GEOSCIENCE, PH.D.

Saint Louis University's geology research facilities include a network of seismograph stations surrounding the New Madrid fault zone, state-of-the-art seismic observatories that transmit data by satellite from sites distributed across a broad region of the central United States; excellent computing facilities consisting of LINUX, Solaris, MAC and PC workstations; rock preparation and mineral separation facilities; a stable isotope geochemistry lab; a remote sensing lab; and a digital image analysis lab.

Extensive research is conducted at the Saint Louis University Earthquake Center and the Seismic Analysis and Remote Sensing Laboratories.

Curriculum Overview
The Doctor of Philosophy in Geosciences requires a minimum of 48 credits of course work and exactly 12 credits of dissertation research. Up to 24 credits of course work leading to a master's degree may count toward the credit requirement.

Two concentrations are available:
- Geophysics
- Environmental geoscience

Fieldwork and Research Opportunities
Active research areas in geophysics include earthquake seismology, tectonics, those in geology include tectonics, remote sensing, sedimentary geology and sedimentation, igneous and metamorphic petrology, geochemistry, geochronology, geomorphology and fluid-rock interaction, while those in environmental geosciences include river/reservoir sustainability, land use effects on water quality, contaminant transport, wetland biogeochemistry, hydro-geochemistry, fluvial geomorphology, coastal geomorphology and processes.

Careers
The Ph.D. program prepares students for careers in academic research, teaching, government or industrial research environments. After graduating, alumni might pursue a career as an earthquake hazard analyst, environmental consultant or an exploration geophysicist.

Admission Requirements
Successful applicants possess sufficient test scores, a sufficient GPA and sufficient TOEFL scores (for international students).

Geophysics Concentration
Prerequisites include structural geology, college physics, mechanics and mathematics through differential equations.

Environmental Geosciences Concentration
Prerequisites for master's degree: an undergraduate degree in a STEM discipline with at least one semester each of calculus, physics, biology, chemistry, and geoscience; a second semester of calculus or one semester of statistics.

Application Requirements
- Application form and fee
- Three letters of recommendation
- Transcript(s)

Requirements for International Students
All admission policies and requirements for domestic students apply to international students along with the following:
- Demonstrate English Language Proficiency (http://catalog.slu.edu/academic-policies/office-admission/undergraduate/english-language-proficiency)
- Proof of financial support must include:
  - A letter of financial support from the person(s) or sponsoring agency funding the time at Saint Louis University
  - A letter from the sponsor's bank verifying that the funds are available and will be so for the duration of study at the University
- Academic records, in English translation, of students who have undertaken postsecondary studies outside the United States must include the courses taken and/or lectures attended, practical laboratory work, the maximum and minimum grades attainable, the grades earned or the results of all end-of-term examinations, and any honors or degrees received. WES and ECE transcripts are accepted.

Application and Assistantship Application Deadlines
Students who want to be considered for an assistantship must submit their applications by Feb. 1.

U.S. students should apply for the fall semester by July 1 and for the spring semester by Oct. 1. International students should apply for the fall semester by May 1 and for the spring semester by Oct. 1.

Review Process
Faculty committee members examine qualified applicants' materials and make recommendations.

Scholarships, Assistantships and Financial Aid
For priority consideration for graduate assistantship, applicants should complete their applications by the program admission deadlines listed. Fellowships and assistantships provide a stipend and may include health insurance and a tuition scholarship for the duration of the award.

For more information, visit the student financial services office online at http://www.slu.edu/financial-aid.

Learning Outcomes
1. Graduates will be able to assess relevant literature or scholarly contributions in the earth and atmospheric sciences.
2. Graduates will be able to apply the major practices, theories, or research methodologies in the earth and atmospheric sciences.
3. Graduates will be able to apply knowledge from the earth and atmospheric sciences to address problems in broader contexts.
4. Graduates will be able to articulate arguments or explanations to both a disciplinary or professional audience and to a general audience, in oral forms.
5. Graduates will be able to articulate arguments or explanations to both a disciplinary or professional audience and to a general audience, in written forms.
6. Graduates will be able to evidence scholarly or professional integrity in earth and atmospheric sciences.

**Requirements**

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**Concentration Elective Courses**
Select 31-32 credits of the following concentrations:

- Geophysics (p. 2)
- Environmental Geosciences (p. 2)

**Dissertation Research**
EAS 5990 Thesis Research (taken over multiple semesters) 12

Total Credits 48

**Geophysics Concentration**
The Master of Science (Thesis) in Geoscience with geophysics concentration requires a minimum of 24 credits plus a written thesis of six credits. The Master of Science in Geoscience (non-Thesis) with geophysics concentration, coursework option, requires a minimum of 30 credits and independent study.

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**Concentration Choice #1**

- EAS 5170 Divergent & Convergent Margins 3
- EAS 5180 Trans Margins & Plate Interior

**Concentration Choice #2**
Select two of the following: 6

- EAS 5040 Potential Theory
- EAS 5400 Continuum Mechanics in Wave Propagation
- EAS 5510 Seismic Exploration Methods
- EAS 5520 & EAS 5520 Seismic Exploration Lab

**Concentration Elective Courses**
Select 20 credits of the following: 20

- EAS 5040 Potential Theory
- EAS 5070 Advanced Coastal Processes
- EAS 5080 Dynamics of the Atmosphere
- EAS 5090 Physics of the Atmosphere
- EAS 5110 Computing in Atmospheric Science
- EAS 5120 Time Series Analysis in Geophysics
- EAS 5150 Properties of Earth Materials
- EAS 5180 Trans Margins & Plate Interior
- EAS 5190 Seminar in Geoscience
- EAS 5200 Numerical Method of Prediction
- EAS 5230 Boundary Layer Meteorology
- EAS 5240 Tropical Meteorology
- EAS 5260 Synoptic & Dynamic Meteorology of the Jet Stream
- EAS 5270 Meteorology of Severe Storms
- EAS 5280 Environmental Geochemistry

**Environmental Geosciences Concentration**
Select 32 credits of the following: 32

- EAS 5040 Potential Theory
- EAS 5060 Physics of Solid Earth
- EAS 5070 Advanced Coastal Processes
- EAS 5080 Dynamics of the Atmosphere
- EAS 5090 Physics of the Atmosphere
- EAS 5110 Computing in Atmospheric Science
- EAS 5120 Time Series Analysis in Geophysics
- EAS 5150 Properties of Earth Materials
- EAS 5170 Divergent & Convergent Margins
- EAS 5180 Trans Margins & Plate Interior
- EAS 5190 Seminar in Geoscience
- EAS 5200 Numerical Method of Prediction
- EAS 5220 Geophysical Data Processing
- EAS 5230 Boundary Layer Meteorology
- EAS 5240 Tropical Meteorology
- EAS 5260 Synoptic & Dynamic Meteorology of the Jet Stream
- EAS 5270 Meteorology of Severe Storms
- EAS 5280 Environmental Geochemistry
EAS 5290 Mesometeorology
EAS 5330 Communicating in Research
EAS 5340 Cloud Physics
EAS 5360 Principles of Radiative Transference
EAS 5380 Stat Methods in Meteorology
EAS 5390 Seminar in Seismology
EAS 5400 Continuum Mechanics in Wave Propagation
EAS 5420 Advanced Structural Geology
EAS 5430 Isotope Geochemistry
EAS 5440 Advanced Sedimentary Geology
EAS 5450 Advanced Petrology
EAS 5460 Geodynamics
EAS 5470 Turbulence
EAS 5510 Seismic Exploration Methods
EAS 5520 Seismic Exploration Lab
EAS 5540 Potential and Electrical Exploration Methods
EAS 5610 Satellite Meteorology
EAS 5650 Radar Meteorology
EAS 5700 Convection in the Atmosphere
EAS 5720 Seismological Instrumentation
EAS 5750 Land-Atmosphere Interaction
EAS 5800 Synoptic and Mesoscale Circulation
EAS 6100 Advanced Topics in Solid Earth Geophysics
EAS 6190 Advanced Seminar in Geophysics
EAS 6200 Advanced Geomagnetism
EAS 6310 Advanced Seismology I
EAS 6320 Advanced Seismology II
EAS 6480 Gen Circulation of Atmosphere
EAS 6590 Numeric Methods of Atmospheric Sciences
EAS 6981 Independent Study

Total Credits 32

Continuation Standards
Students must maintain a cumulative grade point average (GPA) of 3.00 in all graduate/professional courses.

Roadmap
Roadmaps are recommended semester-by-semester plans of study for programs and assume full-time enrollment unless otherwise noted.

Courses and milestones designated as critical (marked with !) must be completed in the semester listed to ensure a timely graduation. Transfer credit may change the roadmap.

This roadmap should not be used in the place of regular academic advising appointments. All students are encouraged to meet with their advisor/mentor each semester. Requirements, course availability and sequencing are subject to change.

Geophysics Concentration Roadmap

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Journal Club

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## Environmental Geosciences Concentration Roadmap

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