

# Warnell School of Forestry and Natural Resources

## Professional Program Curriculum

### Natural Resource Management and Sustainability Major Program of Study

Course ID	Course Title	Hours
FANR 3000-3000L <sup>1</sup>	Field Orientation, Measurements, and Sampling in Forestry and Natural Resources	4
CRSS (FANR) 3060-3060L	Soils and Hydrology	4
FANR 3200W-3200L	Ecology of Natural Resources	4
(FANR 3300-3300D and FANR 3400-3400D) <sup>2</sup>	Economics of Renewable Resources Society and Natural Resources	2 2
FANR 3800-3800L	Spatial Analysis of Natural Resources	3
FANR 4500S or FANR 4990R <sup>3 4</sup>	Senior Project or Senior Thesis	4
FANR 4800W	Renewable Resources Policy	2
<b>Computer Programming Requirement – choose one course from:</b>		
PBIO (BINF)(FANR) 4700	Computational Plant Science	3
CSCI 1301-1301L	Introduction to Computing and Programming	4
CSCI 1360	Foundations for Informatics and Data Analytics	4
CSCI 2150-2150L	Introduction to Computational Science	4
<b>Area of Emphasis and Restricted Electives</b> (choose Community Forestry and Arboriculture, Geospatial Information Science, or Water and Soil Resources) <sup>5</sup>		<b>32</b>
<b>Professional Hours</b>		<b>60</b>
<b>Total with Regents Core</b>		<b>120</b>

<sup>1</sup> FANR 3000-3000L must be taken in the first term that a student is in the professional program (official major).

<sup>2</sup> FANR 3300-3300D meets for the first half of the semester, and FANR 3400-3400D meets for the last half of the semester at the same time.

<sup>3</sup> Students must apply to take Senior Thesis in the term prior to their graduation term. Undergraduate research can be used for up to three hours of the four required for Thesis.

<sup>4</sup> Both Senior Project and Senior Thesis fulfill UGA's Experiential Learning requirement. Other approved courses and co-curricular activities are available at <http://bulletin.uga.edu/elcourses.aspx>

<sup>5</sup> See the following pages for the requirements for each area of emphasis.

## Professional Program Curriculum (continued)

### Natural Resource Management and Sustainability Major Areas of Emphasis

<b>Community Forestry and Arboriculture Area of Emphasis</b>		
Course ID	Course Title	Hours
<b>Required Courses:</b>		<b>23</b>
COFA 5001	Urban Tree Management I	3
COFA 5300-5300L	Community Soils & Site Development	4
COFA 5010-5010L	Urban Tree Management II	4
COFA 5500	Community Forest Management	3
COFA 4650	Community Forestry & Arboriculture Practicum	3
COFA 3900	Community Forestry & Arboriculture Internship*	3
FORS 3010 and 3010L	Dendrology and Dendrology Lab	3
<b>Community Forestry and Arboriculture Electives (choose from the list below):</b>		<b>9**</b>
AAEC 3980 or 3980E	Introduction to Agribusiness Management	3
AAEC 4040-4040L	Statistics for Agribusiness Management	4
AAEC 4980	Agribusiness Management	3
ACCT 2101 or 2101E	Principles of Accounting I	3
ACCT 2102 or 2102E	Principles of Accounting II	3
CVLE 4770	Urban Infrastructure Systems	3
ECOL 3770S	Urban Ecology	3
ECON 4010	Intermediate Microeconomics	3
ECON 4150	Environmental Economics	3
ECON 4160	Urban Economics	3
EDES 4270	Environmental Design Uses of Geographic Information Systems	3
EDES 4640	The History of Urban Planning	3
EDES(PLAN) 4650	City Planning	3
ENTO 3740-3740L	Insect Pest Management	4
ENTO 4500E/6500E	Biological Control	3
ENTO(CRSS)(PATH) 4740	Integrated Pest Management	3
ENTR 5500	Introduction to Entrepreneurship	3
FANR 4220	Foundations of Restoration Ecology	3
FANR 5620	GIS Applications for Natural Resources	3
FORS 4210	Forest Health and Protection	3
FORS 4530	Wood Properties and Utilization	3
FORS 5760	Forest Products Marketing	3
GEOG 3630	Introduction to Urban Geography	3
GEOG(CRSS) 4375	GIS Applications in Agriculture	4
GEOG 4385	Community GIS	3
GEOG 4630	Advanced Urban Geography	3
GEOG 4631	Race, Inequality, and the American City	3
GEOG 4632	Urban Social Movements	3
GEOG 4633	Urban Political Ecology	3
GEOG 4660	Urban and Regional Development	3
HIST 3170	History of American Cities	3
HORT(LAND) 3450	Residential Design	3
HORT 4030S	Sustainable Community Food Production	3
HORT 4090	Landscape Horticulture	3
HORT 4095	GPS/GIS Applications for Landscape Managers	3
HORT(CRSS) 4440-4440L	Environmental Physiology	4
JURI 4790	Land Use Planning	2-3
LAND 3410	Plants of the South	3
LAND 4120	Designing Healthy Places	3
LAND 4360	Applied Landscape Ecology	3

*elective list continues on following page*

## Professional Program Curriculum (continued)

### Natural Resource Management and Sustainability Major Areas of Emphasis

Community Forestry and Arboriculture Area of Emphasis		
Course ID	Course Title	Hours
<i>elective list continued from previous page</i>		
LAND 4370	Applied Landscape Construction	2
MGMT 3001	Principles of Management	3
POLS 4640	Urban Politics	3
POLS 4645E	Applied Civic Engagement	3
PRTM 4400	Park Management	3
PRTM 5900	Ecotourism and Sustainable Development	3
RMIN 4000	Risk Management and Insurance	3
SOCI 3320	Sociology of Urban Life	3
SPAN 3010	Spanish Conversation and Composition	3
SPAN 4150	Business Spanish	3
STAT 4210	Statistical Methods	3
WASR(FORS) 4000	Forest Soil Management	3
WASR(FORS) 4110	Forest Hydrology	4
WASR 4400-4400L	Introduction to Wetlands	3
or	other faculty mentor-approved course	

\* No more than 3 hours of COFA 3900 may count towards graduation. Students must apply for internship credit before starting work.

\*\* Total hours for Area of Emphasis and Restricted Electives must equal 32.

## Professional Program Curriculum (continued)

### Natural Resource Management and Sustainability Major Areas of Emphasis

<b>Geospatial Information Science Area of Emphasis</b>		
Course ID	Course Title	Hours
<b>Required Courses:</b>		<b>12</b>
FANR 5620-5620L	GIS Applications for Natural Resources	3
FANR 5630	Statistical Software for Natural Resource Management	3
GEOG 4590-4590L	Programming for Geographic Information Science	3
<b>Required Option—choose one from the following:</b>		
GEOG 4350-4350L or GEOG 4460	Remote Sensing of Environment, or Field Methods in Remote Sensing	3 3
<b>Natural Resources Electives (choose from the list below):</b>		<b>10*</b>
ECOL 4050	Ichthyology	4
FANR 4800	Renewable Resources Policy	2
WILD (FISH) 3000	Introduction to Fish and Wildlife Management	2
FISH 4200, 4200L	Aquatic Biology, Aquatic Biology Lab	2, 1
FISH (WILD) 4300, 4300L	Environmental Biology of Fishes, Environmental Biology of Fishes Lab	3, 1
ECOL (FISH) 4310-4310L	Freshwater Ecosystems	4
FISH 4500, 4500L	Fish Physiology, Fish Physiology Lab	3, 1
FISH (WILD) 4520-4520L	Conservation Decision-Making	3
FISH (WILD) 4550-4550L	Sustainable Aquaculture	4
FISH (EHSC) 4600	Ecotoxicology	3
FISH 4650L	Georgia Fishes Field Study	4
FORS 3010, 3010L	Dendrology, Dendrology Lab	2, 1
FORS 4010-4010L	Silviculture	4
FORS 4210	Forest Health and Protection	3
FORS 4610-4610L	Forest Mensuration	4
FORS 4620	Timber Management	4
FORS 4700-4700L	Forest Economics	3
PRTM 3310	Humans, Nature and Environmental Awareness	3
PRTM 4400	Park Management	3
PRTM 5410-5410L	Stewardship and Protection of Natural Resources	3
PRTM 5800S	Environmental Interpretation	3
PRTM 5900	Ecotourism and Sustainable Development	3
WASR (FORS) 4110-4100L	Forest Soil Management	3
WILD (ECOL) 3580, 3580L	Vertebrate Natural History, Vertebrate Natural History Lab	3, 1
WILD (ECOL) 4040-4040L	Herpetology	4
WILD (BIOL) 4050, 4050L	Mammalogy, Mammalogy Lab	3, 1
WILD (ECOL) 4060-4060L	Ornithology	4
WILD 4100-4100L	Principles of Wildlife Habitat and Management	3
WILD 4400	Wildlife Physiology and Nutrition	3
WILD 4500	Nongame and Endangered Species Management	3
WILD 4700, 4700L	Techniques in Wildlife Population Management, Techniques Lab	2, 1
WILD (POPH) 5100	Principles and Management of Wildlife Diseases	3
WILD (CRSS) 5330-5330L	Conserving Wildlife in Agricultural Landscapes	3
WILD 5350, 5350L	Wetland Management for Wildlife, Wetland Management Lab	2, 1
WILD 5700, 5700L or	Applied Population Dynamics, Applied Population Dynamics L other faculty mentor-approved course	2, 1
<b>Geospatial Electives (choose from the list below):</b>		<b>10*</b>

*See next page for a list of pre-approved courses.*

\* Total hours for Area of Emphasis, including Natural Resources Electives and Major Electives, must equal 32.

Effective for students entering Fall 2017 and later.

(continued from previous page)

<b>Geospatial Electives (choose from the list below):</b>		<b>10*</b>
CBIO (CSCI) 4835	Introduction to Computational Biology	3
CRSS 4050	Improving Nutrient and Energy Efficiency with G.I.S.	4
EDES 4270	Environmental Design Uses of Geographic Information Systems	3
EDES 4280E	Environmental Design Uses of Geographic Information Systems	3
ENGR 3120	Spatial Data Analysis	3
ENGR 5930	GPS with Engineering and GIS Applications	3
FANR 5640-5640L	Unmanned Aerial Systems' (UAS) Role in Natural Resources Mgmt.	3
FORS 5650-5650L	Aerial Photogrammetry in Forestry	3
FORS 5670	Forestry Information Systems	3
WILD (FISH) 5750	Statistical Software for Fish and Wildlife Population Analysis	1-3
GEOG 3510-3510L	Cartography and Graphics	3
GEOG 4140	Satellite Meteorology and Climatology	3
GEOG 4330-4330L	Aerial Photographs and Image Interpretation	3
GEOG 4380-4380L	Transportation Modeling and GIS	3
GEOG 4385	Community GIS	3
GEOG 4410-4410L	Cartographic Visualization Methods	3
GEOG 4430-4430L	Advanced Image Analysis and Photogrammetry	3
GEOG 4450	Digital Image Analysis	3
GEOG 4460	Field Methods in Remote Sensing	3
GEOG 4470-4470L	Geospatial Analysis	3
GEOG 4570-4570L	Advanced Geographic Information Science	3
HORT 4095	GPS/GIS Applications for Landscape Managers	3
STAT 4360	Statistical Software Programming	3
or	other faculty mentor-approved course	

\* Total hours for Area of Emphasis, including Required Courses, Natural Resources Electives and Geospatial Electives, must equal 32.

*Students pursuing the Geospatial Information Science area of emphasis are encouraged to also enroll in the GIS Certificate Program through the Department of Geography.*

## Professional Program Curriculum (continued)

### Natural Resource Management and Sustainability Major Areas of Emphasis

<b>Water and Soil Resources Area of Emphasis</b>		
Course ID	Course Title	Hours
<b>Required Courses:</b>		<b>23</b>
PHYS 1111-1111L	Introductory Physics—Mechanics, Waves, Thermodynamics	4
CRSS 4670	Environmental Soil Chemistry	3
GEOL 4220	Hydrogeology	3
WASR(FORS) 4110-4110L	Forest Hydrology	4
<b>Required Option #1—choose one from the following:</b>		
(CRSS 4600 and 4600L) or WASR 4500	Soil Physics <i>and</i> Soil Physics Laboratory, <i>or</i> Quantitative Methods in Hydrology	4 3
<b>Required Option #2—choose one from the following:</b>		
GEOG 3010 or CRSS(GEOL) 4540-4540L	General Geomorphology <i>or</i> Pedology	3 3
<b>Required Option #3—choose one from the following:</b>		
EHSC(MIBO) 4310-4310L or ECOL(WASR) 4310-4310L or CRSS(MIBO) 4610-4610L	Environmental Microbiology <i>or</i> Freshwater Ecosystems <i>or</i> Soil Microbiology	4 4 3
<b>Water &amp; Soil Resources Electives (choose from the list below):</b>		<b>9*</b>
CRSS 2010-2010L	Crop Science	4
CRSS 3540	Soil Morphology and Interpretation	1
CRSS(GEOL) 4540-4540L	Pedology	3
CRSS 4580	Soil Erosion and Conservation	3
CRSS 4600	Soil Physics	3
CRSS 4600L	Soil Physics Laboratory	1
CRSS(MIBO) 4610-4610L	Soil Microbiology	3
CRSS(WASR) 4660	Hydrogeochemical Characterization of Environmental Field Sites	3
ECOL(WASR) 4310-4310L	Freshwater Ecosystems	4
EHSC(MIBO) 4310-4310L	Environmental Microbiology	4
EHSC 4350-4350L	Environmental Chemistry	3
EHSC 4490	Environmental Toxicology	3
EHSC 4610	Water Pollution and Human Health	3
FORS 3010	Dendrology	2
FORS 3010L	Dendrology Laboratory	1
GEOG 3010	General Geomorphology	3
GEOG 4060	Field Methods: Environmental Monitoring and Assessment	3
GEOG 4300	Introductory Spatial Analysis	3
GEOG 4330-4330L	Aerial Photographs and Image Interpretation	3
GEOG 4350	Remote Sensing of Environment	3
GEOL 3010-3010L	Earth Materials	4
GEOL 3020-3020L	Surficial and Near-Surficial Processes	4
GEOL 4110	Principles of Geochemistry	3
WASR 3000+	any WASR course numbered 3000-5999	
WASR 3900**	Water and Soil Resources Internship	1-3
WASR(FORS) 4000-4000L	Forest Soil Management	3
WASR 4500	Quantitative Methods in Hydrology	3
WASR(CRSS) 4700/4700L or	Hydrology, Geology, and Soils of Georgia other faculty mentor-approved course	3

\* Total hours for Area of Emphasis and Restricted Electives must equal 32.

\*\* No more than 3 hours of WASR 3900 may count towards graduation. Students must apply for internship credit before starting work.

Effective for students entering Fall 2017 and later.