MASTER OF SCIENCE IN GEOSPATIAL SCIENCE
Department of Geography
University of North Alabama
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PROGRAM OVERVIEW: Geospatial science is an innovative approach to applying spatial knowledge and technology to solve contemporary problems. The Master of Science in Geospatial Science in the Department of Geography at the University of North Alabama focuses on the multidisciplinary application of geography, the spatial paradigm, and methods of geospatial technologies to prepare students to:

- Solve complex environmental, urban, economic, and business problems;
- Conduct independent research;
- Develop skills in critical thinking and writing; and
- Enter professions requiring knowledge of geospatial methods, analysis, and techniques.

The Master of Science degree in Geospatial Science allows students to choose between a thesis and non-thesis option. All students must complete at least 33 hours of graduate credit, of which eighteen hours (six classes) are required core courses, six hours of research or thesis, and the remaining nine hours of electives, as approved by the student’s advisor.

PROGRAM OBJECTIVES: The Master of Science in Geospatial Science has three objectives:

- Provide advanced coursework and independent research opportunities in the theory and application of geospatial science to a broad range of current issues in environmental, urban, economic, business, and social fields.

- Develop advanced critical and spatial thinking abilities and combine these with a problem-solving proficiency through the application of geospatial methods and technology in the areas of Geographic Information Systems (GIS), remote sensing, aerial photograph interpretation, computer cartography, Global Positioning Systems (GPS), spatial statistics, urban and regional planning, and policy analysis.

- Prepare students for private industry, government, and education careers in geospatial science, a field identified by the US Department of Labor as one of the three major growth industries for the twenty-first century.

LEARNING OUTCOMES: Upon completion of the Master of Science in Geospatial Science, graduates will be able to:

1. Ask scientific questions using a geospatial paradigm.
2. Design and conduct research using geospatial methods and technologies.
3. Employ enhanced analytical, critical, and spatial thinking, and knowledge to solve contemporary problems.
4. Graduate with advanced knowledge of geospatial science and thorough competence in the application of geospatial technologies.
**ADMISSION REQUIREMENTS:** Students applying to the M.S. degree program in Geospatial Science must meet the general requirements for admission into graduate studies at the University of North Alabama as described in the University’s current Graduate Bulletin ([www.una.edu/catalog/](http://www.una.edu/catalog/)). In addition to the general requirements for admission to graduate studies, admission to the graduate program also requires the following minimum requirements:

1. **Application and Transcript:** A formal application and an official transcript from each institution previously attended, including community and junior colleges, must be submitted to the Office of Admissions of the University. Applications must be filed with the Office of Admissions well in advance of, but not later than two weeks prior to, the opening date of registration for the term.

2. **Preparation:** Applicants must hold a bachelor’s or higher degree in an appropriate field of study from an accredited institution or complete coursework that will meet this requirement as determined by the Graduate Admissions Committee.

3. **Scholastic Achievement:** Applicants must have a minimum of 3.0 Grade Point Average on a 4.0 scale in the last two years of undergraduate work and in all previous graduate work (if any) is required.

4. **Test Scores:** Applicants must have a combined score of at least 1000 on the verbal and quantitative sections of the Graduate Record Exam (GRE).

5. **Letters of Recommendation:** Applicants must submit three letters of recommendation from academic or professional sources. At least one letter of recommendation must be provided by a faculty member from the applicant’s prior undergraduate or graduate program.

A departmental Graduate Admission Committee will review each application and make all admission decisions. All applications and supporting documents must be submitted to the Office of Admissions of the University in accordance with submission deadlines established by that office.

**CONDITIONAL ADMISSION:** A student may be conditionally admitted to the M.S. in Geospatial Science program if his/her GRE scores have not yet been obtained, if the Graduate Admissions Committee deems the undergraduate coursework insufficient, or if the applicant’s letters of recommendation have not been received by the Department of Geography. A student without sufficient prior coursework in geography may be required to enroll in undergraduate courses to meet prerequisites for graduate level work. The student must submit satisfactory test scores or complete remedial coursework prior to completing 12 credit hours in the program.

Applicants not meeting requirements #3, and #4 above may still be considered if other evidence is presented of potential academic achievement. Transfer credits will be accepted in accordance with the policy of the University as described in the University of North Alabama Graduate Bulletin. Generally, the University will accept up to six hours of transfer credit.

**REQUIRED COURSES:** The following courses are the required core courses for the Master of Science in Geospatial Science:

- Introduction to Geospatial Science (GE 610)
- Remote Sensing (GE 524)
- Projects in GIS (GE 584)
- Geographic Thought (GE 600)
- Geographic Methods (GE 609)
- Spatial Modeling and Analysis (GE 684)
COURSE DESCRIPTIONS (all courses are three semester hours):

GE 502. Problems in Political Geography
This course is as study of the role of geographic factors in influencing the political structure of nations. Also listed as PS 502 but creditable only in the field for which registered.

GE 503. Nature and Society Interactions
This course involves a global analysis of human-environment issues including human’s impact on the environment and the environment’s impact on humans. Topics addressed may include, but are not limited to, global warming, overpopulation, environmental degradation, environmental hazards and disasters, and effective natural resources use. Field work required.

GE 504. Environmental Hazards
Natural and technological events continue to impact people and places across the globe. This course draws upon hazard and disaster experiences to address the nature, impact, and social responses to environmental hazards. Course focus is on the relationship between nature, society and technology and analyzes how people and places experience, cope with, and recovery from environmental disasters.

GE 510. Integration of Geography and History
This course integrates the spatial concepts of geography with the chronological concepts of history. Also listed as HI 510 but creditable only in the field for which registered.

GE 513. Geography of Asia
This course involves an analysis of culture, the distribution of resources and relationships of the citizens to each other and the rest of the world.

GE 520 Principles of Urban and Regional Planning
The course focuses on planning both as a profession and as an important element of city, county, and regional government with primary emphasis on American planning. Both the general nature of planning and the specifics of how to plan will be covered.

GE 554. Remote Sensing
This course expands upon concepts and methods of remote sensing through the digital interpretation of satellite imagery. The interpreted information (data and findings) will support the understanding of the processes involved in land use and land cover analysis, change detection, and the map update process. The course includes lecture and discussion related to remote sensing and image processing theory with associated, practical laboratory exercises and applications of satellite image analysis and digital image processing. Special fee: $30.00.

GE 535. Geomorphology
The origin and development of land forms and the processes involved. Two class periods, one 2-hour laboratory period per week, and one required field trip per semester. Prerequisite: ES 121 or 131 or GE 111 or 112. Special fee: $30.00.

GE 560. Advanced Cultural Geography
This course provides a conceptual approach to the study of human environment systems, cultural landscape, ecological perspectives, environmental perception and behavior, and environmental stress.
GE 572. Historical Geography of the United States
This course analyzes the role of geographic conditions in the exploration, settlement, and development of the United States. Also listed as HI 572 but creditable only in the field for which registered.

GE 584. Projects in Geographic Information Systems
The course encompasses advanced reading and discussion of state of the art projects and techniques in Geographic Information Systems, remote sensing, computer cartography, and image processing. Students will conduct a detailed database development project including database design, database populations, data management, and the application of spatial modeling techniques. A field trip is required. Prerequisite: permission from department chair. Special fee: $30.00.

GE 599. Independent Study-Practicum
Open to graduate students on approval of the department chair. This course provides for independent study and research under departmental determination, supervision, and evaluation.

GE 600 Geographic Thought
A study of the history and development of geographic thought, the evolution of the discipline of geography, and contemporary geographic philosophies, paradigms, and debates.

GE 601. Physical Geography for Teachers
Considers the spatial aspects of climate, vegetation, soils, and landforms with special emphasis given to map use and map interpretation skills.

GE 602. Cultural Geography for Teachers
This course considers the spatial aspects of human culture including location, population, migration, economics, politics, and global interdependence with special emphasis on map and atlas interpretation skills.

GE 603. Regional Geography for Teachers
An examination of the spatial distribution of physical and cultural attributes which give uniqueness and diversity to world regional patterns on the earth’s surface.

GE 604. Methods and Materials of Geographic Education
The examination and application of instructional procedures and materials focusing upon current geographic objectives, concepts, and methods of learning appropriate to the needs of teachers of geography.

GE 605. Field Experience in Geography
This is a field-oriented approach to the study of environmental concepts, including man-earth relationships and is designed to be offered as a Saturday course during the regular school year or as a short summer course to allow for an adequate block of time to engage in field work.

GE 609. Geographic Methods and Design
This course presents the core competencies required to perform professional level research in Geography. The course will review methods of research design and methodology, with a focus on appropriate geographic and statistical techniques required.

GE 610. Introduction to Geospatial Science
Geospatial science delves into determining the correct data and technology to address today’s issues related to humans and their environment. An understanding of geospatial science provides a distinct perspective on the world, a unique lens through which to examine and interpret events, patterns, and processes that operate on or near the surface of Earth.
GE 620. Planning Theory and Process
This course is designed to provide an overview of the development of planning theory as it applies to the field of Urban and Regional Planning in the United States. The course will critically evaluate trends in planning theory with a focus on the evolution of main ideas and people who have influenced the field of planning in the US. To accomplish this goal, emphasis will be placed on normative, conceptual, methodological issues and various roles planners play, and also the ethical dilemmas they face in practice.

GE 624. Advanced Remote Sensing
This course provides students with advanced topics in remote sensing and image processing including, change detection, image fusion, principle components analysis, spectral signatures, fuzzy classification, and pattern recognition. This course includes classroom instruction, videos, laboratory exercises, fieldwork, and state-of-the-art digital image processing techniques, all to support the interpretation of satellite imagery for extraction of land use and land cover information. One field trip is required. Pre-requisite: GE523 or graduate image processing course.

GE 625. Cartographic Design and Visualization
This course is concerned with advanced map communication concepts; cartographic visualization; designing graphic solutions to geographic situations and needs; illustrating spatial patterns; and considering cartographic representations in terms of aesthetics. Prerequisite: Cartography or equivalent undergraduate cartography class.

GE 684. Spatial Modeling and Analysis in Geographic Information Science
This course focuses on advanced problem solving in the spatial environment including GIS system planning, and design, error handling and quality control, decision support techniques, exploratory data analysis, and spatial statistics and geostatistical analysis. Course labs and projects will focus on current issues, events and opportunities in GIScience. Prerequisite: GE524 and GE584

GE 692. Research
This course involves the selection of a research topic, collection and analysis of primary and secondary sources, field work, and composition of research paper under faculty supervision. May be taken more than once. Permission of supervising faculty and graduate director required.

GE 695. Thesis
This course involves the selection of a thesis topic, collection and analysis of primary and secondary sources, field work, and composition of thesis and thesis defense under faculty supervision. May be taken more than once. Permission of supervising faculty and graduate director required.

GE 697. Advanced Topics
Selected topics in geospatial science offered by faculty. May be repeated for credit if the topic is different. Permission of supervising faculty and graduate director required.