Learn to manage urban natural resources to improve the quality of life for people in towns and cities while also protecting environmental resources. Graduates are involved in the planning, design, and management of trees and vegetation in parks, greenbelts, open spaces, and private lands. Employers include city government, tree care firms, state and federal forestry agencies, nurseries, and utility companies. Graduates may also qualify for traditional forestry positions. This track is accredited by the Society of American Foresters.

**Communication Skills**

- Freshman Composition
- COMM 1101 Introduction to Public Speaking [CIV] (3 cr, F/S/Sm)
  - or AECM 2421W Professional and Oral Communication for Agriculture, Food, and the Environment (3 cr, F/S)

**Physical and Biological Sciences**

- BIOL 1001 Introductory Biology: Evolutionary and Ecological Perspectives [BIOL] (4 cr, F/S)
  - or BIOL 1009 General Biology [BIOL] (4 cr, F/S/Sm, prereq high school chemistry)
- PMB 2022 General Botany (3 cr, F/S, prereq one semester of college biology)
- SOIL 2125 Basic Soil Science [PHYS, ENV] (4 cr, F/S, prereq CHEM 1015/1017 or CHEM 1061)

**Mathematical Thinking**

- MATH 1151 Precalculus II [MATH] (3 cr, F/S/Sm, prereq MATH 1031 or 1051 or by placement)
  - or MATH 1142 Short Calculus [MATH] (4 cr, F/S/Sm, prereq MATH 1031 or 1051 or by placement)
  - or MATH 1271 Calculus I [MATH] (4 cr, F/S/Sm, prereq MATH 1151 or 1155 or by placement)
- ESPM 3012 Statistical Methods for Environmental Scientists and Managers [MATH] (4 cr, S, prereq 2 years high school math)
  - or STAT 3011 Introduction to Statistical Analysis [MATH] (4 cr, F/S/Sm)

**Chemistry**

- CHEM 1015 Introductory Chemistry: Lecture (3 cr, F/S/Sm, prereq high school chemistry)
  - and CHEM 1017 Introductory Chemistry: Lab (1 cr, F/S/Sm)
  - or CHEM 1061 Chemical Principles I [PHYS] (3 cr, F/S/Sm, prereq CHEM 1101 or 1015 or by placement)
  - and CHEM 1065 Chemical Principles I Lab [PHYS] (1 cr, F/S/Sm)
  - or CHEM 1071H Honors Chemistry I [PHYS] (1 cr, F) and CHEM 1075H Honors Chemistry I Lab [PHYS] (1 cr, F)

**Economics and Policy**

- ESPM 3261 Economics and Natural Resources Management [SOCS, ENV] (4 cr, S, prereq MATH 1031, 1051, 1142, 1155, or 1271 or ESPM 3012 or STAT 3011 or SOC 3811)
- ESPM 3241W Natural Resource and Environmental Policy [SOCS, CIV, WI] (3 cr, S)

**Major Professional Courses**

- FNRM 1001 Orientation and Information Systems (1 cr, F)
- FNRM 1101 Dendrology: Identifying Forest Trees and Shrubs (3 cr, F)
- FNRM 3131 Geographic Information Systems (GIS) for Natural Resources [TS] (4 cr, F/S, prereq soph, jr, sr, or UHP fr)
- FNRM 4232W Managing Recreational Lands [WI] (4 cr, S)
### Liberal Education Requirements and Writing Intensive

<table>
<thead>
<tr>
<th>Required Credits</th>
<th>UCF courses that fulfill requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diversified Core</strong></td>
<td></td>
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<tr>
<td>Arts/Humanities [AH]</td>
<td>3</td>
</tr>
<tr>
<td>Biological Science [BIOL]</td>
<td>4, must include lab or field experience</td>
</tr>
<tr>
<td>Historical Perspective [HIS]</td>
<td>3</td>
</tr>
<tr>
<td>Literature [LIT]</td>
<td>3</td>
</tr>
<tr>
<td>Mathematical Thinking [MATH]</td>
<td>3</td>
</tr>
<tr>
<td>Physical Science [PHYS]</td>
<td>4, must include lab or field experience</td>
</tr>
<tr>
<td>Social Sciences [SOCS]</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Designated Themes

*Four of the following five themes must be satisfied*

- Civic Life and Ethics [CIV] 3
  - COMM 1101, ESPM 3241W
- Diversity and Social Justice in the US [DSJ] 3
- The Environment [ENV] 3
  - SOIL 2125, ESPM 3261
- Global Perspectives [GP] 3
- Technology and Society [TS] 3
  - ESPM 3261, ESPM 3241W

#### Writing Intensive [WI]: first year writing requirement and four writing intensive courses (two of which must be taken at the upper division level, one of which must be in your major)

### Urban and Community Forestry (UCF) Core

- **FNRM 3501 Arboriculture: Selection and Maintenance of Trees (3 cr, S)**
- **HORT 1015 Woody and Herbaceous Plants (4 cr, F)**
- **HORT 4141W Plant Production I (4 cr, F, prereq HORT 1001 or 1015)**
  - or **LA 3501 Environmental Design and Its Biological and Physical Context (3 cr, S)**
- **ENT 4251 Forest and Shade Tree Entomology (3 cr, F)**
- **PLPA 3003 Diseases of Forest and Shade Trees (3 cr, S)**
- **FNRM 4501 Urban Forest Management: Managing Greenspaces for People (3 cr, S)**
- **FNRM 3104 Forest Ecology (4 cr, F, prereq BIOL 1001 or 1009, college chemistry recommended)**
- **FNRM 3411 Managing Forest Ecosystems: Silviculture (3 cr, F, prereq FNRM 3104 or consent from instructor, FEMC track students should take FNRM 5413 concurrently)**
- **PMB 3002 Plant Biology: Function (2 cr, S, prereq BIOL 1002, 1009, 2003 or equivalent, CHEM 1011 or one semester chemistry with some organic content)**
- **FNRM 3218 Measuring and Modeling Forests (3 cr, S, prereq STAT 3011 or ESPM 3012 and MATH 1151)**
  - or **ESPM 3211 Survey, Measurement and Modeling for Environmental Analysis (3 cr, S, prereq MATH1031 or 1051, ESPM 3012 or Stat 3011 or FW 4001)**
- **FNRM 3114 Hydrology and Watershed Management (3 cr, F, prereq MATH 1151, BIOL 1001 or 1009, and CHEM 1015/1017 or CHEM 1061/1065)**
  - or **ESPM 4061W Water Quality and Natural Resources (3 cr, F)**
- **URBS 1001 W Introduction to Urban Studies: The Complexity of Metropolitan Life (3 cr, F/S)**
  - or **URBS 3001W Introduction to Urban Studies: The Complexity of Metropolitan Life (3 cr, F/S)**
  - or **URBS 3751 Understanding the Urban Environment (3 cr, S)**
Introductory Cloquet Field Session in Assessment and Biology of Forests (at Cloquet Forestry Center, Cloquet, MN in August)
   ______ FNRM 2101 Identifying Forest Plants (1 cr, Summer registration)
   ______ FNRM 2104 Measuring Forest Resources (1 cr, Summer registration)
   ______ FNRM 2102 Northern Forests: Field Ecology (2 cr, Fall registration, prereq BIOL 1001 or 1009)

Experiential Learning
   ______ FNRM 4232W Managing Recreational Lands fulfills this requirement
        or FNRM 2102 Northern Forests: Field Ecology fulfills this requirement or other course approved by major coordinator

Interdisciplinary Learning
   ______ FNRM 4501 Urban Forest Management: Managing Greenspaces for People (3 cr)

Electives
At the University, 120 credits are required for graduation. After completing the major requirements, credits from any discipline may be used to reach 120 credits.

Minors and Certificates
Minors and certificates are an excellent way to further focus your studies in a related area of interest. The following are minors and certificates typically of interest to students in natural resources.
   Environmental Sciences, Policy and Management (16 cr)
   Fisheries and Wildlife (16-18 cr)
   Forest Ecosystem Management and Conservation (18-19cr)
   Geographic Information Science (16 cr)
   Mass Communications-Emphasis in Public Relations (18 cr)
   Parks and Protected Area Management (18-20 cr)
   Sustainable Tourism Certificate (12 cr in addition to FNRM 3101)
   Sustainability Studies (15-18 cr)

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Study Abroad
The University encourages students to incorporate international study into their academic programs. In addition to those programs offered at the University level, the College of Food, Agricultural and Natural Resource Sciences also offers international programs specific to many of the majors housed within the college. Visit the Learning Abroad Center or CFANS International Programs Office to learn more about the many study abroad experiences available.

Subject/ Career Options
Students may also use their elective credits to develop additional coursework to further build knowledge and skill for employment. These are not required or equivalent to minors. See your advisor or faculty leader(s) noted for more information and assistance selecting courses. Subject and/or career option areas to consider include:
   Geospatial Science Option
   Urban Natural Resource Management
   Urban Tree Care
   Graduate Study Preparation
The **Geospatial Science Option** *(Faculty: P. Bolstad, J. Knight, C. Babcock)* is for students seeking to emphasize Geographic Information Systems (GIS), remote sensing, Global Positioning System (GPS), and spatial analysis. This option will prepare students for graduate studies in geospatial science programs. Coursework could include ESPM 3031 Applied Global Positioning Systems for GIS, ESPM 4295W GIS in Environmental Science and Management, FNRM 3362/5362 Drones: Data Analysis and Operations, FNRM 3462/5462 Advanced Remote Sensing and Geospatial Analysis, GEOG 3531 Numerical Spatial Analysis, GIS 5555 Basic Spatial Analysis, or GIS 5578 GIS Programming.

The **Urban Natural Resource Management Option** *(Faculty: G. Johnson, C. Edgar)* is for students interested in enhancing their background for agency or municipal urban greenspace management. Careers include urban forester and specialist positions in regional urban forest management and in municipal environmental resource management. Coursework could include ESPM 3245 Sustainable Land Use Planning and Policy, ESPM 4061W Water Quality and Natural Resources, FNRM 3262 Remote Sensing of Natural Resources and Environment, HORT 5071 Restoration and Reclamation Ecology, LA 4755 Infrastructure, Natural Systems, and Space of Inhabited Landscapes, or URBS 3751 Understanding the Urban Environment.

The **Urban Tree Care Option** *(Faculty: G. Johnson, A. David)* is for students interested in specializing in urban tree care. This option enhances preparation for professional careers in commercial and utility arboriculture, urban forestry consulting, urban forest analysis and management and property management. Coursework could include HORT 4061W Turfgrass Management, LA 3501 Environmental Design and its Biological and Physical Context, PLPA 5480 Principles of Plant Pathology, SOIL 3416 Plant Nutrients in the Environment, or SOIL 5611 Soil Biology and Fertility.

**Graduate Study Option** *(Faculty: All)* Students interested in graduate school should strengthen their undergraduate core and take prerequisites for classes likely to be needed in graduate school. Students should meet with faculty in their area of interest to develop their coursework. Math, science and basic courses also help students prepare for the Graduate Record Exam (GRE).