Developing Stackable Environmental Science and Hydrology Coursework and Credentials for Technicians, Scientists, and Professional Land Surveyors

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Applying Geospatial & Engineering Technology
(Grant # 1700568)

Objective 1: Curriculum Development
Objective 2: Workforce Development
Objective 3: Dissemination

The National Science Foundation (NSF) awarded a three-year, $609,739 grant (#1700568) to the University of North Georgia's Lewis F. Rogers Institute for Environmental and Spatial Analysis (IESA) for a project entitled, "Applying Geospatial and Engineering Technology (AGET). A goal of the project was to meet the demand for highly skilled and educated technicians in the burgeoning field of geospatial and environmental technologies to prepare them for careers in fields such as hydrology, land-use planning, flood-plain mapping, environmental protection, land surveying, precision farming and water resource management. Courses developed led to a new associate of science degree in Environmental, Earth & World Studies, Spatial Science & Engineering plus an undergraduate Land Surveying Certificate. Associated courses build progressive steps in understanding engineering, hydrology, CAD, surveying, GST and applied environmental skills via directed emphasis areas for specific science and engineering careers. These stackable courses and credentials may also articulate with baccalaureate programs to meet workforce needs at multiple levels. Courses developed included Physical Environmental Science, Environmental Management & Sustainability, Surveying I and II, Legal Aspects of Surveying, and Professional Practice of Surveying. In addition to introductory hydrologic concepts in these courses, a newly planned undergraduate certificate in hydrology is planned to meet workforce requirements or licensing benchmarks for environmental scientists and professional land surveyors.

Institute for Environmental & Spatial Analysis

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Undergraduate
- Environmental Spatial Analysis (B.S.)
- Environmental, Earth & World Studies, and Spatial Science & Engineering (A.S.)

Minors
- Earth Science Minor
- Environmental Studies Minor
- Geography Minor
- Geospatial Science & Technology Minor
- Space Studies Minor

Certificate
- Earth Science Certificate
- Environmental Science Certificate
- Environmental Studies Certificate
- Geographic Information Science Certificate
- Geomatics Graduate Certificate
- Geospatial Intelligence Certificate
- Geospatial Science Technology Graduate Certificate
- Land Surveying Certificate
- Space Studies Certificate

Environmental Spatial Analysis (B.S.)

The Bachelor of Science in environmental spatial analysis (ESA) is designed to produce graduates with skills that meet the needs of employers in geospatial technology fields with little or no further training by employers. The ESA degree is composed of a curriculum built on a firm foundation in geographical information science (GIS) and supported by courses in remote sensing and information technology.

Degree Type
Bachelor of Science

Campus Availability
- Gainesville Campus

Environmental Spatial Analysis Major Concentration Areas

Environmental, Earth & World Studies, and Spatial Science & Engineering Pathway

The Environmental, Earth & World Studies, and Spatial Science & Engineering pathway strives to meet the demand for highly skilled and educated technicians in the burgeoning field of geospatial technology in Georgia. Students will be prepared for careers in fields such as land-use planning, flood-plain mapping, environmental protection, precision farming and national security. Upon completion of this pathway, students may transition into the Bachelor of Science in Environmental and Spatial Analysis at the University of North Georgia or another four-year institution.

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Degree Type
Associate of Science in Core Curriculum

Campus Availability
- Blue Ridge Campus
- Cumming Campus
- Gainesville Campus

Students can start at any of these campuses and transfer to the Gainesville Campus to complete the associate pathway.

Core Curriculum (Areas A-E) - 42 hours

Area F: Courses Appropriate to the Major - 18 hours

Required Courses - 6 hours
- GISC 2011 - Geographic Information Science
- GISC 2011L - Geographic Information Science Lab

Select one:
- ENST 2030 - Environmental Studies & Sustainability
- ENVE 1103 - Introduction to Environmental Professions

Area - 6-8 hours

Select one of the following areas:
- ENVE 2221K - Surveying I
- ENVE 2771K - Graphics and Information Visualization

or,
- ENVS 2111K - Physical Environmental Science
- ENVS 2112K - Environmental Management & Sustainability

or,

Select two:
- GEOG 1111K - Introduction to Physical Geography
- GEOG 1112 - Introduction to Weather and Climate and
- GEOG 1112L - Introduction to Weather and Climate Lab
- GEOG 1530K - Introduction to Oceanography

or,

Select two:
- GEOG 1101 - Introduction to Human Geography
- GEOG 1102 - World Regional Geography
- GEOG 2010 - Geography of East Asia

or,
- GEOL 1121K - Physical Geology
- GEOL 1122K - Historical Geology

Elective Courses - 4-6 hours

Stackable Credential Pathways

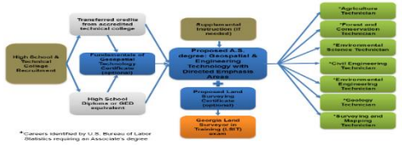
Graduate Certificates:
- ***Geospatial Intelligence***
- **Geomatics**
- **Geospatial Science & Technology**

B.S.
- **B.S. Environmental Spatial Analysis**

Undergraduate Certificates (Upper-level)
- **Environmental Science**
- **Earth Science**
- **Environmental Studies**
- **Geographic Information Science**
- **Space Studies**

A.S.
- **A.S. Environmental, Earth,& World Studies and Spatial Science & Engineering**

Undergraduate Certificates (Technician-level)
- Space Studies
- **Land Surveying**



New Land Surveying Courses & Certificate & Environmental Science Courses

New Courses
- ENVE 2221K – Surveying I
- ENVE 2222K – Surveying II
- ENVE 3465 – Legal Aspects of Surveying
- ENVE 3475K –Professional Practice of Surveying
- ENVS 2221K - Physical Environmental Science
- ENVS 2212K - Environmental Management & Sustainability

Courses Modified
- ENVE 2771K Graphics & Information Visualization

Geomatics Graduate Certificate

This certificate strives to meet the demand for highly skilled and educated land surveyors and geomatics professionals in Georgia. Geomatics is a rapidly changing field that is always incorporating the latest technology to improve accuracy and precision in spatial data collection. The Department of Labor Occupational Handbook predicts faster than average growth in this field over the next decade.

The University of North Georgia Graduate Certificate in Geomatics includes all of the coursework required for the state of Georgia's surveying licensing process at the graduate level.

Future Hydrology and Land Use Certificate

- ENVS 2111K – Physical Environmental Science
- ENVS 2112K – Environmental Management & Sustainability
- ENVE 3001K - Land Use and Conservation
- ENVS 3003K – Soils
- ENVS 4003K – Hydrology

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