GEOLOGICAL ENGINEERING (GEOE)

GEOE 3010: Geological Eng. Des. Fld. Camp
Geology Geological Engineering
Introduction to the use of geological engineering field instruments and field techniques; measuring and describing stratigraphic sections; creation of stratigraphic columns and correlation diagrams; geologic mapping.
3 credits
Prerequisites
min grade of C in GEOL 2220 or GEOL 2250 and GEOL 3140 and 24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Laboratory, Lecture

GEOE 3050: Geomechanics
Geology Geological Engineering
Properties and behavior of earth materials and their geological engineering applications to problems and design in geotechnics, mining, and petroleum. (2 lecture, 2 lab hours).
3 credits
Prerequisites
ENGR 3120 and 24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture

GEOE 4010: Geological Eng. Des. Fld. Camp
Geology Geological Engineering
Advanced application of geological engineering field instruments and field techniques; geologic engineering mapping exercises as individual and group projects drawn from selected geological engineering topics, including hydrology, environmental applications, geotechnical engineering, hazards engineering, and resource assessment; preparation of geologic and engineering reports, maps, and figures; analysis of observed conditions to make engineering judgments.
3 credits
Prerequisites
min grade of C in ENGR 3400 and GEOE 3010 and GEOL 3050 and min grade of C in GEOL 3030 and 24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture

GEOE 4050: Engineering Geophysics
Geology Geological Engineering
The application of geophysical methods and techniques to subsurface engineering investigations.
3 credits
Prerequisites
min grade of C in ENGR 3400 and MATH 2612 and PHYS 2120 or PHYS 2140 and 24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture

GEOE 4130: Prob & Stat Analyses in Eng
Geology Geological Engineering
Introduction to probability, statistics, uncertainty, and reliability. Application of common continuous and discrete probability distributions. Design under uncertainty and elementary decision analysis. Simulation of random variables. Applications in natural and man-made materials, hydrologic and geological conditions and other natural processes, and engineering design.
3 credits
Prerequisites
min grade of C in MATH 2612 and 24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture

GEOE 4150: Petroleum Geology
Geology Geological Engineering
Development of petroleum exploration programs based on stratigraphic, structural, and/or geochemical data.
3 credits
Prerequisites
GEOL 3140 and 24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 4200: Subsurface Site Characterizati
Geology Geological Engineering
Coring, logging, introduction and application of geophysical methods, sampling, and penetrometer testing. Applications require preparation of quality assurance and control procedures, maps, cross sections, and oral and written reports.
4 credits
Prerequisites
min grade of C in ENGR 3400 and GEOE 3010 and min grade of C in GEOL 3030 and 24 Earned Credits; AND One-Way Corequistes: GEOE 4500 and GEOL 3050.
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 4210: Geological Engineering Design
Geology Geological Engineering
Geological engineering design by the application of rock mechanics, soil mechanics, geology, geophysics, remote sensing, and hydrology to geological and engineering problems. The taking of the national Fundamentals of Engineering (FE) examination is a requirement of this course.
4 credits
Prerequisites
min grade of C in GEOE 4200 and 24 Earned Credits; AND One-Way Corequisite: CIVE 3031 or GEOE 3050 or GEOE 5400.
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 4300: Geological Field Studies I
Geology Geological Engineering
Application of geological engineering and geology to special study field problems.
4 credits
Prerequisites
24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 4360: Field Camp G E Design
Geology Geological Engineering
3 credits
Prerequisites
24 Earned Credits.

GEOE 4500: Hydrogeology
Geology Geological Engineering
The theory and geology of the flow of ground water. Engineering principles and the design of wells for production or injection of fluids from or into subsurface aquifers. (3 lecture, 2 lab hours).
4 credits
Prerequisites
MATH 2612 and 24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 4700: Intro. to Geograph. Info. Sys
Geology Geological Engineering
Introduces the use of a geographic information system. Topics include applications of geographic information; spatial data collection; data accuracy and uncertainty; data visualization of cartographic principles; spatial analysis; GPS/GNSS; and legal, economic, and ethical issues associated with the use of a geographic information system.
3 credits
Prerequisites
24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 4900: Directed Studies and Projects
Geology Geological Engineering
Individual studies and/or projects for undergraduates on specific topics.
1 - 3 credits
Prerequisites
24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Independent Study

GEOE 5030: Environmental Geochemistry
Geology Geological Engineering
Chemical interaction between water and aquifer minerals, organic minerals, and contaminants.
3 credits
Prerequisites
CHEM 1060.
Potentially offered with the following Instruction Type(s):
Lecture

GEOE 5050: Intro. to Mining Engineering
Geology Geological Engineering
Introduction of theories and fundamentals of mining engineering, including the identification and evaluation of mineral deposits, the design and implementation of efficient mining operations, and innovations in mining technology.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture

GEOE 5100: Remote Sensing
Geology Geological Engineering
Interdisciplinary course designed to introduce theory and principles of remote sensing technology. Topics covered will include digital image processing and classification, rectification and projections, interpolation, sensors and platforms, history and theory, as well as other related topics. The course is designed to cover the subject material to allow for multidisciplinary participants.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 5110: Spatial Analysis
Geology Geological Engineering
GIS analysis of the relationships of mapped features. Course will include application and integration of GIS, image processing, and mathematical modes.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 5130: Economic Geology
Geology Geological Engineering
Study of the formation and classification of ore deposits; exploration techniques; evaluation of reserves; and extraction techniques.
3 credits
Prerequisites
min grade of C in GEOL 3030.
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 5250: Engineering Seismology
Geology Geological Engineering
Origin of earthquakes, their effects on structures and the selection of ground-motion parameters for earthquake-resistant design.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture

GEOE 5270: Geophysics I
Geology Geological Engineering
The application of geophysical methods and techniques to shallow subsurface investigations. Not intended for students in the B.S.G.E. program.
3 credits
Prerequisites
MATH 2612 and (PHYS 2120 or PHYS 2140); AND One-Way Corequisite: ENGR 3400.
Potentially offered with the following Instruction Type(s):
Lecture

GEOE 5300: Advanced Geomechanics
Geology Geological Engineering
Applications of the principles of geomechanics to engineering problems dealing with earth materials.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 5400: Rock Mechanics
Geology Geological Engineering
Survey of engineering properties and behaviors of rock mass system components. Reconstruction and visualization of internal structure of system domains. Classifications of rock masses. Role of environmental variables in system behavior. Modeling system behavior as equivalent continuum and simplified discontinuum.
4 credits
Prerequisites
(min grade of C in ENGR 3090 and ENGR 3400).
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 5499A: Special Topics
Geology Geological Engineering
Lecture or lecture/lab courses on specific topics and on a one-time basis.
1 - 3 credits
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 5530: Environmental Geochemistry
Geology Geological Engineering
Chemical interaction between water and aquifer minerals, organic minerals, and contaminants.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture

GEOE 5550: Intro. to Mining Engineering
Geology Geological Engineering
Introduction of theories and fundamentals of mining engineering, including the identification and evaluation of mineral deposits, the design and implementation of efficient mining operations, and innovations in mining technology.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture

GEOE 5600: Remote Sensing
Geology Geological Engineering
Interdisciplinary course designed to introduce theory and principles of remote sensing technology. Topics covered will include digital image processing and classification, rectification and projections, interpolation, sensors and platforms, history and theory, as well as other related topics. The course is designed to cover the subject material to allow for multidisciplinary participants.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 5610: Spatial Analysis
Geology Geological Engineering
GIS analysis of the relationships of mapped features. Course will include application and integration of GIS, image processing, and mathematical modes.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 5630: Economic Geology
Geology Geological Engineering
Study of the formation and classification of ore deposits; exploration techniques; evaluation of reserves; and extraction techniques.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 5750: Engineering Seismology
Geology Geological Engineering
Origin of earthquakes, their effects on structures and the selection of ground-motion parameters for earthquake-resistant design.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture

GEOE 5770: Geophysics I
Geology Geological Engineering
The application of geophysical methods and techniques to shallow subsurface investigations. Not intended for students in the B.S.G.E. program.
3 credits
Corequisites
ENGR 3400
Potentially offered with the following Instruction Type(s):
Lecture

GEOE 5800: Advanced Geomechanics
Geology Geological Engineering
Applications of the principles of geomechanics to engineering problems dealing with earth materials.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 5900: Rock Mechanics
Geology Geological Engineering
Survey of engineering properties and behaviors of rock mass system components. Reconstruction and visualization of internal structure of system domains. Classifications of rock masses. Role of environmental variables in system behavior. Modeling system behavior as equivalent continuum and simplified discontinuum.
4 credits
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 5999A: Special Topics
Geology Geological Engineering
Lecture or lecture/lab courses on specific topics and on a one-time basis.
1 - 3 credits
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 6350: Advanced Rock Mechanics
Geology Geological Engineering
The application of mechanics to solving problems in rock engineering for both surface and underground conditions.
3 credits
Prerequisites
GEOE 5400 or GEOE 5900.
Potentially offered with the following Instruction Type(s):
Lecture/Lab

GEOE 6810: Applications in Geophysics
School of Engineering
Design and analysis of geophysical field problems. (4 lab hours). May be repeated for a maximum of 6 hours.
3 credits
Potentially offered with the following Instruction Type(s):
Independent Study