

ETSU  
Department of Geosciences  
Honors-in-Discipline  
Program



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DEPARTMENT of  
GEOSCIENCES

College of Arts & Sciences

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EAST TENNESSEE STATE UNIVERSITY

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## **The Department of Geosciences Honors in Discipline Program**

Department of Geosciences  
College of Arts and Sciences  
East Tennessee State University

The Honors-in-Discipline (HiD) program in the Department of Geosciences is designed to provide an enhanced educational program of study for your major in Geosciences (with concentration in Geospatial Sciences, Geology and Environment, Paleontology and Geography). To ensure the quality of the program, only a limited number of spaces are available. Scholarships are limited, all students selected for the program will be considered for honors scholarships, as they become available from the Honors College.

The Geosciences HiD program focuses on student learning through original research. Our Honors students work with a diverse group of professors, graduate students and researchers to discuss research opportunities, and become involved in their own researches. Our HiD students participate in scientific professional conferences and present their work with peers and faculty supervisors.

### **I. Academic Program**

#### Number of Credit Hours Required

The Geosciences Honors Program consist of a minimum of 18 credits, including 12 credits of (i) Geosciences honors enriched courses and 6 credits of (ii) Honors Thesis research or a combination of 3 credits of Honors Thesis and 3 credits of Geosciences Field Experience.

1. Honors-enriched Courses (minimum 12 credits): Several Geosciences upper level and some lower level courses will be enriched with an addition of a variety of laboratory, field and/or theoretical project components specifically designed to expose an honors student to a higher level learning experience (section VI for details).
2. Honors Thesis Research (6 credits -comprised of GEOG/GEOL 4905 Independent Study (3 credits) plus GEOG/GEOL 4018 Honors Thesis (3 credits). Students will identify and initiate a research project appropriate for an Honors Thesis which will be completed over two semesters. The student and a faculty project supervisor will mutually agree to the project.

or

Geosciences Field Experience (3 credits) and Honors Thesis Research (3 credits). Students will participate in GEOG/GEOL 3700: Geosciences Field Experience which visits a different region of North America each year. Course work includes production of a term paper, two oral presentations and active participation during the field experience. The Honors Thesis Research will include additional research on

an aspect of the region mutually agreed to by the student and a faculty project supervisor.

## **II. Eligibility, Retention & Graduation Requirements**

### **Eligibility**

Applications for admission to the honors program will be accepted from students in the second semester of their freshman year. However, admission will be contingent upon their final grades on completion of the freshman year.

Both ETSU students and transfer students must have an overall minimum GPA of 3.2 with a minimum GPA of 3.5 in geosciences courses.

### **Retention**

A student must remain registered for a minimum of 15 credits per semester. An exception is one capstone semester when scholarship recipients may register for only 12 hours. Requirements for students with scholarships are found in section IV.

Students should maintain a minimum overall GPA of 3.25 with a minimum GPA of 3.5 in Geosciences.

Honors students who do not meet these requirements may be granted one semester of probation by the Honors Program Coordinator. If the student meets the retention requirements after the probationary period, he/she will be allowed to remain in the Honors Program.

### **Graduation**

To graduate with Honors in Geosciences, an honors student should have a minimum 3.25 GPA, complete all required courses (Honors, General Education, Academic Proficiencies), and complete and orally present the Honors thesis. In addition, the thesis grade must be B or higher.

## **III. Application & Admission Procedures**

- Completed Application Form (available in Section XXX)
- A letter describing his/her expectations of the ETSU Geosciences HiD Program and career goals.
- A list of Geosciences courses that have been taken and the grades earned.
- A list future Honors-in-discipline classes required for timely graduation (after consultation with Geosciences HiD coordinator).
- A letter of recommendation directly sent from a professor at the university attended by the student to Geosciences HiD coordinator.

Application should be sent to: Geosciences HiD Coordinator, Dr. Arpita Nandi [nandi@etsu.edu](mailto:nandi@etsu.edu) East Tennessee State University, Department of Geosciences, Box 70357, Johnson City, TN 37614.

## IV. Honors-in-Discipline Scholarships

Students in good standing in the Geosciences HiD Program will be considered for in-state or out-of-state Honors-in-Discipline scholarships, as they become available from the Honors College. A student receiving an Honors-in-Discipline scholarship, whether in-state or out-of-state, must enroll in at least 15 credit hours per semester. An exception is one capstone semester when scholarship recipients may register for only 12 hours.

## V. Program Coordination and Student Advisement

Coordinator

1. The department chair will serve as the honors program coordinator and will be responsible for the Geosciences Honors-in-Discipline Program.
2. Each semester the honors program coordinator will advise honors students, maintain folders, monitor progress, assemble reports, and ensure, within some degree of flexibility, an equitable distribution of the workload for directing honors theses.

Honors Faculty

The honors faculty will consist of those teaching honors courses and/or directing honors thesis in any given year and will be responsible for maintaining the standards of the respective honors enriched courses taught by them.

## VI. Course Descriptions

*Honors-Enriched Courses and Enrichment Experiences:*

GEOG 2500-088 Digital Mapping with GIS (3 credits) -An application of the principles of map construction, compilation, and the techniques of map drawing and map reading. *Honors students will be required to write a 6-page term paper which compares and contrasts different types of maps and how they are applied to various data sets. The student will also produce a map using a data set to be determined by the instructor.*

GEOG 3060-088 Geomorphology (4 credits) -An investigation into the physical processes responsible for landforms. *Honors students will be expected to conduct a research project on the geomorphology of a region of the student's choice (to be approved by the instructor). The student will prepare a final 8-page written report, and will also present the research to the class.*

GEOG 3090-088 Meteorology and Climatology (4 credits) -A study of atmospheric elements and processes and climatic controls and patterns as they influence and are influenced by human life. *Honors students will be required to write a 8-page term paper on a topic within the field of Meteorology. The topic must be approved by the instructor and the term paper must include an*

*extended and annotated reference list. Lastly, the student will make an oral presentation to the class as part of the final grade.*

GEOG 3400-088 Geography of the United States (3 credits) -A regional study of the physical and cultural elements of the United States.

*Honor students will be required to write a 8-page paper that treats the geography of the United States from a systematic or topical viewpoint. The topic must be approved by the instructor and the paper should include a variety of illustrations, images and maps. The bibliography can contain internet sources, but must also include traditional periodical and/or technical reports.*

GEOG 3500-088 Geographic Information Systems (3 credits) -The field of GIS is relatively new and expanding and is concerned with techniques and theory of cartographic and spatial data rectification and enhancement and spatial information extraction.

*Honors students will be required to write a 8-page proposal on the application of GIS to an individual research interest field. The proposal should include a short summary of literature, significance, proposed GIS project, and the expected result.*

GEOG 3600-088 Remote Sensing (3 credits) -A systematic treatment of elements involved in interpreting, measuring, and mapping of images that appear on aerial photographs.

*Honors students will be required to write an 8-page term paper on a study that uses satellite images to monitor environmental change. The topic must be approved by the instructor and the term paper must include an extended and annotated reference list.*

GEOG 3700-088 Geosciences Field Experience (3 credits) -This course requires students to research and present written and oral reports on an area of interest which is then visited as part of a field camp exercise. The field camp areas may be within the United States or international in nature.

*Honors students will be required to choose two topics relevant to the geography of the region visited during the Field Camp trip. Honors students will be required to write a 5-page paper and give an oral presentation on each topic at a relevant location during the field camp.*

GEOG 4700-088 Natural Resource Management (3 credits) -The study of cultural attitudes, conceptual approaches, and evaluation techniques in resource management. Analysis of selected resource issues at various areal scales.

*Honors students will be required to volunteer with a city or state park, municipal or state government, or local community group that focuses on environmental management of natural resources. The student shall amass 20 hours of volunteer work and contributions to resource management at the local level and provide a 6-page report detailing their work at the local level.*

GEOG-4200-088 Soil Geoscience and Mechanics (3 credits) -An introduction to soil science. Particular attention is focused on soil morphology, soil classification, and the study of distributional patterns of soils and their relationships to other geographical elements.

*Honors students will be expected to conduct specific field and laboratory experiments within the area of study to be approved by the instructor. The student will present a final written report and make an oral presentation to the class as part of the final grade.*

GEOG 4307-088 Regional Geography (3 credits) -Under this cover title, individual courses will be offered in such areas as Europe, Latin America, Asia, Soviet Union, and Africa. Course may be repeated as subject matter changes.

*Honors students will be required to write a 10-page term paper on the region of study. The topic must be approved by the instructor and the term paper must include an extended and annotated reference list.*

GEOG 4317-088 Advanced Geographic Information Systems (3 credits) -A critical examination of the contemporary issues involved with Geographic Information Systems and digital spatial data. One-half of the course content will be dedicated to practical training on the sophisticated vector-based GIS software called Arc/Info. A hands-on understanding of the nature and functionality of this software will be acquired within a workstation computer environment.

*Honors students will be required to write a research term project or prepare a lab advanced GIS techniques. The topic must be approved by the instructor and final results will be presented by the student to the whole class.*

GEOG 4237 - Advanced Remote Sensing (3 credits) - A study of different types of remotely sensed images and their interpretation.

*Honors students will be required to write a change detection project using satellite imagery. The topic must be approved by the instructor and final results will be presented by the student to the whole class.*

GEOL 2000-088 Earth Materials (4 credits) -Earth Materials is the study of mineral crystal structure and morphology, and their optical properties. This course will consider silicate and non-silicate minerals, their identification, environments of formation and their common associations.

*Honors students will select and research four different mineral groups through the course of the semester. The student will submit an individual report on each mineral group which includes its chemistry, structure, formation, associations, distribution, economic importance and uses. One report will be orally presented by the student to class members in the Earth Materials course.*

GEOL 2480-088 Field Methods in Geosciences (4 credits) -An introduction to the methods of measurement, sampling techniques, and data collection used by the field geologist. Topographic and satellite image techniques of mapping, section measurement and description, structure description and analysis will be treated.

*Honors students will map an area, mutually agreed on by the instructor and the student, and submit the map, and a 6-page report on the geology of the selected area, by the end of the semester.*

GEOL 3000-088 Volcanology (3 credits) -Volcanology includes the study of volcanoes, their deposits, and the physical and chemical processes that drive eruptions. This course focuses on physical approaches used to understand eruption processes and deposits and the sociology of volcanic crises. Course topics may include: rheology and transport of magma; intensity and style of explosive eruptions; emplacement of lava flows; origins and characteristics of pyroclasts and pyroclastic rocks; monitoring of active volcanoes; impacts of volcanic hazards (on human health and the environment); and human & social dynamics at volcanoes.

*Honors students will be required to undertake additional work on their major assignments that involves a written paper and oral presentation. This will require 8-page written paper and a 10 minute oral presentation on the selected topic.*

GEOL 3391-088 Paleobiology (4 credits) -Principles of taxonomy, classification, paleoecology, evolution, and geologic records of the major invertebrate phyla are considered.

*Honors students will be required to choose an invertebrate fossil group and to collect, identify and curate that material as part of the Geology teaching collection.*

GEOL 3395-088 Vertebrate Paleontology (4 credits) -The goal of this course is to provide a general overview of vertebrate evolution through time and to discuss how it is (and has been) interpreted from the fossil record. In addition, new theories and recent discoveries will be addressed (specifically, their relevance to past and current thinking).

*Honors students will be required to work a minimum of 20 hours at the Gray Fossil Site and submit an 8-page report on their work by the end of the semester.*

GEOL 3481-088 Natural Hazards and Society (3 credits) -This course considers specifics in man's relationship to the physical environment. Natural environmental hazards, such as volcanoes, earthquakes, subsidence, soil flow, landslides, floods, and sedimentation, are examined. The limitations of natural resources and future projections are considered along with the impact of man's demands upon the environment. Oil spills, surface mining, waste disposal, water supplies, and other problems of a geologic nature that are pertinent to the environment are discussed from the standpoint of specific case histories.

*Honors students will be required to choose a topic within the broad scope of Natural Hazards and write an 8-page term paper on a specific mechanism or event. The topic must be mutually agreed on by the student and instructor and will be the subject of an oral presentation in class. The paper should consider the history of the hazard, how the hazard was evaluated, what mitigation techniques were considered and applied, the results of the mitigation and the political and social impacts that the hazard created.*

GEOL 3700-088 Geosciences Field Experience (3 credits) -This course requires students to research and present written and oral reports on an area of interest which is then visited as part of a field camp exercise. The field camp areas may be within the United States or international in nature.

*Honors students will be required to choose two topics relevant to the geology of the region visited during the Field Camp. Honors students will be required to write a 5-page paper for each topic and give an oral presentation on each topic on relevant outcrops during the field camp.*

GEOL 4120-088 Petrography (4 credits) -Igneous, sedimentary, and metamorphic rocks are examined both in hand specimen and in thin section. The student will learn to recognize component minerals and other important characteristics and to apply principles of rock classification and identification.

*Honors students will collect and prepare a sequence of rocks, to be mutually agreed on by both the student and the instructor, which can be added to the Geology teaching collection. The project will include collection and description of rock hand samples, preparation of thin-sections, and a written report on both.*



GEOL 4540-088 Sedimentation-Stratigraphy (4 credits) -The first part of the semester is devoted to the origin, classification, and interpretation of sediments and modern sedimentary environments. The second part is devoted to the recognition of these environments in the geologic record through stratigraphic analysis. The latter includes principles of correlation, stratigraphic paleontology, compilation of stratigraphic maps, and interpretation of the geologic column.

*Honors students will be expected to choose a rock section in the region and measure and describe it in detail. The choice of section must be mutually agreed upon by the student and the instructor. The student will submit a detailed description and stratigraphic column of the section as a final report. The student may also choose to carry out a sedimentary analysis on an exposed rock section, a stream deposit or soil horizon to be mutually agreed upon by the instructor and the student. Analyses will include petrographic description of sediments and grain size analysis of representative sediment/soil samples all to be presented in an end of semester report.*

GEOS 2020-088 Scientific Methods in Geosciences (4 credits) -The ultimate goal of this class is to learn fundamental scientific methods used in Earth Sciences. Students will identify the components of the scientific method and explain each; they will design and evaluate simple scientific analyses using real world data sets. This course will introduce students to undergraduate research, which can be related to individual or team research projects, and possibly lead to a senior theses, publications and presentations.

*Honors students will select a topic, work with relevant real-world data, and apply scientific methods to analyze the data. This will require a 6-page written paper and a 10 minute oral presentation on the selected topic.*

GEOS 3335-088 Subsurface Geology (4 credits) -This class provides an introduction to gravity, magnetic and seismic studies, geophysical logs and sub-surface mapping.

*Honors students will be required to work on a practical geophysical research problem and submit an 8-page report on their work by the end of the semester.*

GEOS 4587-088 Engineering Geology (4 credits) -Real-world applications of geology in the field of engineering. Topics include: soil properties, floods and flood control, dams, stream management and reconstruction, erosion and erosion control, mass movement, municipal waste treatment, septic systems, radioactive waste disposal, tunnels, geologic applications of explosives, permafrost, strip mining and mine reclamation, earthquakes and coastal management.

*Honors students will be required to choose a topic within the broad scope of Engineering Geology and write a 10-page term paper on the issue. The topic must be mutually agreed on by the student and instructor and will term paper orally defended in class. The paper should consider the history of the engineering project, how the site/issue was evaluated, what engineering techniques were considered and applied, the results of the engineering effort and the political and social impacts that the project had.*

GEOS 4617-088 Structural Geology (4 credits) -Focus is on the description and analysis of geological structures within the Earth's crust, with an introduction to global tectonics. Includes the description of geological structures; the kinematics and dynamics of folding and faulting; stress, strain, deformation and rheology; introduction to dislocation theory;

principles of plate tectonics; micro-structural analysis; and selected orogenic systems of the world.

*Honors students will be expected to map a structurally complex area, mutually agreed on by the instructor and the student, and submit the map, and a report on the geology of the selected area, by the end of the semester.*

GEOS 4857-088 Principles of Hydrogeology (4 credits) -The objective of this course is to understand the fundamental principles of the hydraulic cycle. The teaching approaches involve the use of field observations, lab and chemical data, as well as modeling as basic tools to understand and manage the groundwater resource. This course will also include several required field trips to study the local hydrogeology and geology.

*Honors students will be expected to conduct a field experiment or computer modeling experiment with the area of study to be approved by the instructor. The student will present a final written report and make an oral presentation to the class as part of the final grade.*

#### *Honors Thesis:*

GEOG/GEOL 4018-00x Honors Thesis (3-6 credits). Prerequisites: Permission of chair. The Department of Geosciences will require the completion of a senior Honors Thesis (GEOG/GEOL-4018) as a capstone course. A Geography/Geology faculty member, chosen by the student, will direct a year-long, 6 credit hour, thesis project (3 credits as GEOG/GEOL 4905 Independent Study plus 3 credits of GEOG/GEOL 4018 Honors Thesis or a 3 credit hour thesis project if combined with the 3 credit GEOG/GEOL 3700 Geosciences Field Experience course. One additional faculty member or professional thesis reader will serve on the committee with the faculty advisor. An oral presentation of thesis results is required.

ETSU Geosciences Honors students will find diverse opportunities to interact with colleagues and other scientists. With assistance from the Honors College, funds are available for research grants and travel to attend professional scientific conferences.

## VII. Honors-in-Geosciences Checklist

Name: \_\_\_\_\_

Student #: \_\_\_\_\_

- All Honors-in-Geosciences students must complete a 12 credits of Geosciences honors enriched courses [GEOG/GEOL/GEOS XXXX-088 ]

Honors Enriched Course	Credits	Semester Completed
Total		

- Honors-in-Geosciences students must complete 6 credits Honors Thesis research [GEOG/GEOL 4905 and 4018] or 3 credits of Honors Thesis [GEOG/GEOL 4905] and 3 credits of Geosciences Field Experience [GEOG/GEOL 3700-088]
- Junior Year: Meet with faculty members in the department to determine thesis project and supervisor. Submit a research proposal to research supervisor and HID Coordinator.
- Senior Year: Fall semester and Spring semester – register for Honors Thesis credit hours and complete thesis research project.
- Choose one additional readers for your thesis.
- Publicly present thesis either at a department seminar, or through a professional setting (Boland Symposium, or a conference are appropriate venues).
- Careful editing of the thesis by the committee (supervisor and reader) for content, organization, and grammar is required.
- The signed thesis must be turned into the Honors College by Nov. 15 (Fall Semester) or April 15 (Spring Semester).
- Submission as an EThesis.

## VIII. Honors-in-Geosciences Application Form



DEPARTMENT of  
GEOSCIENCES  
College of Arts & Sciences  
EAST TENNESSEE STATE UNIVERSITY

### GEOSCIENCES HONORS-IN-DISCIPLINE APPLICATION FORM



DEPARTMENT of  
GEOSCIENCES  
College of Arts & Sciences  
EAST TENNESSEE STATE UNIVERSITY

Fill in and send to the Department of Geosciences Honors-in-Discipline Program Coordinator.

Last Name..... First Name..... E#.....

Address.....

City.....Johnson City..... State.....TN..... Zip Code...37615.....

Email..... Phone.....

#### ACADEMIC INFORMATION

University or College you are now attending.....|

Entry Date.....

Date of Application at ETSU, if not already enrolled at ETSU.....

Total Credit Hours Earned.....

Total Hours in Major Earned.....

Cumulative University GPA or .....GPA in Geology Courses Alone.....

GPA Minimum Requirements: 3.5 overall for transfer student; 3.2 overall for ETSU students entering the Geosciences Honors-in-Discipline Program after their freshman year, or 3.50 in Geosciences courses alone. If you have any questions please contact the Geosciences Honors-in-Discipline Coordinator at: [nandi@etsu.edu](mailto:nandi@etsu.edu).

#### STATEMENT AND LETTER OF RECOMMENDATION

In order for your application to be complete, you need to provide two more items:

1. Please send a letter describing your expectations of the ETSU Geosciences Honors-in-Discipline Program and your career goals. Please include a list of Geosciences courses you have taken and the grades you earned. Also, please describe any other classes or activities that you think we should know about.
2. Please have a letter of recommendation sent from a professor at the university you attend. The letter should be sent to: Honors Coordinator, East Tennessee State University, Department of Geosciences, [Box 70753](#), Johnson City, TN 37614.