# FOREST ECOSYSTEM <br> MANAGEMENT, B.S. 

Begin Campus: Any Penn State Campus
End Campus: University Park

## Degree Requirements

For the Bachelor of Science degree in Forest Ecosystem Management, a minimum of 120 credits is required for the Forest Biology, Forest Management, and Watershed Management options, and a minimum of 123 credits for the Community and Urban Forest Management option:

| Requirement | Credits |
| :--- | :--- |
| General Education | 45 |
| Electives | $2-11$ |
| Requirements for the Major | $88-100$ |

21-24 of the 45 credits for General Education are included in the Requirements for the Major. This includes: 9 credits of GN courses; 6 credits of GQ courses; 3-6 credits of GS courses; 0-3 credits of GA courses; 3 credits of GWS courses.

Students should be aware that, in most cases, completion of the Forest Ecosystem Management degree in four years requires enrollment at the University Park Campus beginning the fall semester of the sophomore year.

## Requirements for the Major

To graduate, a student enrolled in the major must earn a grade of $C$ or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (https://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/ \#82-44).

| Common Requirements for the Major (All Options) |  |  |
| :---: | :---: | :---: |
| Code | Title | Credits |
| Prescribed Courses |  |  |
| CHEM 110 | Chemical Principles I | 3 |
| CHEM 111 | Experimental Chemistry I | 1 |
| FOR 421 | Silviculture: Applied Forest Ecology | 3 |
| SOILS 101 | Introductory Soil Science | 3 |

Prescribed Courses: Require a grade of C or better
FOR $200 \quad$ The Profession of Forestry 1
FOR 203 Field Dendrology 3

FOR 255 GPS and GIS Applications for Natural Resources 3 Professionals
FOR 266 Forest Resources Measurements 4
FOR 308 Forest Ecology 3

## Additional Courses

Select one of the following:

| AGBM 101 | Economic Principles of Agribusiness Decision <br> Making |
| :--- | :--- |
| ECON 102 | Introductory Microeconomic Analysis and Policy |
| ECON 104 | Introductory Macroeconomic Analysis and Policy |

Additional Courses: Require a grade of $C$ or better

| $\begin{aligned} & \text { ENGL 202C } \\ & \quad \text { or ENGL 202D } \end{aligned}$ | Effective Writing: Technical Writing Effective Writing: Business Writing | 3 |
| :---: | :---: | :---: |
| Select one of the | following: | 3-4 |
| STAT 200 | Elementary Statistics |  |
| STAT 240 | Introduction to Biometry |  |
| STAT 250 | Introduction to Biostatistics |  |
| Requirements for the Option |  |  |
| Select an option |  | 55-66 |
| Requirements for the Option Forest Biology Option (57-58 credits) |  |  |
| Code | Title Cr | Credits |
| Prescribed Courses |  |  |
| BIOL 110 | Biology: Basic Concepts and Biodiversity | 4 |
| BIOL 220W | Biology: Populations and Communities | 4 |
| CHEM 202 | Fundamentals of Organic Chemistry I | 3 |
| FOR 204 | Silvics and Forest Dynamics | 2 |
| FOR 409 | Tree Physiology | 2 |
| FOR 410 | Elements of Forest Ecosystem Management | 3 |
| FOR 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 |
| Prescribed Courses: Require a grade of C or better |  |  |
| FOR 350 | Forest Ecosystem Monitoring and Data Analysis | 3 |
| Additional Courses |  |  |
| Select 4-5 credits from the following: |  | 4-5 |
| ENT 313 | Introduction to Entomology |  |
| FOR 403 | Invasive Forest Plants: Identification, Ecology, and Management |  |
| PPEM 318 | Diseases of Forest and Shade Trees |  |
| Additional Courses: Require a grade of C or better |  |  |
| MATH 110 or MATH 140 | Techniques of Calculus I Calculus With Analytic Geometry I | 4 |
| Supporting Courses and Related Areas |  |  |
| Select 15 credits f | from department list in consultation with adviser | 15 |
| Forest Management Option (57-60 credits) |  |  |
| Code | Title Cr | Credits |
| Prescribed Courses |  |  |
| ENT 313 | Introduction to Entomology | 2 |
| FOR 204 | Silvics and Forest Dynamics | 2 |
| FOR 440 | Forest and Conservation Economics | 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 |
| Prescribed Courses: Require a grade of $C$ or better |  |  |
| FOR 320 | Forest Fire Management | 2 |
| FOR 350 | Forest Ecosystem Monitoring and Data Analysis | - 3 |
| FOR 455 | Remote Sensing and Spatial Data Handling | 3 |
| FOR 466W | Forest Management and Planning | 3 |

Additional Courses

| $\begin{aligned} & \text { BIOL } 110 \\ & \text { or BIOL } 127 \end{aligned}$ | Biology: Basic Concepts and Biodiversity Introduction to Plant Biology | 3-4 |
| :---: | :---: | :---: |
| $\begin{aligned} & \text { FOR } 401 \\ & \text { or FOR } 450 W \end{aligned}$ | Urban Forest Management <br> Human Dimensions of Natural Resources | 3 |
| $\begin{aligned} & \text { FOR } 410 \\ & \text { or FOR/WFS } \\ & 430 \end{aligned}$ | Elements of Forest Ecosystem Management Conservation Biology | 3 |
| Select one of the following: |  | 3 |
| FOR 409 <br> \& SOILS 102 | Tree Physiology and Introductory Soil Science Laboratory |  |
| ERM 448 | Rural Road Ecology and Maintenance |  |
| FOR 439 | Timber Sale Administration |  |
| FOR 475 | Principles of Forest Soils Management |  |
| Additional Courses: Require a grade of C or better |  |  |
| Select one of the following: |  | 6 |
| MATH 22 \& MATH 33 | College Algebra With Analytic Geometry and Applications II and Mathematics for Sustainability |  |
| MATH 22 \& MATH 34 | College Algebra With Analytic Geometry and Applications II and The Mathematics of Money |  |
| MATH 22 <br> \& AGBM 106 | College Algebra With Analytic Geometry and Applications II and Agribusiness Problem Solving |  |
| MATH 110 | Techniques of Calculus I |  |
| MATH 140 | Calculus With Analytic Geometry I |  |
| Supporting Courses and Related Areas |  |  |
| In consultation with adviser, select 12 credits from department list approved for the option. Six credits must be 300-to 400-level. |  | 2 |
| Community and Urban Forest Management Option (62-66 credits) |  |  |
| Code | Title Cred | its |
| Prescribed Courses |  |  |
| ENT 313 | Introduction to Entomology | 2 |
| ENT 314 | Management of Insect Pests of Ornamentals | 1 |
| 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 |
| Prescribed Courses: Require a grade of C or better |  |  |
| FOR 204 | Silvics and Forest Dynamics | 2 |
| FOR 401 | Urban Forest Management | 3 |
| FOR 450W | Human Dimensions of Natural Resources | 3 |
| Additional Courses |  |  |
| $\begin{aligned} & \text { BIOL } 110 \\ & \text { or BIOL } 127 \end{aligned}$ | Biology: Basic Concepts and Biodiversity Introduction to Plant Biology | 3-4 |
| Select one of the following: |  | 3 |
| ARCH 316 | Analysis of Human Settlements: Cities |  |
| LARCH 60 | Cultural History of Designed Places |  |
| LARCH 65 | Built Environment and Culture: Examining the Modern City |  |

Select one of the following:

| RPTM 320 | Recreation Resource Planning and Management |
| :--- | :--- | :--- |
| RPTM 325 | Principles of Environmental Interpretation |
| RPTM 435 | Recreation Facilities Planning and Management |
| RPTM 470 | Recreation and Park Management |
| Select one of the following: |  |
| FOR 455 | Remote Sensing and Spatial Data Handling |
| GEOG 363 | Geographic Information Systems |
| SOILS 450 | Environmental Geographic Information Systems |

Select one of the following:
FOR 409 Tree Physiology
\& SOILS 102 and Introductory Soil Science Laboratory
ERM 448 Rural Road Ecology and Maintenance
FOR 439 Timber Sale Administration
FOR 475 Principles of Forest Soils Management
Additional Courses: Require a grade of C or better

| FOR 495 | Forestry Internship | 3 |
| :---: | :--- | :---: |
| or FOR 496 | Independent Studies |  |

Select one of the following: 4-6

| MATH 22 | College Algebra With Analytic Geometry and <br> \& MATH 33 <br> Applications II <br> and Mathematics for Sustainability |
| :--- | :--- |
| MATH 22 | College Algebra With Analytic Geometry and <br> \& MATH 34 |
| Applications II <br> and The Mathematics of Money |  |
| MATH 22 | College Algebra With Analytic Geometry and <br> \& AGBM 106 <br> Applications II <br> and Agribusiness Problem Solving |
| MATH 110 | Techniques of Calculus I |
| MATH 140 | Calculus With Analytic Geometry I |

## Supporting Courses and Related Areas

Select 8-9 credits from department list In consultation with adviser $\quad 8-9$

| Watershed Management Option (55-59 credits) |  |  |
| :--- | :--- | ---: |
| Code Title | Credits |  |
| Prescribed Courses |  |  |
| FOR 450W $\quad$ Human Dimensions of Natural Resources | 3 |  |
| Prescribed Courses: Require a grade of C or better |  |  |
| FOR 470 | Watershed Management | 3 |
| FOR 471 | Watershed Management Laboratory | 1 |

## Additional Courses

MATH 111 Techniques of Calculus II 2-4
or MATH 141 Calculus with Analytic Geometry II
Select one of the following:
FOR 409 Tree Physiology
\& SOILS 102 and Introductory Soil Science Laboratory
ERM 448 Rural Road Ecology and Maintenance
FOR 439 Timber Sale Administration
FOR 475 Principles of Forest Soils Management
Additional Courses: Require a grade of C or better
MATH 110 Techniques of Calculus I 4
or MATH 140 Calculus With Analytic Geometry I

## Supporting Courses and Related Areas

Select 6 credits of GS social sciences from the following:

| EBF 200 | Introduction to Energy and Earth Sciences Economics |  |
| :---: | :---: | :---: |
| ECON 302 | Intermediate Microeconomic Analysis |  |
| EGEE 211 |  |  |
| ENVST 100 |  |  |
| GEOG 20 | Human Geography: An Introduction |  |
| GEOG 30N | Environment and Society in a Changing World |  |
| GEOG 160 | Mapping Our Changing World |  |
| PLSC 1 | American Politics: Principles, Processes and Powers |  |
| PLSC 135 |  |  |
| Select 6 credits | physical sciences from the following: | 6 |
| EARTH 100 | Environment Earth |  |
| EARTH 103 |  |  |
| EARTH 111 |  |  |
| GEOG 10 | Physical Geography: An Introduction |  |
| GEOG 110 | Climates of the World |  |
| GEOSC 1 | Physical Geology |  |
| GEOSC 10 | Geology of the National Parks |  |
| GEOSC 40 | The Sea Around Us |  |
| METEO 3 | Weather Revealed: Introductory Meteorology |  |
| METEO 122 | Atmospheric Environment: Growing in the Wind |  |
| MICRB 106 | Elementary Microbiology |  |
| MICRB 201 | Introductory Microbiology |  |
| Select 6-8 credi | of GN from the following: | 6-8 |
| PHYS 1 | The Science of Physics |  |
| PHYS 150 | Technical Physics I |  |
| PHYS 151 | Technical Physics II |  |
| PHYS 211 | General Physics: Mechanics |  |
| PHYS 213 | General Physics: Fluids and Thermal Physics |  |
| PHYS 250 | Introductory Physics I |  |
| PHYS 251 | Introductory Physics II |  |
| Select 3 credits in geospatial analysis from the following: |  | 3 |
| FOR 455 | Remote Sensing and Spatial Data Handling |  |
| GEOG 362 | Image Analysis |  |
| GEOG 363 | Geographic Information Systems |  |
| GEOG 364 | Spatial Analysis |  |
| SOILS 450 | Environmental Geographic Information Systems |  |
| Select 6 credits of resources management from the following: |  | 6 |
| ASM 327 | Soil and Water Resource Management |  |
| CED 201 | Introductory Environmental and Resource Economics |  |
| CED 327 | Environment and Society |  |
| CED 429 | Natural Resource Economics |  |
| CED 431W | Economic Analysis of Environmental and Resource Policies |  |
| CED 450 | International Development, Renewable Resources, and the Environment |  |
| ERM 411 | Legal Aspects of Resource Management |  |
| ERM 412 | Resource Systems Analysis |  |
| ERM 413W | Case Studies in Ecosystem Management |  |
| FOR 410 | Elements of Forest Ecosystem Management |  |
| FOR 440 | Forest and Conservation Economics |  |


| GEOG 411W | Forest Geography |
| :--- | :--- |
| GEOG 430 | Human Use of Environment |
| GEOG 431 | Geography of Water Resources |
| SOILS 422 | Natural Resources Conservation and Community <br> Sustainability |
| Select 9 credits of water sciences (3 credits must be at the 400-level) |  |
| from the following: |  |
| ASM 309 | Measurement \& Monitoring of Hydrologic Systems |
| CE 360 | Fluid Mechanics |
| CE 370 | Introduction to Environmental Engineering |
| CE 371 | Water and Wastewater Treatment |
| ENVE 411 | Water Supply and Pollution Control |
| ENVE 415 | Hydrology |
| ENVSE 408 | Contaminant Hydrology |
| ERM 435 | Limnology |
| ERM 447 | Stream Restoration |
| ERM 450 | Wetland Science and Sustainability |
| GEOG 310 | Introduction to Global Climatic Systems |
| GEOG 311 |  |
| GEOG 412W | Climatic Change and Variability |
| GEOSC 412 | Water Resources Geochemistry |
| GEOSC 413W | Techniques in Environmental Geochemistry |
| GEOSC 440 | Marine Geology |
| GEOSC 452 | Hydrogeology |
| METEO 451 | Introduction to Physical Oceanography |
| METEO 454 | Introduction to Micrometeorology |
| SOILS 405 | Hydropedology |
| WFS 422 | Ecology of Fishes |

Select 3 additional credits at the 300-to 400-level from the lists above 3

## General Education

Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (https://bulletins.psu.edu/undergraduate/general-education/baccalaureate-degree-general-education-program/) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

## Foundations (grade of C or better is required and Inter-Domain courses do not meet this requirement.) <br> - Quantification (GQ): 6 credits <br> - Writing and Speaking (GWS): 9 credits

## Breadth in the Knowledge Domains (Inter-Domain courses do not meet this requirement.) <br> - Arts (GA): 3 credits

- Health and Wellness (GHW): 3 credits
- Humanities (GH): 3 credits
- Social and Behavioral Sciences (GS): 3 credits
- Natural Sciences (GN): 3 credits


## Integrative Studies

- Inter-Domain Courses (Inter-Domain): 6 credits


## Exploration

- GN, may be completed with Inter-Domain courses: 3 credits
- GA, GH, GN, GS, Inter-Domain courses. This may include 3 credits of World Language course work beyond the 12th credit level or the requirements for the student's degree program, whichever is higher: 6 credits


## University Degree Requirements

## First Year Engagement

All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

## Cultures Requirement

6 credits are required and may satisfy other requirements

- United States Cultures: 3 credits
- International Cultures: 3 credits


## Writing Across the Curriculum

3 credits required from the college of graduation and likely prescribed as part of major requirements.

## Total Minimum Credits

A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits Students should consult with their college or department adviser for information on specific credit requirements.

## Quality of Work

Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.

## Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80 (https://senate.psu.edu/ policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/\#83-80)). For more information, check the Suggested Academic Plan for your intended program.

