Geographic Information System (GIS) and GeoInformatics

Degrees Offered

- Master of Science in GIS & GeoInformatics (Non-Thesis)
- Graduate Certificate of GIS & GeoInformatics: Geospatial Information Technology
- Graduate Certificate of GIS & GeoInformatics: GIS for Geohazards Evaluation
- Graduate Certificate of GIS & GeoInformatics: GIS for Environmental Studies
- Graduate Certificate of GIS & GeoInformatics: GIS for Natural Resources Assessment

Program Description

The interdisciplinary online program in Geographic Information System (GIS) and GeoInformatics focus on the applications of GIS technology, hands-on geospatial training, multi-criteria decision making, advanced application and quantitative analysis aspects of GIS and Remote Sensing (RS), and are directly aligned with Colorado School of Mines' focuses and strengths on Earth, Energy and Environment. Our programs will enhance students' quantitative geospatial data analysis skills, help the students get ahead of the technology curve, and enable professionals to advance their careers.

Certificate and Degree Requirements

We offer four graduate certificates and a non-thesis Master’s degree. The courses taken for certificate degrees can be used towards the Master’s degree.

The Graduate Certificate Program in GIS & GeoInformatics outlined below may be completed by individuals already holding undergraduate or advanced degrees or as a combined degree program by individuals already matriculated as undergraduate students at The Colorado School of Mines. The program is comprised of:

The Graduate Certificate Programs in GIS & GeoInformatics outlined below may be completed by individuals already holding an undergraduate or advanced degree or as a combined degree program by individuals already matriculated as undergraduate students at The Colorado School of Mines. The program is comprised of:

**Course Work**

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<th>Course Work</th>
<th>12.0 Hours</th>
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| Total Semester Hrs | 12.0 Hours |

Up to 3.0 credit hours can be at the 300- or 400-level and the remainder will be 500 or 600 level as listed below.

There are four certificates with different specialization areas, namely Geospatial Information Technology, Geohazards Evaluation, Environmental Studies and Natural Resources Assessment.

Graduate Certificate of GIS & GeoInformatics: Geospatial Information Technology

Students working towards a Graduate Certificate of GIS & GeoInformatics with specialization in Geospatial Information Technology are required to take any four of the following courses:

- GEGN542 ADVANCED ENGINEERING GEOMORPHOLOGY 3.0
- GEGN575 APPLICATIONS OF GEOGRAPHIC INFORMATION SYSTEMS 3.0
- GEGN580 APPLIED REMOTE SENSING FOR GEOENGINEERING AND GEOSCIENCES 3.0
- GEGN588 ADVANCED GEOGRAPHIC INFORMATION SYSTEMS 3.0
- MNGN5XX Big Data Analytics for Earth Resources Sciences and Engineering 3.0
- CSCI303 INTRODUCTION TO DATA SCIENCE 3.0

Graduate Certificate of GIS & GeoInformatics: Geohazards Evaluation

Students working towards a Graduate Certificate of GIS & GeoInformatics with specialization in Geohazards Evaluation are required to take:

Two Required Courses:

- GEGN542 ADVANCED ENGINEERING GEOMORPHOLOGY 3.0
- GEGN575 APPLICATIONS OF GEOGRAPHIC INFORMATION SYSTEMS 3.0

And, any two of the following courses:

- GEGN532 GEOLOGICAL DATA ANALYSIS 3.0
- GEGN579 PYTHON SCRIPTING FOR GEOGRAPHIC INFORMATION SYSTEMS 3.0
- GEGN580 APPLIED REMOTE SENSING FOR GEOENGINEERING AND GEOSCIENCES 3.0
- GEGN588 ADVANCED GEOGRAPHIC INFORMATION SYSTEMS 3.0
- MNGN5XX Big Data Analytics for Earth Resources Sciences and Engineering 3.0

Graduate Certificate of GIS & GeoInformatics: Environmental Studies

Students working towards a Graduate Certificate of GIS & GeoInformatics with specialization in Environmental Studies are required to take:

Two Required Courses:

- CEEN581 WATERSHED SYSTEMS MODELING 3.0
- GEGN542 ADVANCED ENGINEERING GEOMORPHOLOGY 3.0

And, any two of the following courses:

- GEGN532 GEOLOGICAL DATA ANALYSIS 3.0
- GEGN579 PYTHON SCRIPTING FOR GEOGRAPHIC INFORMATION SYSTEMS 3.0
- GEGN580 APPLIED REMOTE SENSING FOR GEOENGINEERING AND GEOSCIENCES 3.0
**Graduate Certificate of GIS & GeoInformatics: Natural Resources Assessment**

Students working towards a Graduate Certificate of GIS & GeoInformatics with specialization in Natural Resources Assessment are required to take:

**Two Required Courses:**
- MNGN4XX  Mine Closure and Reclamation  3.0
- MNGN5XX  Big Data Analytics for Earth Resources Sciences and Engineering  3.0

**And, any two of the following courses:**
- GEGN532  GEOLOGICAL DATA ANALYSIS  3.0
- GEGN575  APPLICATIONS OF GEOGRAPHIC INFORMATION SYSTEMS  3.0
- GEGN579  PYTHON SCRIPTING FOR GEOGRAPHIC INFORMATION SYSTEMS  3.0
- GEGN580  APPLIED REMOTE SENSING FOR GEOENGINEERING AND GEOSCIENCES  3.0
- GEGN588  ADVANCED GEOGRAPHIC INFORMATION SYSTEMS  3.0

**The Master of Engineering (Non-Thesis) Program in GIS & GeoInformatics**

The Master of Engineering (Non-Thesis) Program outlined below may be completed by individuals already holding undergraduate or advanced degrees or as a combined degree program by individuals already matriculated as undergraduate students at Colorado School of Mines. Courses taken while working on any of the four GIS & GeoInformatics graduate certificates can be applied to this Master of Engineering program. The program is comprised of:

**Core Course Work**
- SYGN588  GIS-BASED REAL WORLD LEARNING PROJECT  6.0

**Total Semester Hrs**  30.0

Up to 9.0 credit hours can be at the 300- or 400- level listed below and the remainder will be 500 or 600 level.

**All Master of Engineering (Non-Thesis) program will include the following core requirements:**
- GEGN575  APPLICATIONS OF GEOGRAPHIC INFORMATION SYSTEMS  3.0
- SYGN588  GIS-BASED REAL WORLD LEARNING PROJECT  1-6

**And, any seven of the following courses:**
- GEGN542  ADVANCED ENGINEERING GEOMORPHOLOGY  3.0
- GEGN532  GEOLOGICAL DATA ANALYSIS  3.0
- GEGN579  PYTHON SCRIPTING FOR GEOGRAPHIC INFORMATION SYSTEMS  3.0
- GEGN580  APPLIED REMOTE SENSING FOR GEOENGINEERING AND GEOSCIENCES  3.0
- GEGN588  ADVANCED GEOGRAPHIC INFORMATION SYSTEMS  3.0
- CSCI303  INTRODUCTION TO DATA SCIENCE  3.0
- CEEN581  WATERSHED SYSTEMS MODELING  3.0
- MNGN4XX  Mine Closure and Reclamation  3.0
- MNGN5XX  Big Data Analytics for Earth Resources Sciences and Engineering  3.0

**Mines Combined Undergraduate / Graduate Program**

Students enrolled in Mines's Combined Undergraduate/Graduate Program (meaning uninterrupted registration from the time the student earns a Mines undergraduate degree to the time the student begins a Mines graduate degree) may double count up to six hours of credits which were used in fulfilling the requirements of their undergraduate degree at Mines, towards their graduate program. Any courses that count towards the graduate degree requirements as either "Required Coursework" or "Elective Coursework", as defined below, may be used for the purposes of double counting at the discretion of the advisor (MS Non-Thesis) or thesis committee (MS Thesis or Ph.D.). These courses must have been passed with a "B-" or better and meet all other University, Department, Division, and Program requirements for graduate credit.

**Program Director**

Wendy Zhou, Graduate Dean & Associate Professor, Engineering Geology & GIS

**Program Associate Director**

Sebnem Duzgun, Professor, Fred Banfield Endowed Chair in Mining Engineering

**Professors**

Terri Hogue, Hydrology and Water Resources, Professor
Paul Santi, Engineering Geology and Hydrogeology, Professor
Kamini Singha, Hydrogeology, Professor, Fryrear Chairs for Innovation and Excellence

**Teaching Associate Professor**

Wendy Fisher, Computer Science, Teaching Associate Professor

**Arthur Lakes Library**

Carol Smith, University Librarian

**Colorado Geological Survey**

Kevin McCoy, Engineering Geologist