.psu.edu
Canvas	Online system for teaching and learning	canvas.psu.edu
DUSuccess	Tools and resources to help you achieve academic success. Topics include motivation, direction & goals, adjustment to college, personal issues, study skills & time management, technology, tutoring, and finances for college.	dus.psu.edu/dusuccess/dus-success
LionPATH	Student Center for course registration, financial aid/tuition, transfer credit tool, graduation, academic changes and more	lionpath.psu.edu
Nittany Lion Careers	Recruiting platform for jobs, internships, and graduate assistantships	nittanylioncareers.psu.edu
Scholarships	College of Agricultural Sciences scholarships and emergency loan funds External scholarships about which we have been notified	agsci.psu.edu/students/scholarships ecosystems.psu.edu/undergraduate/resources/financial/external-scholarships
Starfish	Resource to communicate with advisers, instructors, and others who are here to support you	starfish.psu.edu
University Registrar	Academic calendars, enrollment verifications, leaving the University, returning to the University, student forms, transcripts, transfer credits	registrar.psu.edu

Ecosystem Science and Management Department

The Ecosystem Science and Management Department is an academic unit in the College of Agricultural Sciences at Penn State. Our mission is to provide educational opportunities and science-based information to protect, manage, and use natural resources for sustained benefits. This is accomplished through educational, research, and outreach programs in forestry, wildlife and fisheries, soils, water, and related areas.

The Ecosystem Science and Management Department offers two associate in science (A.S.) degree programs: Forest Technology (at Penn State Mont Alto) and Wildlife Technology (at Penn State DuBois); and two bachelor of science (B.S.) degree programs: Forest Ecosystem Management and Wildlife and Fisheries Science. A minor in each of these areas is also offered as is a minor in Environmental Soil Science and a certificate in Community Forestry. In addition, we offer graduate programs at both the master's and doctoral levels. We are committed to quality teaching.

Information about our academic programs, scholarships, student activities and professional societies, faculty, and facilities is available on our website, ecosystems.psu.edu.

Statement on Diversity and Inclusion

The Department of Ecosystem Science and Management is a community of students, staff, and faculty that values and is committed to advancing awareness and inclusion of diversity and strives to create a climate of mutual respect for all. We believe an environment of diversity and respect is critical to achieve and sustain excellence in learning, teaching, and research. Further, we recognize that the responsibility for our values lies with us all within the department – the leadership, faculty, staff, and students. As such, we will hold ourselves to a high standard of excellence and will not stand for the discrimination and harassment of any group or individual. To achieve this, we will:

1. Foster and maintain an environment of respect and inclusion.
2. Ensure equal opportunities for all students, including underrepresented students, and to provide resources to ensure a quality learning environment.
3. Hold students, staff, and faculty accountable according to Penn State policies and the Student Code of Conduct.

Reporting Incidents

Students who believe they have experienced or observed a hate crime, an act of intolerance, discrimination, or harassment that occurs at Penn State are urged to report these incidents as outlined on the University's Report Bias webpage (equity.psu.edu/reportbias). Incidents of gender-based discrimination, abuse, or harassment should be reported online at: titleix.psu.edu.

Additional Resources

- Penn State policy: guru.psu.edu/policies/ad91.html
- Student Code of Conduct: studentaffairs.psu.edu/support-safety-conduct/student-conduct/code-conduct

Undergraduate Programs Office

The Undergraduate Programs Office is a resource for all students, regardless of campus location, who are enrolled in, or thinking about enrolling in Forest Ecosystem Management or Wildlife and Fisheries Science.

CONTACT US

Undergraduate Programs Office
113 Forest Resources Building
University Park, PA 16802
(814) 865-4237



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Undergraduate Program Coordinator
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Introduction

Degrees in forestry have been awarded at Penn State University Park since 1907 and our program was among the first group of forestry programs accredited by the Society of American Foresters (SAF) in 1935. The SAF is a professional organization that strives, among other things, to advance the science, education, technology, and practice of forestry and is the only organization that may accredit forestry curricula in the United States.

The SAF maintains a list of accredited institutions on its website, eforester.org; click on the “Accreditation” tab. These institutions offer curricula that have been found to meet minimum standards for objectives, curriculum, faculty, students, administration, parent-institution support, and physical resources and facilities. The SAF accreditation process is recognized by the Commission on Recognition of Postsecondary Accreditation.



Penn State’s Forest Management, Forest Biology, and Community and Urban Forest Management options are accredited by the SAF and fulfill the educational qualification requirements for the federal occupational series in forestry. The Watershed Management option is not accredited by the SAF but fulfills the educational qualification requirements for the federal occupational series in hydrology, and with certain course selections may also fulfill the educational requirements for the federal occupational series in forestry. In addition, it is possible through elective coursework in all four options to satisfy several federal Wildland Firefighter basic trainings (Basic Firefighting PA130 and Introduction to Fire Behavior S190) and Wildfire Power Saws S212.

The scope and complexity of the forestry profession have increased since its inception in the United States more than a century ago. Today, professional foresters are challenged with the conservation, restoration, and sustainable provision of a wide range of forest ecosystem services including timber and non-timber forest products, wildlife habitat, biodiversity, clean water, healthy soils, carbon sequestration, recreational opportunities, and the aesthetics of both rural and urban landscapes. Foresters need specialized knowledge to manage for this wide range of ecosystem services.

Our curriculum teaches students to 1) identify, measure, and quantify a variety of forest ecosystem attributes, 2) communicate effectively with diverse groups, 3) analyze and interpret natural resources information in an ecological, economic, and social context, and 4) integrate the relevant ecological, economic, and societal aspects of contemporary problems in natural resources management and use this understanding to develop, support, and implement effective solutions.

For a successful forestry career, several personal qualities are desirable:

- a love of the woods and the outdoors
- concern for natural resources and an appreciation of nature
- an analytical mind to manage complex ecological systems and resolve environmental, economic, and social challenges
- an aptitude for innovation and strategic thinking

Forest Ecosystem Management graduates may become forest managers responsible for managing the flora and fauna on thousands of acres of forests and watersheds, including valuable timberland, national and state parks and forests, game lands, and recreation areas. Others may work as ecologists, studying environmental factors that affect forests, or as consultants, surveying timberlands and recommending harvest and reforestation practices. Graduates also find employment as community foresters managing urban trees and green spaces; as biometricians working with databases to assess forest conditions and trends; as industrial foresters ensuring a company’s need for raw materials; as land managers for conservation organizations; as park superintendents overseeing the operation of parks and recreation facilities; as resource economists determining levels of supply and demand for forest resources; as watershed managers responsible for the protection of municipal watersheds; or in forest policy, addressing issues raised by the interaction of people and forests.

Employment opportunities for graduates of the Forest Management and Forest Biology options include forest management positions with public agencies such as the Pennsylvania Bureau of Forestry and the U.S. Forest Service, nonprofit organizations such as The Nature Conservancy, industries such as sawmills and bioenergy facilities, and environmental consulting firms. The Community and Urban Forest Management option prepares students to manage community trees and green spaces. Employment opportunities include municipalities, arboricultural companies, utilities, and government agencies. The Watershed Management option focuses on the integrated management of natural resources, with emphasis on water. Graduates can find federal employment as hydrologists or pursue careers in municipal watershed management; in local, state, and federal government; and in environmental/engineering consulting.

Mission

The mission of the bachelor of science program in Forest Ecosystem Management is to help students develop the knowledge, skills, and professional ethics for understanding and managing forest ecosystems and living as responsible members of society.

Required Field Equipment

One of the hallmarks of the professional forester is familiarity and competency with commonly used field equipment. Several of the core courses in the Forest Ecosystem Management major require you to provide your own field equipment. Most of this equipment will be required by more than one course and, if properly maintained, will serve you for many years. It is your responsibility to obtain the required equipment in advance of each course. Student discounts from Forestry Suppliers are detailed below. You are not required to purchase equipment from a specific dealer; you may also choose to purchase used equipment.



Equipment	Courses
Mirrored compass (in azimuths, with adjustable declination)	FOR 266, 308, 421, 439
Clinometer* (with topo 1:66 and percent scales)	FOR 266, 308, 421, 439
75-foot Loggers tape (with DBH in tenths on backside)	FOR 266, 308, 421, 439
Horseshoe nail hook	FOR 266, 421
10 BAF prism and case	FOR 266, 421, 439
Tree and log scale stick (in International scale)	FOR 266
Hard hat (ANSI Z98.1 standard, fluorescent orange)	FOR 228, 266, 320, 439
Cruising vest (fluorescent orange)	FOR 266, 439

*Protective cases, although optional, are highly recommended to prolong the life of your equipment.

Forestry Suppliers

Forestry Suppliers (1-800-647-5368; forestry-suppliers.com) offers the following discounts to Penn State students. You must use **promotion code f43** when placing your order with Forestry Suppliers. This keycode will give you a **10% discount** on anything you order, even items not listed below, and you will also get a free Forestry Suppliers Field Cap. You will need to provide your name, billing and shipping address and payment information with your order. These Forestry Suppliers discounts are available through January 31, 2021.

Item #	Description	Catalog Price
37185 or 37163	Suunto® MC2D Navigator Compass with Inch Scales and USGS Scales, Azimuth	\$43.95 or \$42.95
43895	SUUNTO® PM5/66PC Clinometer with Percent and Topo Scales	\$145.25
39436	Spencer® Logger's Tape Model 975DC . Measures in feet, 10ths, 100ths on one side and 120" diameter inches, 10ths, other side	\$68.95
39341	Spencer Horseshoe Nail (get 3)	\$0.75
59026	JIM-GEM® Rectangular Shape Prism, 10 BAF, Clear	\$33.10
59770	Tree and Log Scale Stick, International 1/4" Scale	\$19.95
96010 or 96013	JIM-GEM® "Pro" 10-Pocket Cruiser Vest, Hi-Vis Orange (Make sure your cruising vest is large enough to fit over your winter coat)	\$76.75 or \$65.00

A 10% discount will also be applied to any hard hat or field vest you order from Forestry Suppliers; remember to use the promo code F43.

Hard hats (helmets) are available in a wide range of cost, comfort, and level of protection, and can also be purchased locally from several sources. You may wish to invest in a "better" product, which, with proper care, will provide good service for many years. Choose fluorescent orange color. **HARD HATS available from Forest Suppliers (ANSI Z98.1 standard, florescent orange)**

Item #	Description	Catalog Price
24206	MSA V-Gard ratchet	\$18.95
24356	MSA V-Gard pinlock	\$11.25
24556	Bullard Standard, pinlock	\$8.95
24529	Aluminum – Forester Full-Brim aluminum	\$54.95

Excel and Technology Resources

Microsoft Excel is used in several FOR courses, and proficiency with the software is expected.

Currently enrolled Penn State students have access to free online video tutorials at [linkedinlearning.psu.edu](https://www.linkedinlearning.psu.edu), and “Excel 2016 Essential Training” is one of many modules available. [Linkedinlearning.psu.edu](https://www.linkedinlearning.psu.edu) also includes tutorials on Illustrator, Dreamweaver, Photoshop, Access, PowerPoint, and more.

Penn State IT (Information Technology) provides chat, phone, and email support 24/7. Visit the **Technology Jumpstart Guide** for helpful information including recommendations for computer purchases.

At **Penn State IT Learning and Development**, students may search for technology training solutions that best meet their needs.

Tech tutors, [techtutors.psu.edu](https://www.techtutors.psu.edu), provide personalized, face-to-face, and online help with Access, Photoshop, Excel, PowerPoint, Visio, Word, Acrobat, Indesign, Sites at Penn State, WikiSpaces, Prezi, and more.

Forest Ecosystem Management Curriculum Requirements

(Effective Spring 2020)

120 - 123 credits are required for a Bachelor of Science degree in Forest Ecosystem Management:

- Forest Biology Option (FBIO) - 120 credits
- Forest Management Option (FMGT) - 120 credits
- Community and Urban Forest Management Option (CURFM) - 123 credits
- Watershed Management Option (WMGT) - 120 credits

Courses Required for ALL Options:

(Individual course credits are given in parentheses.)

COMMUNICATIONS

- ENGL 15 GWS* - Rhetoric and Composition (3)
- ENGL 202C GWS* - Technical Writing (3); or ENGL 202D GWS* - Business Writing (3)
- CAS 100 GWS* - Effective Speech (3)

QUANTIFICATION

- STAT 200 GQ* - Elementary Statistics (4); or STAT 240 GQ* - Introduction to Biometry (3); or STAT 250 GQ* - Introduction to Biostatistics (3)

NATURAL SCIENCES and OTHER PRESCRIBED COURSES

- CHEM 110 GN - Chemical Principles (3)
- CHEM 111 GN - Experimental Chemistry (1)
- AGBM 101 GS - Economic Principles of Agribusiness Decision Making (3) or ECON 102 GS - Introductory Microeconomic Analysis and Policy (3) or ECON 104 - Introductory Macroeconomic Analysis and Policy (3)
- FOR 200* - The Profession of Forestry (1)
- FOR 203* - Field Dendrology (3)
- FOR 255* - GPS and GIS Applications for Natural Resources Professionals (3)
- FOR 266* - Forest Resources Measurements (4)
- FOR 308* - Forest Ecology (3)
- FOR 421 - Silviculture (3)
- SOILS 101 - Introduction to Soils (3)

*Courses requiring at least a C grade.

ARTS [GA]

- Select from the University-approved Arts list (6)
(Note: the CURFM option requires that 3 GA credits be selected from LARCH 60, LARCH 65, or ARCH 316)

HUMANITIES [GH]

- Select from the University-approved Humanities list (6)

SOCIAL AND BEHAVIORAL SCIENCES [GS]

- AGBM 101 GS - Economic Principles of Agribusiness Decision Making (3) or ECON 102 GS - Introductory Microeconomic Analysis and Policy (3) or ECON 104 - Introductory Macroeconomic Analysis and Policy (3)
- Select from the University-approved Social and Behavioral Sciences list (3)
(Note: The WMGT option has a specific list of GS courses from which to choose.)

HEALTH AND WELLNESS [GHW]

- Select from the University-approved Health Sciences and Physical Education course list (3)

INTEGRATIVE STUDIES (6)

- May double count with other Gen Ed requirements.

ELECTIVES

- Open selection (excludes remedial courses) (2-11)

UNITED STATES CULTURES and INTERNATIONAL CULTURES

- Select 3 credits of University-approved United States Cultures (US) and 3 credits of University-approved International Cultures (IL) (6)
- Courses that are listed as both US or IL and GA, GH, or GS can count for both requirements (i.e., a course listed for both GA and IL will satisfy both Arts and International Cultures).

FIRST-YEAR SEMINAR

- Select a course designated as a First-Year Seminar (1+)

WRITING-INTENSIVE COURSE WORK [W]

- Select a writing-intensive course within your major or college of enrollment. (3)
This is satisfied by completion of FOR 466W in the FMGT option, and by FOR 450W in the CURFM, FBIO, and WMGT options.

Community and Urban Forest Management (CURFM) Option

Prescribed Courses for the Urban Forestry option:

- ENT 313 - Introduction to Entomology (2)
- ENT 314 - Management of Insect and Pests of Ornamentals (1)
- FOR 204* - Dendrology (2)
- FOR 401* - Urban Forest Management (3)
- FOR 450W* - Human Dimensions of Natural Resources (3)
- FOR 480 - Policy and Administration (3)
- GEOG 430 - Human Use of Environment (3)
- HORT 138 - Ornamental Plant Materials (3)
- HORT 301 - Principles of Arboriculture (3)
- HORT 408 - Landscape Plant Establishment and Maintenance (4)
- PLANT 217 - Landscape Soil and Water Management (3)
- PPEM 318 - Diseases of Forest and Shade Trees (2)

Additional Courses for the Urban Forestry option:

- BIOL 110 GN (4) or BIOL 127 GN (3)
- MATH 22 GQ* (3) and MATH 33 GQ* (3); or MATH 22 GQ* (3) and MATH 34 (GQ)* (3); or MATH 22 GQ* (3) and AGBM 106 (3); or MATH 110 GQ* (4); or MATH 140 GQ* (4)
- 3 credits from LARCH 60 GA (3) or LARCH 65 GA (3), or ARCH 316 GA (3)
- 3 credits from ERM 448 (3); FOR 439 (3); FOR 475 (3); or FOR 409 (2) and SOILS 102 (1)
- 3 credits from FOR 495* (3) or FOR 496* (3)
- 3 credits from RPTM 320 (3) or RPTM 325 (3) or RPTM 435 (3) or RPTM 470 (3)
- 3 credits from FOR 455 (3) or GEOG 363 (3) or SOILS 450 (3)
- 8-9 credits from Supporting Courses and related areas from one grouping.

Municipal Forestry –

AGECO 457, CAS 404, CED 309, CED 417, ERM 411, FOR 466W, HORT 201, LARCH 241

Commercial Arboriculture –

ACCTG 211, AGECO 457, BA 250, BLAW 243, FIN 100, HORT 201, MGMT 100, MKTG 221

Env. Outreach & Planning –

CAS 404, CED 309, CED 409, CED 417, CED 427W, ERM 411, FOR 410, FOR 430, FOR 470, LARCH 241,
LARCH 341, WFS 209N

**Courses requiring at least a C grade.*

▲ *Please see the **Internship Handbook**.*

Suggested Academic Plan for Forest Ecosystem Management – Community and Urban Forest Management Option
Commonwealth Campuses and University Park, Effective Spring 2020

Semester 1 (fall)	Credits	Semester 2 (spring)	Credits
First-Year Seminar	1-3	<i>CHEM 110 (GN)</i> Chemical Principles	3
MATH 22 & 33 (GQ), or MATH 22 & 34 (GQ), or MATH 22 & AGBM 106 (GQ), or MATH 110 (GQ), or MATH 140 (GQ)	4-6	<i>CHEM 111 (GN)</i> Experimental Chemistry	1
<i>BIOL 110 or 127 (GN)</i> Introductory Biology	3-4	<i>AGBM 101 (GS) or ECON 102 (GS) or ECON 104 (GS)</i>	3
ENGL 15 or 30 (GWS) Rhetoric & Comp	3	STAT 200, 240, or 250 (GQ) Statistics	3-4
General Education selection*	3	CAS 100 (GWS) Effective Speech	3
		General Education selection*	3
	credits: 14-19		credits: 16-17
Semester 3	Credits	Semester 4	Credits
FOR 200 Profession of Forestry	1	FOR 204 Dendrology	2
FOR 203 Field Dendrology	3	FOR 266 Forest Resources Measurements	4
FOR 255 GPS/GIS for Natural Resources	3	HORT 301 Principles of Arboriculture	3
<i>SOILS 101 (GN)</i> Introduction to Soils	3	ENT 313 Intro to Entomology	2
<i>LARCH 60, 65, or ARCH 316 (GA)</i>	3	ENT 314 Insect Pests of Ornamentals	1
General Education (GHW)	1.5	ENGL 202C or 202D (GWS)	3
	credits: 14.5		credits: 15
Semester 5	Credits	Semester 6	Credits
FOR 308 Forest Ecology	3	PPEM 318 Forest Pest Management	2
HORT 138 Ornamental Plant Materials - Shrubs	3	PLANT 217 Landscape Soil & Water Mgmt	3
Supporting Course	3	FOR 455, GEOG 363, or SOILS 450	3
ERM 448 Rural Roads, or FOR 439 Timber Sale Admin, or FOR 475 Forest Soils, or Supporting Course ▲	3	FOR 409 Tree Physiology and SOILS 102, or Supporting Course ▲	3
RPTM 320, 325, 435, or 470	3	General Education selection*	3
		Elective	0-5
	credits: 15		credits: 14-19
Semester 7	Credits	Semester 8	Credits
FOR 421 Silviculture	3	HORT 408 Landscape Plant Estab & Mainten	4
FOR 495 or 496	3	FOR 480 Policy & Administration	3
Supporting Course	2-3	GEOG 430 Human Use of Environment	3
FOR 401 Urban Forest Management	3	FOR 450W Human Dimensions Nat Res	3
General Education selection*	3	General Education (GHW)	1.5
		Elective	2
	credits: 14-15		credits: 16.5

*Refer to your degree audit to determine which General Education requirements need yet to be fulfilled.

▲Refer to both FOREM CURFM checksheet and your degree audit for clarification about how ERM 448, FOR 439, FOR 475, FOR 409, SOILS 102 and Supporting Courses satisfy degree requirements.

Bold type indicates courses requiring a grade of C or better; *italics* indicates courses that satisfy both major and General Education.

Name _____
 Student Number _____
 User ID _____

Adviser _____
 Gen Ed Year _____
 Program Year _____

**Forest Ecosystem Management
 Community and Urban Forest Management Option, 123 credits required
 effective spring 2020**

<i>Sem.</i>	<i>Course</i>	<i>Grade</i>
Prescribed Courses for the Major (24 cr.)		
_____	CHEM 110 GN	3 cr. _____
_____	CHEM 111 GN	1 cr. _____
_____	FOR 200*	1 cr. _____
_____	FOR 203*	3 cr. _____
_____	FOR 255*	3 cr. _____
_____	FOR 266*	4 cr. _____
_____	FOR 308*	3 cr. _____
_____	FOR 421	3 cr. _____
_____	SOILS 101 GN	3 cr. _____

Additional Courses for the Major (9-10 cr.)		
_____	AGBM 101 or ECON 102 or ECON 104 GS	3 cr. _____
_____	ENGL 202C* or 202D* GWS	3 cr. _____
_____	STAT 200*, 240*, or 250* GQ	3-4 cr. _____

Prescribed Courses for the Option (32 cr.)		
_____	ENT 313	2 cr. _____
_____	ENT 314	1 cr. _____
_____	FOR 204*	2 cr. _____
_____	FOR 401*	3 cr. _____
_____	FOR 450W*	3 cr. _____
_____	FOR 480	3 cr. _____
_____	GEOG 430	3 cr. _____
_____	HORT 138	3 cr. _____
_____	HORT 301	3 cr. _____
_____	HORT 408	4 cr. _____
_____	PLANT 217	3 cr. _____
_____	PPEM 318	2 cr. _____

*Courses requiring at least a C grade.
 A minimum cumulative GPA of 2.00 is required for graduation.
 Use this checklist in conjunction with your LionPATH degree audit to confirm completion of all degree requirements.

1/27/2020

<i>Sem.</i>	<i>Course</i>	<i>Grade</i>
Additional Courses for the Option (22-25 cr.)		
_____	BIOL 110 or 127 GN	3-4 cr. _____
_____	MATH 22* & 33* GQ; or MATH 22* & 34* GQ; or MATH 22* & AGBM 106* GQ, or MATH 110* GQ; or MATH 140* GQ	4-6 cr. _____
_____	LARCH 60, 65, or ARCH 316 GA	3 cr. _____
_____	ERM 448; or FOR 439; or FOR 475; or FOR 409 and SOILS 102	3 cr. _____
_____	FOR 495* or 496*	3 cr. _____
_____	RPTM 320, 325, 435, or 470	3 cr. _____
_____	FOR 455 or GEOG 363 or SOILS 450	3 cr. _____

Supporting Courses for the Option (8-9 cr.)		
<i>Select 8-9 credits, from one grouping, in consultation with an adviser.</i>		
<i>Municipal Forestry:</i> AGECO 457, CAS 404, CED 309, 417, ERM 411, FOR 466W, HORT 201, LARCH 241		
<i>Commercial Arboriculture:</i> ACCTG 211, AGECO 457, BA 250, BLAW 243, FIN 100, HORT 201, MGMT 100, MKTG 211		
<i>Env. Outreach & Planning:</i> CAS 404, CED 309, 409, 417, 427W, ERM 411, FOR 410, 430, 470, LARCH 241, 341, WFS 209		
_____	_____	_____ cr. _____
_____	_____	_____ cr. _____
_____	_____	_____ cr. _____
_____	_____	_____ cr. _____

Electives (2-7 cr.)		
_____	_____	_____ cr. _____
_____	_____	_____ cr. _____

General Education (45 cr.)
 24 of these 45 credits are included in the requirements listed above; that is, 9 credits of GN; 6 credits of GQ; 3 credits of GA; 3 credits of GS; and 3 credits of GWS. See back for remaining General Education requirements.

continued on back

**Forest Ecosystem Management, Community and Urban Forest Management Option
General Education (45 cr.) - effective summer 2018**

FOUNDATIONS (15 cr.) – all must be completed with a grade of 'C' or better

Writing/Speaking GWS 9 cr.

_____ ENGL 15 GWS 3 cr. _____

_____ CAS 100 GWS 3 cr. _____

and ENGL 202C GWS if 'C' or better grade is earned

Quantification GQ 6 cr.

satisfied by MATH GQ and STAT GQ if 'C' or better grades are earned

EXPLORATION (9 cr.) – select 9 credits that may include up to 6 credits of GN and up to 3 credits of the other domains (GH, GA, GS, GHW). Substituting an upper-level course, a World Language, or Move-3, can be discussed with your adviser. Substitutions require college-level approval and a manual update to your degree audit.

satisfied by 6 credits of SOILS 101 GN and CHEM 110 GN, and 3 credits of GA from Additional Courses for the Option

KNOWLEDGE DOMAINS (30 cr.)

Natural Sciences GN 9 cr.

satisfied by BIOL GN, CHEM 110 GN, and SOILS 101 GN

Arts GA 6 cr.

_____ 3 cr. _____

and ARCH 316, LARCH 60, or LARCH 65 GA

Humanities GH 6 cr.

_____ 3 cr. _____

_____ 3 cr. _____

Social and Behavioral Sciences GS 6 cr.

_____ 3 cr. _____

and AGBM 101 GS, ECON 102 GS, or ECON 104 GS

Health and Wellness GHW 3 cr.

_____ cr. _____

_____ cr. _____

BREADTH OF KNOWLEDGE (15 cr.) – at least 3 credits in each Knowledge Domain cannot be an inter-domain course, or a Move-3, or a World Language substitution

INTEGRATIVE STUDIES (6 cr.) – either inter-domain (N suffix) or linked (Z suffix) courses. May double count with other Gen Ed requirements. For inter-domain courses, credit may apply to both Knowledge Domain designations but does not reduce the total number of required credits within each domain. Linked courses must represent two different Knowledge Domains.

_____ 3 cr. _____

_____ 3 cr. _____

ADDITIONAL UNIVERSITY REQUIREMENTS (9-12 cr.) – may double count with General Education or Electives

United States Cultures (US)

_____ 3 cr. _____

International Cultures (IL)

_____ 3 cr. _____

First-Year Experience (FYS) 0-3 cr. – depending upon the campus at which you first enrolled

_____ cr. _____

Writing Across the Curriculum 3 cr.

satisfied by FOR 450W

If the GN, GA, GH, GS, and GHW requirements in the General Education areas above are completed prior to earning 30 total General Education units in those areas, complete additional courses with those attributes to meet the 30-unit requirement. The 30-unit total is tracked on the LionPATH degree audit and may also be tracked here.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

Forest Biology (FBIO) Option

Prescribed Courses for the Forest Biology option:

- BIOL 110 GN - Biology: Basic Concepts and Biodiversity (4)
- BIOL 220W GN - Biology: Populations and Communities (4)
- CHEM 202 - Fundamentals of Organic Chemistry I (3)
- FOR 204 - Dendrology (2)
- FOR 350* - Forest Ecosystem Monitoring and Data Analysis (3)
- FOR 409 - Tree Physiology (2)
- FOR 410 - Elements of Forest Ecosystem Management (3)
- FOR/WFS 430 - Conservation Biology (3)
- FOR 450W - Human Dimensions of Natural Resources (3)
- HORT 445 - Plant Ecology (3)
- SOILS 102 - Introductory Soil Science Laboratory (1)
- WFS 209N - Wildlife and Fisheries Conservation (3)

*Courses requiring at least a C grade.

Additional Courses for the Forest Biology option:

- MATH 110 GQ* (4) or MATH 140 GQ* (4)
- Select 4-5 credits from ENT 313 (2) or FOR 403 (3) or PPEM 318 (2)
- Supporting Courses selected in consultation with a Forest Ecosystem Management Adviser (15)

Supporting Course selections for the Forest Biology option:

Select required courses for a MINOR in Biology or Chemistry or Mathematics or Statistics or
Select 15 credits from department list in consultation with an adviser.

A maximum of 3-4 credits may be selected from this list:

BIOL 222	ERM 300	METEO 122
BIOL 240W	HORT 202	SC 120 (<i>prior to fall 2020 was BIOL 120</i>)

Select 12-15 credits from this list:

AGECO 438▲	BIOL 420	BIOL 441▲	BIOL 463	FOR 494 (3 cr. max)	HORT 407	WFS 409▲
AGECO 457	BIOL 427▲	BIOL 444	ERM 412▲	GEOG 314	SOILS 412W▲	WFS 447W
BIOL 407▲	BIOL 428▲	BIOL 446▲	FOR 303	GEOG 411	WFS 406▲	WFS/ERM 450
BIOL 414▲	BIOL 436	BIOL 448▲	FOR 418	GEOG 412W▲	WFS 407	
BIOL 419	BIOL 438▲	BIOL 450W▲	FOR 475	HORT 402W▲	WFS 408	

▲Course has prerequisites not otherwise required in FOREM FBIO program

Suggested Academic Plan for Forest Ecosystem Management - Forest Biology
Starting at Commonwealth Campuses, Effective Spring 2020

Semester 1 (fall)		Credits	Semester 2 (spring)		Credits
First-Year Seminar		1-3	BIOL 220W (GN) Populations and Comm		4
<i>BIOL 110 (GN) Basic Concepts and Biodiversity</i>		4	<i>CHEM 110 (GN) Chemical Principles</i>		3
MATH 110 or 140 (GQ)		4	<i>CHEM 111 (GN) Experimental Chem.</i>		1
ENGL 15 or 30 (GWS) Rhetoric & Comp		3	STAT 200, 240, or 250 (GQ) Statistics		3-4
General Education selection*		3	CAS 100 (GWS) Effective Speech		3
	credits:	15-17		credits:	14 -15
Semester 3		Credits	Semester 4		Credits
FOR 200 Profession of Forestry		1	FOR 204 Dendrology		2
FOR 203 Field Dendrology		3	FOR 266 Forest Resources Measurements		4
FOR 255 GPS/GIS for Natural Resources		3	CHEM 202 Organic Chemistry I		3
<i>SOILS 101 (GN) Introduction to Soils</i>		3	<i>AGBM 101 (GS) or ECON 102 (GS) or ECON 104 (GS)</i>		3
SOILS 102 (GN)		1	ENGL 202C or 202D (GWS)		3
WFS 209N Wildlife and Fisheries Cons.		3	General Education selection*		3
	credits:	14		credits:	18
Semester 5		Credits	Semester 6		Credits
FOR 308 Forest Ecology		3	ENT 313, FOR 403, or PPEM 318 (need 2)		2-3
Supporting Course selection from list		3	FOR 350 Ecosystem Monitoring & Data Analysis		3
General Education selection*		3	FOR 409 Tree Physiology		2
General Education selection*		3	FOR 410 Forest Ecosystem Management		3
FOR/WFS 430 Conservation Biology		3	Supporting Course selection from list		3
General Education (GHW)		1.5	General Education (GHW) *		1.5
	credits:	16.5		credits:	14.5-15.5
Semester 7		Credits	Semester 8		Credits
FOR 421 Silviculture		3	ENT 313, FOR 403, or PPEM 318 (need 2)		2-3
General Education selection*		3	FOR 450W Human Dimensions Nat Res		3
HORT 445 Plant Ecology		3	Supporting Course selection from list		3
Supporting Course selection from list		3	Supporting Course selection from list		3
Elective		3	Elective		1-3
	credits:	15		credits:	12-15

*Refer to your degree audit to determine which General Education requirements need yet to be fulfilled.

Bold type indicates courses requiring a grade of C or better; *italics* indicates courses that satisfy both major and General Education.

Suggested Academic Plan for Forest Ecosystem Management - Forest Biology
Starting at University Park, Effective Spring 2020

Semester 1 (fall)	Credits	Semester 2 (spring)	Credits
First-Year Seminar	1-3	<i>AGBM 101 (GS) or ECON 102 (GS) or ECON 104 (GS)</i>	3
<i>BIOL 110 (GN) Basic Concepts and Biodiversity</i>	4	<i>CHEM 110 (GN) Chemical Principles</i>	3
MATH 110 or 140 (GQ)	4	<i>CHEM 111 (GN) Experimental Chem.</i>	1
ENGL 15 or 30 (GWS) Rhetoric & Comp	3	STAT 200, 240, or 250 (GQ) Statistics	3-4
General Education selection*	3	CAS 100 (GWS) Effective Speech	3
		WFS 209N Wildlife and Fisheries Cons.	3
	credits: 15-17		credits: 16-17
Semester 3	Credits	Semester 4	Credits
FOR 200 Profession of Forestry	1	FOR 204 Dendrology	2
FOR 203 Field Dendrology	3	FOR 266 Forest Resources Measurements	4
FOR 255 GPS/GIS for Natural Resources	3	CHEM 202 Organic Chemistry I	3
BIOL 220W (GN) Populations and Comm	4	General Education selection*	3
General Education selection*	3	<i>SOILS 101 (GN) Introduction to Soils</i>	3
		SOILS 102 (GN)	1
	credits: 14		credits: 16
Semester 5	Credits	Semester 6	Credits
FOR 308 Forest Ecology	3	ENT 313, FOR 403, or PPEM 318 (need 2)	2-3
ENGL 202C or 202D (GWS)	3	FOR 350 Ecosystem Monitoring & Data Analysis	3
General Education selection*	3	FOR 409 Tree Physiology	2
Supporting Course selection from list	3	FOR 410 Forest Ecosystem Management	3
FOR/WFS 430 Conservation Biology	3	Supporting Course selection from list	3
General Education (GHW)	1.5	General Education (GHW)	1.5
	credits: 16.5		credits: 14.5-15.5
Semester 7	Credits	Semester 8	Credits
FOR 421 Silviculture	3	ENT 313, FOR 403, or PPEM 318 (need 2)	2-3
General Education selection*	3	FOR 450W Human Dimensions Nat Res	3
HORT 445 Plant Ecology	3	Supporting Course selection from list	3
Supporting Course selection from list	3	Supporting Course selection from list	3
Elective	3	Elective	1-3
	credits: 15		credits: 12-15

*Refer to your degree audit to determine which General Education requirements need yet to be fulfilled.

Bold type indicates courses requiring a grade of C or better; *italics* indicates courses that satisfy both major and General Education.

Name _____
 Student Number _____
 User ID _____

Adviser _____
 Gen Ed Year _____
 Program Year _____

**Forest Ecosystem Management
 Forest Biology Option, 120 credits required
 effective spring 2020**

Sem. Course Grade

Prescribed Courses for the Major (24 cr.)

_____	CHEM 110 GN	3 cr.	_____
_____	CHEM 111 GN	1 cr.	_____
_____	FOR 200*	1 cr.	_____
_____	FOR 203*	3 cr.	_____
_____	FOR 255*	3 cr.	_____
_____	FOR 266*	4 cr.	_____
_____	FOR 308*	3 cr.	_____
_____	FOR 421	3 cr.	_____
_____	SOILS 101 GN	3 cr.	_____

Additional Courses for the Major (9-10 cr.)

_____	AGBM 101 or ECON 102 or ECON 104 GS	3 cr.	_____
_____	ENGL 202C* or 202D* GWS	3 cr.	_____
_____	STAT 200*, 240*, or 250* GQ	3-4 cr.	_____

Prescribed Courses for the Option (34 cr.)

_____	BIOL 110 GN	4 cr.	_____
_____	BIOL 220W GN	4 cr.	_____
_____	CHEM 202	3 cr.	_____
_____	FOR 204	2 cr.	_____
_____	FOR 350*	3 cr.	_____
_____	FOR 409	2 cr.	_____
_____	FOR 410	3 cr.	_____
_____	FOR/WFS 430	3 cr.	_____
_____	FOR 450W	3 cr.	_____
_____	HORT 445	3 cr.	_____
_____	SOILS 102 GN	1 cr.	_____
_____	WFS 209N	3 cr.	_____

Sem. Course Grade

Additional Courses for the Option (8-9 cr.)

_____	MATH 110* or 140* GQ	4 cr.	_____
_____	Forest Health theme: Select 4-5 credits from ENT 313(2), FOR 403(3), and PPEM 318(2)	4-5 cr.	_____

Supporting Courses for the Option (15 cr.)

Select credits from departmental list in consultation with adviser.

_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____

Electives (4-6 cr.)

_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____

General Education (45 cr.)

21 of these 45 credits are included in the requirements listed above; that is, 9 credits of GN; 6 credits of GQ; 3 credits of GS; and 3 credits of GWS. See back for remaining General Education requirements.

*Courses requiring at least a C grade.
 A minimum cumulative GPA of 2.00 is required for graduation.
 Use this checksheet in conjunction with your LionPATH degree audit to confirm completion of all degree requirements.

continued on back

**Forest Ecosystem Management, Forest Biology Option
General Education (45 cr.) - effective summer 2018**

FOUNDATIONS (15 cr.) – all must be completed with a grade of 'C' or better

Writing/Speaking GWS 9 cr.

_____ ENGL 15 GWS 3 cr. _____

_____ CAS 100 GWS 3 cr. _____

and ENGL 202C GWS if 'C' or better grade is earned

Quantification GQ 6 cr.

satisfied by MATH GQ and STAT GQ if 'C' or better grades are earned

KNOWLEDGE DOMAINS (30 cr.)

Natural Sciences GN 9 cr.

satisfied by BIOL 110 GN, CHEM 110 GN, and SOILS 101 GN

Arts GA 6 cr.

_____ 3 cr. _____

_____ 3 cr. _____

Humanities GH 6 cr.

_____ 3 cr. _____

_____ 3 cr. _____

Social and Behavioral Sciences GS 6 cr.

_____ 3 cr. _____

and AGBM 101 GS, ECON 102 GS, or ECON 104 GS

Health and Wellness GHW 3 cr.

_____ 3 cr. _____

_____ 3 cr. _____

BREADTH OF KNOWLEDGE (15 cr.) – at least 3 credits in each Knowledge Domain cannot be an inter-domain course, or a Move-3, or a World Language substitution

INTEGRATIVE STUDIES (6 cr.) – either inter-domain (N suffix) or linked (Z suffix) courses. May double count with other Gen Ed requirements. For inter-domain courses, credit may apply to both Knowledge Domain designations but does not reduce the total number of required credits within each domain. Linked courses must represent two different Knowledge Domains.

_____ 3 cr. _____

_____ 3 cr. _____

EXPLORATION (9 cr.) – select 9 credits that may include up to 6 credits of GN and up to 3 credits of the other domains (GH, GA, GS, GHW). Substituting an upper-level course, a World Language, or Move-3, can be discussed with your adviser. Substitutions require college-level approval and a manual update to your degree audit.

satisfied by 6 credits of SOILS 101 GN and CHEM 110 GN, and 3 credits of a second single-domain course in GA, GH, GS, or GHW.

ADDITIONAL UNIVERSITY REQUIREMENTS (9-12 cr.) – may double count with General Education or Electives

United States Cultures (US)

_____ 3 cr. _____

International Cultures (IL)

_____ 3 cr. _____

First-Year Experience (FYS) 0-3 cr. – depending upon the campus at which you first enrolled

_____ cr. _____

Writing Across the Curriculum 3 cr.

satisfied by FOR 450W

If the GN, GA, GH, GS, and GHW requirements in the General Education areas above are completed prior to earning 30 total General Education units in those areas, complete additional courses with those attributes to meet the 30-unit requirement. The 30-unit total is tracked on the [LionPATH](#) degree audit and may also be tracked here.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

_____ cr.

Forest Management (FMGT) Option

Prescribed Courses for the Forest Management option:

- ENT 313 - Introduction to Entomology (2)
- FOR 204 - Dendrology (2)
- FOR 320* - Forest Fire Management (2)
- FOR 350* - Forest Ecosystem Monitoring and Data Analysis (3)
- FOR 440 - Forest and Conservation Economics (3)
- FOR 455* - Remote Sensing and Spatial Data Handling (3)
- FOR 466W* - Forest Management and Planning (3)
- FOR 470 - Watershed Management (3)
- FOR 480 - Policy and Administration (3)
- PPEM 318 - Diseases of Forest and Shade Trees (2)
- WFS 209N - Wildlife and Fisheries Conservation (3)

Additional Courses for the Forest Management option:

- BIOL 110 GN (4) or BIOL 127 GN (3)
- FOR 401 - Urban Forest Management (3) or FOR 450W - Human Dimensions of Natural Resources (3)
- FOR 410 - Elements of Forest Ecosystem Management (3) or FOR/WFS 430 - Conservation Biology (3)
- ERM 448 - Rural Road Ecology and Maintenance (3); or FOR 439 - Timber Sale Administration (3); or FOR 475 - Principles of Forest Soils Management; or FOR 409 - Tree Physiology (2) and SOILS 102 - Introductory Soil Science Laboratory (1)
- MATH 22 GQ* (3) and MATH 33 GQ* (3); or MATH 22 GQ* (3) and MATH 34 (GQ)* (3); or MATH 22 GQ* (3) and AGBM 106 (3); or MATH 110 GQ* (4); or MATH 140 GQ* (4)
- Supporting Courses and related areas selected in consultation with a Forest Ecosystem Management adviser (12)

*Courses requiring at least a C grade.

Supporting Courses for the Forest Management option must be selected from the list below.

- Select 12 credits from department list in consultation with adviser.
- Courses that count toward a designated minor will count as Supporting Courses.
- Six of the 12 credits must be at the 300- or 400-level

AGBM 101	ERM 300	FOR 450W	GEOG 363	MATH 318	SOILS 422	WFS 436
ASM 327	ERM 411	FOR 471	GEOG 364	MATH 319	SOILS 450	WFS 446
BA 250	ERM 412	FOR 475	GEOG 411W	PHYS 150	SOILS 499	WFS 447W
CAS 211	ERM 413W	FOR 488Y	GEOG 412W	PHYS 211	STAT 301	WFS 450
CAS 212	ERM 430	FOR 497	GEOG 430	PLANT 217	STAT 318	WFS 452
CAS 213	ERM 435	FOR 499	GEOG 434	PLSC 135	STAT 319	WFS 453
CAS 252	ERM 436	FORT 130	GEOG 436	PLSC 403	STAT 401	WFS 454
CAS 404	ERM 447	FORT 140	GEOG 463	PLSC 444	STAT 402	WFS 460
CED 201	ERM 448	FORT 170	GEOG 464	PPATH 405	SUST 200	WFS 462
CED 309	ERM 450	FORT 230	GEOG 467	SOILS 102	WFS 300	WFS 463W
CED 409	FOR 201	FORT 250	GEOG 468	SOILS 401	WFS 301	WFS 499
CED 417	FOR 242	GEOG 110	GEOG 483	SOILS 402	WFS 310	WILDL103
CED 427W	FOR 297	GEOG 130	GEOG 484	SOILS 403	WFS 406	WILDL 106S
CED 429	FOR 303	GEOG 160	GEOG 485	SOILS 404	WFS 407	WILDL 204
CED 431W	FOR 401	GEOG 161	GEOG 486	SOILS 405	WFS 408	WILDL 208M
CMPSC 101	FOR 403	GEOG 310W	GEOG 487	SOILS 412W	WFS 409	WILDL 211
CMPSC 203	FOR 409	GEOG 311	GEOG 488	SOILS 416	WFS 410	WILDL 213
EARTH 103	FOR 410	GEOG 314	GEOG 489	SOILS 418	WFS 422	WP 203
ECON 302	FOR 418	GEOG 361	MATH 111	SOILS 419	WFS 430	
ECON 428	FOR 439	GEOG 362	MATH 141	SOILS 420	WFS 435	

Suggested Academic Plan for Forest Ecosystem Management - Forest Management
Commonwealth Campuses and University Park, Effective Spring 2020

Semester 1 (fall)	Credits	Semester 2 (spring)	Credits
First-Year Seminar	1-3	<i>CHEM 110 (GN)</i> Chemical Principles	3
MATH 22 & 33 (GQ), or MATH 22 & 34 (GQ), or MATH 22 & AGBM 106 (GQ), or MATH 110 (GQ), or MATH 140 (GQ)	4-6	<i>CHEM 111 (GN)</i> Experimental Chem.	1
<i>BIOL 110 or 127 (GN)</i> Introductory Biology	3-4	<i>AGBM 101 (GS) or ECON 102 (GS) or ECON 104 (GS)</i>	3
ENGL 15 or 30 (GWS) Rhetoric & Comp	3	STAT 200, 240, or 250 (GQ) Statistics	3-4
General Education selection*	3	CAS 100 (GWS) Effective Speech	3
		General Education selection*	3
credits:	14-19	credits:	16-17
Semester 3	Credits	Semester 4	Credits
FOR 200 Profession of Forestry	1	FOR 204 Dendrology	2
FOR 203 Field Dendrology	3	FOR 266 Forest Resources Measurements	4
FOR 255 GPS/GIS for Natural Resources	3	PPEM 318 Forest Pest Management	2
<i>SOILS 101 (GN)</i> Introduction to Soils	3	ENT 313 Intro to Entomology	2
General Education selection*	3	ENGL 202C or 202D (GWS)	3
General Education (GHW)	1.5	General Education selection*	3
credits:	14.5	credits:	16
Semester 5	Credits	Semester 6	Credits
FOR 308 Forest Ecology	3	FOR 320 Forest Fire Management	2
FOR 440 Forest and Conservation Economics	3	FOR 350 Ecosystem Monitoring & Data Analysis	3
General Education selection*	3	WFS 209N Wildlife and Fisheries Cons.	3
FOR 401 Urban Forest Management or Supporting Course ▲	3	FOR 450W Human Dimensions Nat Res or Supporting Course ▲	3
Elective	2	FOR 455 Remote Sensing & Spatial Data	3
		General Education (GHW)	1.5
credits:	14	credits:	15.5
Semester 7	Credits	Semester 8	Credits
ERM 448 Rural Roads, or FOR 439 Timber Sale Admin, or FOR 475 Forest Soils, or Supporting Course ▲	3	FOR 409 Tree Physiology <u>and</u> SOILS 102, or Supporting Course ▲	3
FOR 421 Silviculture	3	FOR 466W Forest Management & Planning	3
FOR/WFS 430 Conservation Biology or Supporting Course ▲	3	FOR 410 Forest Eco Mgmt or Supporting Course ▲	3
Supporting Course	3	FOR 470 Watershed Hydrology	3
Elective	0-4	FOR 480 Policy & Administration	3
credits:	12-16	credits:	15

*Refer to your degree audit to determine which General Education requirements need yet to be filled.

▲ Refer to FOREM FMGT checksheet and your degree audit for clarification about how FOR 401, FOR 450W, ERM 448, FOR 439, FOR 475, FOR 409, SOILS 102, FOR/WFS 430, FOR 410 and Supporting Courses satisfy degree requirements.

Bold type indicates course requiring a grade of C or better; *italics* indicates courses that satisfy both major and General Education.

Name _____

Adviser _____

Student Number _____

Gen Ed Year _____

User ID _____

Program Year _____

**Forest Ecosystem Management
Forest Management Option, 120 credits required
effective spring 2020**

Sem. Course Grade

Sem. Course Grade

Prescribed Courses for the Major (24 cr.)

_____	CHEM 110 GN	3 cr.	_____
_____	CHEM 111 GN	1 cr.	_____
_____	FOR 200*	1 cr.	_____
_____	FOR 203*	3 cr.	_____
_____	FOR 255*	3 cr.	_____
_____	FOR 266*	4 cr.	_____
_____	FOR 308*	3 cr.	_____
_____	FOR 421	3 cr.	_____
_____	SOILS 101 GN	3 cr.	_____

Additional Courses for the Option (16-19 cr.)

_____	BIOL 110 or 127GN	3-4 cr.	_____
_____	FOR 401 or 450W	3 cr.	_____
_____	FOR 410 or FOR/WFS 430	3 cr.	_____
_____	ERM 448; or FOR 439; or FOR 475; or FOR 409 and SOILS 102	3 cr.	_____
_____	MATH 22* & 33* GQ; or MATH 22* & 34* GQ; or MATH 22* & AGBM 106* GQ, or MATH 110* GQ; or MATH 140* GQ	4-6 cr.	_____

Additional Courses for the Major (9-10 cr.)

_____	AGBM 101 or ECON 102 or ECON 104 GS	3 cr.	_____
_____	ENGL 202C* or 202D* GWS	3 cr.	_____
_____	STAT 200*, 240*, or 250* GQ	3-4 cr.	_____

Supporting Courses for the Option (12 cr.)

Select credits from departmental list in consultation with adviser. Six credits must be at the 300- or 400-level.

_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____

Prescribed Courses for the Option (29 cr.)

_____	ENT 313	2 cr.	_____
_____	FOR 204	2 cr.	_____
_____	FOR 320*	2 cr.	_____
_____	FOR 350*	3 cr.	_____
_____	FOR 440	3 cr.	_____
_____	FOR 455*	3 cr.	_____
_____	FOR 466W*	3 cr.	_____
_____	FOR 470	3 cr.	_____
_____	FOR 480	3 cr.	_____
_____	PPEM 318	2 cr.	_____
_____	WFS 209N	3 cr.	_____

Electives (2-6 cr.)

_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____
_____	_____	_____ cr.	_____

*Courses requiring at least a C grade.

A minimum cumulative GPA of 2.00 is required for graduation.

Use this checklist in conjunction with your LionPATH degree audit to confirm completion of all degree requirements.

General Education (45 cr.)

21 of these 45 credits are included in the requirements listed above; that is, 9 credits of GN; 6 credits of GQ; 3 credits of GS; and 3 credits of GWS. See back for remaining General Education requirements.

12/29/2020

continued on back

**Forest Ecosystem Management, Forest Management Option
General Education (45 cr.) - effective summer 2018**

FOUNDATIONS (15 cr.) – all must be completed with a grade of 'C' or better

Writing/Speaking GWS 9 cr.

_____ ENGL 15 GWS 3 cr. _____
 _____ CAS 100 GWS 3 cr. _____
 and ENGL 202C GWS if 'C' or better grade is earned

Quantification GQ 6 cr.

satisfied by MATH GQ and STAT GQ if 'C' or better grades are earned

KNOWLEDGE DOMAINS (30 cr.)

Natural Sciences GN 9 cr.

satisfied by BIOL GN, CHEM 110 GN, and SOILS 101 GN

Arts GA 6 cr.

_____ 3 cr. _____
 _____ 3 cr. _____

Humanities GH 6 cr.

_____ 3 cr. _____
 _____ 3 cr. _____

Social and Behavioral Sciences GS 6 cr.

_____ 3 cr. _____
 and AGBM 101 GS, ECON 102 GS, or ECON 104 GS

Health and Wellness GHW 3 cr.

_____ cr. _____
 _____ cr. _____

BREADTH OF KNOWLEDGE (15 cr.) – at least 3 credits in each Knowledge Domain cannot be an inter-domain course, or a Move-3, or a World Language substitution

INTEGRATIVE STUDIES (6 cr.) – either inter-domain (N suffix) or linked (Z suffix) courses. May double count with other Gen Ed requirements. For inter-domain courses, credit may apply to both Knowledge Domain designations but does not reduce the total number of required credits within each domain. Linked courses must represent two different Knowledge Domains.

_____ 3 cr. _____
 _____ 3 cr. _____

EXPLORATION (9 cr.) – select 9 credits that may include up to 6 credits of GN and up to 3 credits of the other domains (GH, GA, GS, GHW). Substituting an upper-level course, a World Language, or Move-3, can be discussed with your adviser. Substitutions require college-level approval and a manual update to your degree audit.

satisfied by 6 credits of SOILS 101 GN and CHEM 110 GN, and 3 credits of a second single-domain course in GA, GH, GS, or GHW.

ADDITIONAL UNIVERSITY REQUIREMENTS (9-12 cr.) – may double count with General Education or Electives

United States Cultures (US)

_____ 3 cr. _____

International Cultures (IL)

_____ 3 cr. _____

First-Year Experience (FYS) 0-3 cr. – depending upon the campus at which you first enrolled

_____ cr. _____

Writing Across the Curriculum 3 cr.

satisfied by FOR 466W

If the GN, GA, GH, GS, and GHW requirements in the General Education areas above are completed prior to earning 30 total General Education units in those areas, complete additional courses with those attributes to meet the 30-unit requirement. The 30-unit total is tracked on the LionPATH degree audit and may also be tracked here.

_____ cr. _____
 _____ cr. _____
 _____ cr. _____
 _____ cr. _____
 _____ cr. _____
 _____ cr. _____
 _____ cr. _____
 _____ cr. _____
 _____ cr. _____
 _____ cr. _____
 _____ cr. _____

Watershed Management (WMGT) Option

Prescribed Courses for the Watershed Management option:

- FOR 450W - Human Dimensions of Natural Resources (3)
- FOR 470* - Watershed Management (3)
- FOR 471* - Watershed Management Laboratory (1)

Additional Courses for the Watershed Management option:

- MATH 110 GQ* (4); or MATH 140 GQ* (4)
- MATH 111 GQ (2); or MATH 141 GQ (4)
- ERM 448 - Rural Road Ecology and Maintenance (3); or FOR 439 - Timber Sale Administration (3); or FOR 475 - Principles of Forest Soils Management; or FOR 409 - Tree Physiology (2) and SOILS 102 - Introductory Soil Science Laboratory (1)

Supporting Courses for the Watershed Management option:

- 6 credits of GS social sciences from EBF 200 GS (3), ECON 302 GS (3), EGEE 211 GS (3), ENVST 100 GS (3), GEOG 20 GS (3), GEOG 30N GS (3), GEOG 130 GS (3), GEOG 160 GS (3), PLSC 1 GS (3), PLSC 135 GS (3)
- 6 credits of physical sciences from EARTH 100 GN (3), EARTH 103 GN (3), EARTH 111 GN (3), GEOG 10 GN (3), GEOG 110 GN (3), GEOSC 1 (3), GEOSC 10 GN (3), GEOSC 40 GN (3), METEO 3 GN (3), METEO 122 GN (3), MICRB 106 GN (3), MICRB 201 (3)
- 6-8 credits of GN from PHYS 1 GN (3), PHYS 150 GN (3), PHYS 151 GN (3), PHYS 211 GN (4), PHYS 213 GN (2), PHYS 250 GN (4), PHYS 251 GN (4)
- 3 credits of geospatial analysis from FOR 455 (3), GEOG 362 (3), GEOG 363 (3), GEOG 364 (3) or SOILS 450 (3)
- 6 credits of resources management from ASM 327 (3), CED 201 (3), CED 427W (3), CED 429 (3), CED 431W (3), CED 450 IL (3), ERM 411 (3), ERM 412 (3), ERM 413W (3), FOR 410 (3), FOR 440 (3), GEOG 411W (3), GEOG 430 (3), GEOG 431 (3), SOILS 422 (3)
- 9 credits of water sciences from ASM 309 (3), CE 360 (3), CE 370 (3), CE 371 (3), ENVE 411 (3), ENVE 415 (3), ENVSE 408 (3), ERM 435 (3), ERM 447 (3), ERM 450 (3), GEOG 310W (3), GEOG 311 (3), GEOG 412W (3), GEOSC 412 (3), GEOSC 413W (3), GEOSC 440 (3), GEOSC 452 (3), METEO 451 (3), METEO 454 (3), SOILS 405 (3), WFS 422 (3).
Three credits must be at the 400-level.
- 3 additional credits at the 300- or 400-level from the lists above.

* Courses requiring at least a C grade.

Suggested Academic Plan for Forest Ecosystem Management – Watershed Management
Commonwealth Campuses and University Park, Effective Spring 2020

Semester 1 (fall)	Credits	Semester 2 (spring)	Credits
First-Year Seminar	1-3	<i>MATH 111 or 141 (GQ)</i>	2-4
<i>MATH 110 or 140 (GQ)</i>	4	<i>CHEM 110 (GN) Chemical Principles</i>	3
<i>ENGL 15 or 30 (GWS) Rhetoric & Comp</i>	3	<i>CHEM 111 (GN) Experimental Chemistry</i>	1
General Education selection*	3	<i>STAT 200, 240, or 250 (GQ) Statistics</i>	3-4
<i>AGBM 101 (GS) or ECON 102 (GS) or ECON 104 (GS)</i>	3	<i>CAS 100 (GWS) Effective Speech</i>	3
	credits: 14-16		credits: 12 -15
Semester 3	Credits	Semester 4	Credits
FOR 200 Profession of Forestry	1	FOR 266 Forest Resources Measurements	4
FOR 203 Field Dendrology	3	<i>PHYS GN selection from list</i>	3-4
FOR 255 GIS for Natural Resources	3	<i>Social Sciences (GS) selection from list</i>	3
<i>SOILS 101 (GN) Introduction to Soils</i>	3	<i>ENGL 202C or 202D (GWS)</i>	3
General Education selection*	3	General Education selection*	3
General Education (GHW)	1.5		
	credits: 14.5		credits: 16-17
Semester 5	Credits	Semester 6	Credits
FOR 308 Forest Ecology	3	FOR 470 Watershed Hydrology	3
<i>PHYS GN selection from list</i>	3-4	FOR 471 Watershed Measurement Techniques	1
Resources Management selection from list	3	Physical Sciences selection from list	3
ERM 448 Rural Roads, or FOR 439 Timber Sale Admin, or FOR 475 Forest Soils, or Geospatial Analysis selection from list ▲	3	FOR 409 Tree Physiology and SOILS 102, or Geospatial Analysis selection from list ▲	3
Water Sciences selection from list	3	Social Sciences GS selection from list	3
		General Education (GHW)	1.5
	credits: 15-16		credits: 14.5
Semester 7	Credits	Semester 8	Credits
FOR 421 Silviculture	3	Elective	3-6
Physical Sciences selection from list	3	Resources Management selection from list	3
Water Sciences selection from list	3	FOR 450W Human Dimensions Natural Resources	3
General Education selection*	3	Water Sciences selection from list	3
Elective	3-5	Three additional credits at the 300- or 400-level from selection lists	3
	credits: 15-17		credits: 15-18

*Refer to your degree audit to determine which General Education requirements need yet to be fulfilled.

▲Refer to FOREM WMGT checksheet and your degree audit for clarification about how ERM 448, FOR 439, FOR 475, FOR 409, SOILS 102, and Geospatial Analysis selection satisfy degree requirements.

Bold type indicates courses requiring a grade of C or better; *italics* indicates courses that satisfy both major and General Education.

Name _____
 Student Number _____
 User ID _____

Adviser _____
 Gen Ed Year _____
 Program Year _____

**Forest Ecosystem Management
 Watershed Management Option, 120 credits required
 effective spring 2020**

Sem. Course Grade

Prescribed Courses for the Major (24 cr.)

_____ CHEM 110 GN 3 cr. _____
 _____ CHEM 111 GN 1 cr. _____
 _____ FOR 200* 1 cr. _____
 _____ FOR 203* 3 cr. _____
 _____ FOR 255* 3 cr. _____
 _____ FOR 266* 4 cr. _____
 _____ FOR 308* 3 cr. _____
 _____ FOR 421 3 cr. _____
 _____ SOILS 101 GN 3 cr. _____

Additional Courses for the Major (9-10 cr.)

_____ AGBM 101 or ECON 102 or
 ECON 104 GS 3 cr. _____
 _____ ENGL 202C* or 202D* GWS 3 cr. _____
 _____ STAT 200*, 240*,
 or 250* GQ 3-4 cr. _____

Prescribed Courses for the Option (7 cr.)

_____ FOR 450W 3 cr. _____
 _____ FOR 470* 3 cr. _____
 _____ FOR 471* 1 cr. _____

Additional Courses for the Option (9-11 cr.)

_____ MATH 110* or 140*GQ 4 cr. _____
 _____ MATH 111 or 141 GQ 2-4 cr. _____
 _____ ERM 448; or FOR 439;
 or FOR 475; or FOR 409
 and SOILS 102 3 cr. _____

Electives (6-11 cr.)

_____ _____ _____
 _____ _____ _____
 _____ _____ _____

*Courses requiring at least a C grade.
 A minimum cumulative GPA of 2.00 is required for graduation.
 Use this checklist in conjunction with your LionPATH degree
 audit to confirm completion of all degree requirements.

Sem. Course Grade

Supporting Courses for the Option (39-41 cr.)

*Choose 6 GS credits from EBF 200, ECON 302, EGEE 211, ENVST
 100, GEOG 20, GEOG 30N, GEOG 130, GEOG 160, PLSC 1, PLSC 135*

_____ 3 cr. _____
 _____ 3 cr. _____

*Choose 6 credits of physical sciences from EARTH 100, EARTH 103,
 EARTH 111, GEOG 10, GEOG 110, GEOSC 1, GEOSC 10, GEOSC 40,
 METEO 3, METEO 122, MICRB 106, MICRB 201*

_____ 3 cr. _____
 _____ 3 cr. _____

*Choose 6-8 GN credits from PHYS 1, PHYS 150, PHYS 151,
 PHYS 211, PHYS 213, PHYS 250, PHYS 251*

_____ cr. _____
 _____ cr. _____

*Choose 3 credits of geospatial analysis from FOR 455, GEOG 362,
 GEOG 363, GEOG 364, SOILS 450*

_____ 3 cr. _____

*Choose 6 credits of resources management from ASM 327,
 CED 201, CED 427W, CED 429, CED 431W, CED 450, ERM 411,
 ERM 412, ERM 413W, FOR 410, FOR 440, GEOG 411W, GEOG 430,
 GEOG 431, SOILS 422*

_____ 3 cr. _____
 _____ 3 cr. _____

*Choose 9 credits of water sciences from ASM 309, CE 360, 370,
 371, ERM 435, 447, 450, ENVE 411, 415, ENVSE 408, GEOG 310W,
 311, 412W, GEOSC 412, 413, 440, 452, METEO 451, 454, SOILS
 405, WFS 422 (Three credits must be at the 400-level.)*

_____ 3 cr. _____
 _____ 3 cr. _____
 _____ 3 cr. _____

Choose 3 more credits at the 300- or 400-level from lists above.

_____ 3 cr. _____

General Education (45 cr.)

24 of these 45 credits are included in the requirements listed above; that is, 9 credits of GN; 6 credits of GQ; 6 credits of GS; and 3 credits of GWS. See back for remaining General Education requirements.

continued on back

**Forest Ecosystem Management, Watershed Management Option
General Education (45 cr.) - effective summer 2018**

FOUNDATIONS (15 cr.) – all must be completed with a grade of 'C' or better

Writing/Speaking GWS 9 cr.

_____ ENGL 15 GWS 3 cr. _____
 _____ CAS 100 GWS 3 cr. _____
 and ENGL 202C GWS if 'C' or better grade is earned

Quantification GQ 6 cr.

satisfied by MATH GQ and STAT GQ if 'C' or better grades are earned

EXPLORATION (9 cr.) – select 9 credits that may include up to 6 credits of GN and up to 3 credits of the other domains (GH, GA, GS, GHW). Substituting an upper-level course, a World Language, or Move-3, can be discussed with your adviser. Substitutions require college-level approval and a manual update to your degree audit.

satisfied by 6 credits of SOILS 101 GN and CHEM 110 GN and 3 credits of GS from Supporting Courses for the Option

KNOWLEDGE DOMAINS (30 cr.)

Natural Sciences GN 9 cr.

satisfied by CHEM 110 GN, SOILS 101 GN, and PHYS GN

Arts GA 6 cr.

_____ _____ 3 cr. _____
 _____ _____ 3 cr. _____

Humanities GH 6 cr.

_____ _____ 3 cr. _____
 _____ _____ 3 cr. _____

Social and Behavioral Sciences GS 6 cr.

satisfied by "AGBM 101, ECON 102, or ECON 104 GS" and GS credits in the Supporting Courses for the Option

Health and Wellness GHW 3 cr.

_____ _____ ___ cr. _____
 _____ _____ ___ cr. _____

BREADTH OF KNOWLEDGE (15 cr.) – at least 3 credits in each Knowledge Domain cannot be an inter-domain course, or a Move-3, or a World Language substitution

INTEGRATIVE STUDIES (6 cr.) – either inter-domain (N suffix) or linked (Z suffix) courses. May double count with other Gen Ed requirements. For inter-domain courses, credit may apply to both Knowledge Domain designations but does not reduce the total number of required credits within each domain. Linked courses must represent two different Knowledge Domains.

_____ _____ 3 cr. _____
 _____ _____ 3 cr. _____

ADDITIONAL UNIVERSITY REQUIREMENTS (9-12 cr.) – may double count with General Education or Electives

United States Cultures (US)

_____ _____ 3 cr. _____

International Cultures (IL)

_____ _____ 3 cr. _____

First-Year Experience (FYS) 0-3 cr. – depending upon the campus at which you first enrolled

_____ _____ ___ cr. _____

Writing Across the Curriculum 3 cr.

satisfied by FOR 450W

If the GN, GA, GH, GS, and GHW requirements in the General Education areas above are completed prior to earning 30 total General Education units in those areas, complete additional courses with those attributes to meet the 30-unit requirement. The 30-unit total is tracked on the LionPATH degree audit and may also be tracked here.

_____ cr.
 _____ cr.
 _____ cr.
 _____ cr.
 _____ cr.
 _____ cr.
 _____ cr.
 _____ cr.
 _____ cr.
 _____ cr.
 _____ cr.

Internships, Independent Study, Undergraduate Research and Work Experience

Practical work or research experience that supplements a student's course work is an asset when seeking employment after graduation. All Forest Ecosystem Management students are encouraged to get related experience through either summer jobs or internships. Academic credit can be awarded for Independent Studies (FOR 496), Undergraduate Research (FOR 494), or Internship work experiences (FOR 495); however, it is not required (with the exception of the CURFM option).

A handbook of guidelines for FOR 495 internships is available in the Ecosystem Science and Management Undergraduate Programs Office, 113 Forest Resources Building. These guidelines must be followed before a student registers for internship credits. Students must have a minimum cumulative 2.0 GPA in order to register for internship credits. The Ecosystem Science and Management Internship Handbook is also available online at <https://ecosystems.psu.edu/undergraduate/resources/handbooks/internship-handbook>.

The Ecosystem Science and Management Department forwards all natural-resource related job announcements to Nittany Lion Careers, nittanylioncareers.psu.edu. Nittany Lion Careers is open to all students, alumni, and employers. Job and internships are posted daily, so check Nittany Lion Careers often. It is important to remember that this is only one resource and that an effective job search may utilize a variety of sources. Links to natural resources employers and various other job boards are listed on our website at ecosystems.psu.edu/undergraduate/resources/employment.

Details about Undergraduate Research are posted online at agsci.psu.edu/students/research.

Study Abroad

Office of International Programs

Staff in the College of Agricultural Sciences Office of International Programs are available to help students find the right program and identify financial support. Learn more at agsci.psu.edu/international.

Office of Global Programs

The Penn State University Office of Global Programs also offers help in planning an international experience. Penn State has more than 180 summer, semester, and full-year programs in more than 45 countries! More than 60 of these programs are either specially designed, semester-length programs or are reciprocal exchange programs with an international university. The Office of Global Programs also offers numerous other short-term, faculty-led programs. With all these options, it is possible for students in nearly any discipline to study abroad. A listing of these programs may be found at global.psu.edu. In addition, Penn State accepts transfer credits from many other programs.

FOR Course Descriptions

A complete listing of detailed course descriptions can be found at bulletins.psu.edu.

FOR/WFS 150S FIRST-YEAR SEMINAR (2) The objectives of this first-year seminar course are to: (1) Engage and prepare first-year college students for academic success by orienting them to the scholarly community and introducing them to available resources. (2) Introduce students to Pennsylvania's forests and some of the research and other activities currently underway at Penn State that supports the conservation and management of these resources. (3) Introduce students to strategies they can use while at Penn State to prepare for careers related to forestry, wildlife/fisheries, and other natural resources disciplines.

FOR 200 THE PROFESSION OF FORESTRY (1) Introduction to the profession of forestry and related career opportunities.

FOR 201 GN GLOBAL CHANGE AND ECOSYSTEMS (3) This course will provide students with an understanding of the climate system, ecosystems, and feedbacks between the two. Prerequisite: 3 credits of science

FOR 203 FIELD DENDROLOGY (3) Field identification of native and introduced trees and shrubs.

FOR 204 DENDROLOGY (2) Taxonomic and silvical characteristics, ranges, genetic relationships, and uses of important forest tree species. Prerequisite: FOR 203 or FORT 150

FOR 228 CHAINSAW SAFETY, MAINTENANCE, AND OPERATION IN FOREST MANAGEMENT (1) Safety, maintenance, skills, and techniques for effective chainsaw operation in forest management. In FOREM, counts only as Elective.

FOR 255 GPS AND GIS APPLICATIONS FOR NATURAL RESOURCES PROFESSIONALS (3) Using Global Positioning Systems (GPS) and Geographic Information Systems (GIS) for mapping and analysis of natural resources data.

FOR 266 FOREST RESOURCES MEASUREMENTS (4) Measurement systems used in forest and wildlife management and urban forestry. Prerequisite: FOR 203 or FORT 150; Concurrent: FOR 255 or FORT 260 or WILDL 211; and STAT 200 or STAT 240 or STAT 250

FOR 295 FORESTRY INTERNSHIP (1-4) Supervised field experience related to the students major. Prerequisite: Permission of program

FOR 296 INDEPENDENT STUDIES (1-18)

FOR 297 SPECIAL TOPICS (1-9)

FOR 299 IL FOREIGN STUDIES (1-12) Courses offered in foreign countries by individual or group instruction.

FOR 303 HERBACEOUS FOREST PLANT IDENTIFICATION AND ECOLOGY (3) Focuses on developing herbaceous plant identification skills with emphasis on important plant structural features, common taxonomic terms, dichotomous keys, and botanical nomenclature. Provides a practical, applied approach to understanding biological and ecological concepts relevant to plants occurring in forested environments. Human dimensions and ethnobotany, and relevant economic, management, and conservation issues are also included, along with the methods by which botanists collect and preserve plant specimens for historical

documentation and research purposes. Prerequisite: 3 credits in BIOL or BISC or FOR or FORT or HORT or PLANT

FOR 308 FOREST ECOLOGY (3) Effect of environment, spacing, and age in trees; forest influences; origin and development of forest communities. Prerequisite or concurrent: FOR 203 or FORT 150

FOR 320 FOREST FIRE MANAGEMENT (2) Principles and concepts involved in managing the forest ecosystem in regard to fire.

FOR 350 FOREST ECOSYSTEM MONITORING AND DATA ANALYSIS (3) Quantitative approaches for characterization, monitoring, and comparison of forest ecosystems. Prerequisite: STAT 200, STAT 240, STAT 250 or equivalent with a C or higher

FOR 401 URBAN FOREST MANAGEMENT (3) Nature's role in community development, landscapes, arboriculture, administering urban forestry programs, land-use planning and regulatory policy, open-space conservation, civic environmentalism. Prerequisite: fifth-semester standing

FOR 403 INVASIVE FOREST PLANTS: IDENTIFICATION, ECOLOGY AND MANAGEMENT (3) Addresses the impacts and challenges associated with "exotic" plant invasions in eastern North American forests through an interdisciplinary exploration of topics including invasive plant identification and management, ecological interactions and impacts, human roles and influences, and management and policy options. Prerequisites: 6 credits in BIOL or BISC or FOR or FORT or HORT or PLANT

FOR 409 TREE PHYSIOLOGY (2) Fundamentals of the relationship of the basic physiological functions of forest trees to form. Prerequisite: BIOL 110 or BIOL 127

FOR 410 ELEMENTS OF FOREST ECOSYSTEM MANAGEMENT (3) Fundamentals of forest ecosystem management for goods and services. Prerequisite: BIOL 110 or BIOL 127 and BIOL 220W or FOR 308 and 7th Semester standing or higher

FOR 418 US/IL AGROFORESTRY: SCIENCE, DESIGN, AND PRACTICE (3) Agroforestry integrates trees in agricultural landscapes, and/or agriculture products into forested areas for multiple benefits.

FOR 421 SILVICULTURE (3) The application of the principles of forest ecology to control of establishment, composition, and growth of forest stands. Prerequisite: (FOR 266 or (FORT 105 and FORT 110) with a C or higher) and FOR 308

FOR 430/WFS 430 CONSERVATION BIOLOGY (3) The application of biological principles to issues in the conservation of biodiversity. Prerequisite: BIOL 220W or FOR 308 or WFS 209

FOR 439 TIMBER SALE ADMINISTRATION (3) Practical aspects of the logistical, environmental, managerial, and regulatory oversight of active and retired timber sales. Prerequisite: (FOR 203 or FORT 150) and (FOR 266 or (FORT 105 and FORT 110))

FOR 440 FOREST AND CONSERVATION ECONOMICS (3) The role and application of economics and finance to forest resource conservation and management. Prerequisite: AGBM 101 or ECON 102 or ECON 104

FOR 450W HUMAN DIMENSIONS OF NATURAL RESOURCES (3)
Addresses human needs and desires, from individuals to nations, for social, ecological, and economic benefits derived from natural resource decisions. Prerequisite: 6 credits of social and behavioral sciences

FOR 455 REMOTE SENSING AND SPATIAL DATA HANDLING (3) An advanced remote sensing and geospatial technology course emphasizing the use of remote sensors and geographic information systems to study the Earth's land surface. Prerequisite: FOR 255 or FORT 260 or GEOG 160 or GEOG 260 or WILDL211

FOR 466W FOREST RESOURCE MANAGEMENT (3) Rationale, process, and tools for forest management decision-making and planning. Developing and communicating forest plans for forested properties. Prerequisite: (FOR 255 or FORT 260 or WILDL 211) and FOR 421 and FOR 440

FOR 470 WATERSHED MANAGEMENT (3) Management of wild land watersheds for control of the amount and timing of water yield, water quality, erosion, and sedimentation. Prerequisite: 3 credits in Soils

FOR 471 WATERSHED MANAGEMENT LABORATORY (1)
Introduction to hydrologic and climatic measurements and computations useful in watershed management. Prerequisite or concurrent: FOR 470

FOR 475 PRINCIPLES OF FOREST SOILS MANAGEMENT (3) Effect of current forest management practices on the properties and productive capacity of forest soils. Prerequisite: FOR 308 and 3 credits in soils

FOR 480 POLICY AND ADMINISTRATION (3) Forest resources policy objectives; criteria and goals of society; policy implementation by ownership classes; planning, administration, and evaluation of programs. Prerequisite: 3 credits of social or behavioral sciences

FOR 488Y IL GLOBAL FOREST CONSERVATION (3) Ecological, economic, technological, and political aspects of forested ecosystems in a global context, emphasizing tropical and developing countries. Prerequisite: 3 credits in natural sciences and 3 credits in social and behavioral sciences

FOR 494 UNDERGRADUATE RESEARCH (1-12) Supervised student activities on research projects identified on an individual or small group basis. Prerequisite: Permission of the Forest Ecosystem Management Program

FOR 495 FORESTRY INTERNSHIP (1-6) Supervised field experience related to the student's major. Prerequisite: Approval of proposed assignment by instructor prior to registration

FOR 496 INDEPENDENT STUDIES (1-18)

FOR 497 SPECIAL TOPICS (1-9)

FOR 499 IL FOREIGN STUDIES (1-12)

Course	Title (cr.)	Fall 2020	Spring 2021	Fall 2021	Spring 2022	Fall 2022	Spring 2023	Fall 2023	Spring 2024
WFS 209N	Wild/Fish Conservation (3)	X	X	X	X	X	X	X	X
WFS 300	The Vertebrates (2)								
WFS 301	Vertebrate Laboratory (2)	X		X		X		X	
WFS 310	W F S Measurements (3)	X		X		X		X	
WFS 406	Ornithology Lab (2)		X		X		X		X
WFS 407	Ornithology (3)		X		X		X		X
WFS 408	Mammalogy (3)		X		X		X		X
WFS 409	Mammalogy Lab (2)		X		X		X		X
WFS 410	Fisheries Science (3)	X		X		X		X	
WFS 422	Ecology of Fish (3)			X				X	
WFS/FOR 430	Conservation Biology (3)	X		X		X		X	
WFS 435	Limnology (3)	X				X		X	
WFS 446	Wildl Fish Pop Dyn (3)		X		X		X		X
WFS 447W	Wildl Management (3)	X		X		X		X	
WFS/ERM 450	Wetland Conservation (3)	X		X		X		X	
WFS 452	Ichthyology (2)	X		X		X		X	
WFS 453	Ichthyology Lab (2)	X		X		X		X	
WFS 454	Field Ichthyology (2)	X		X		X		X	
WFS 460	Wildlife Behavior (3)	X		X		X		X	
WFS 461	Animal Welfare: Science & Ethics (3)				X				X
WFS 462	Amphibians and Reptiles (3)		X		X		X		X
WFS 463W	Fishery Management (3)		X		X		X		X

The University is committed to equal access to programs, facilities, admission, and employment for all persons. It is the policy of the University to maintain an environment free of harassment and free of discrimination against any person because of age, race, color, ancestry, national origin, religion, creed, service in the uniformed services (as defined in state and federal law), veteran status, sex, sexual orientation, marital or family status, pregnancy, pregnancy-related conditions, physical or mental disability, gender, perceived gender, gender identity, genetic information, or political ideas. Discriminatory conduct and harassment, as well as sexual misconduct and relationship violence, violates the dignity of individuals, impedes the realization of the University's educational mission, and will not be tolerated. Direct all inquiries regarding the nondiscrimination policy to the Affirmative Action Office, The Pennsylvania State University, 328 Boucke Building, University Park, PA 16802-5901, Email: aao@psu.edu, Tel (814) 863-0471.