

Fall 2020 Course Descriptions as of 04/05/2020 08:11 PM

Information in Browse Course Catalog is subject to change. Information is term specific. Please refer to the appropriate term when searching for course content. Key to Course Descriptions may be found at: http://rcs.registrar.arizona.edu/course_descriptions_key.

Geological Engineering (GEN)

GEN 199: Independent Study (1 - 6 units)

Description: Qualified students working on an individual basis with professors who have agreed to supervise such work.

Grading basis: Alternative Grading: S, P, F

Career: Undergraduate

Course Components: Independent Study Required

Repeatable: Course can be repeated a maximum of 99 times.

GEN 210: Mineralogy and Petrology for Engineers (3 units)

Description: A foundation in mineralogy and petrology in an engineering context. The engineering context means that we will place a heavy emphasis on understanding how minerals form, how they are identified, where economically important minerals are found, their uses, how to identify major rock types and understand their basic engineering behavior.

Grading basis: Regular Grades

Career: Undergraduate

Course Components:	Laboratory	Required
	Lecture	Required

Equivalent to: GEN 210

Also offered as: MNE 210

Course typically offered:

Main Campus: Spring

Recommendations and additional information: CHEM 103A, CHEM 103B, CHEM 104A, CHEM 104B.

Field trip: May include 1 or more required field trips.

Home department: Mining & Geological Engineering

GEN 299: Independent Study (1 - 5 units)

Description: Qualified students working on an individual basis with professors who have agreed to supervise such work.

Grading basis: Alternative Grading: S, P, F

Career: Undergraduate

Course Components: Independent Study Required

Repeatable: Course can be repeated a maximum of 99 times.

-SA represents a Student Abroad & Student Exchange offering

-CC represents a Correspondence Course offering

May Be Offered Departments may offer this component in some semesters. See the Schedule of Classes for term-specific offerings.

GEN 299H: Honors Independent Study (1 - 3 units)

Description: Qualified students working on an individual basis with professors who have agreed to supervise such work.

Grading basis: Regular Grades

Career: Undergraduate

Course Components: Independent Study Required

Repeatable: Course can be repeated a maximum of 99 times.

Enrollment requirement: Student must be active in the Honors College.

Honors Course: Honors Course

Honors Course: Honors Course

GEN 330: Introduction to Remote Sensing (3 units)

Description: Introduction to remote sensing principles, techniques, and applications, designed principally for those with no background in the field.

Grading basis: Regular Grades

Career: Undergraduate

Flat Fee: \$50

Course Components: Laboratory May Be Offered
 Lecture Required

Equivalent to: GEN 330, GEOS 330, SW 330, SWES 330, WSM 330

Also offered as: ENV5 330, GEOG 330, GEOS 330, GIST 330, WSM 330

Course typically offered:

Main Campus: Fall

Online Campus: Fall, Spring, Summer

Home department: School of Geography and Development

Student Engagement Activity: Discovery

Student Engagement Competency: Interdisciplinarity

GEN 397B: Workshop (1 - 3 units)

Description: The practical application of theoretical learning within a group setting and involving an exchange of ideas and practical methods, skills, and principles.

Grading basis: Regular Grades

Career: Undergraduate

Course Components: Workshop Required

Also offered as: MSE 397B

Course typically offered:

Main Campus: Fall, Spring

Home department: Materials Science & Engineering

Enrollment requirement: Adv Stdg: Engineering.

-SA represents a Student Abroad & Student Exchange offering

-CC represents a Correspondence Course offering

May Be Offered Departments may offer this component in some semesters. See the Schedule of Classes for term-specific offerings.

GEN 399: Independent Study (1 - 5 units)

Description: Qualified students working on an individual basis with professors who have agreed to supervise such work.

Grading basis: Alternative Grading: S, P, F

Career: Undergraduate

Course Components: Independent Study Required

Repeatable: Course can be repeated a maximum of 99 times.

Enrollment requirement: Adv Stdg: Engineering.

GEN 399H: Honors Independent Study (1 - 3 units)

Description: Qualified students working on an individual basis with professors who have agreed to supervise such work.

Grading basis: Regular Grades

Career: Undergraduate

Course Components: Independent Study Required

Repeatable: Course can be repeated a maximum of 99 times.

Enrollment requirement: Adv Stdg: Engineering. Honors active.

Honors Course: Honors Course

Honors Course: Honors Course

GEN 402: Probability and Statistical Concepts in Geologic Media (3 - 4 units)

Description: Univariate probabilistic and statistical methods: data reduction, basic probability concepts, discrete and continuous probability distributions, sampling distributions, confidence intervals, goodness-of-fit-tests; applications in geologic media. Introduction to a few statistical packages.

Grading basis: Regular Grades

Career: Undergraduate

Course Components:	Laboratory	May Be Offered
	Lecture	Required

Equivalent to: MNE 402

Also offered as: MNE 402

Co-convened with: GEN 502

Course typically offered:

Main Campus: Spring

Recommendations and additional information: MATH 223.

Enrollment requirement: Adv Stdg: Engineering.

-SA represents a Student Abroad & Student Exchange offering

-CC represents a Correspondence Course offering

May Be Offered Departments may offer this component in some semesters. See the Schedule of Classes for term-specific offerings.

GEN 415: Rock Excavation (3 units)

Description: Methods of excavation of rock in surface and underground mines and construction, ranging from the empiricism of conventional blasting practice to the application of the fundamental mechanics of rock fracture.

Grading basis: Regular Grades

Career: Undergraduate

Course Components: Lecture Required

Equivalent to: GEN 415

Also offered as: MNE 415

Co-convened with: GEN 515

Course typically offered:

Main Campus: Fall

Recommendations and additional information: CE 214, prerequisite or concurrent enrollment in CE 215, or instructor consent.

Field trip: Field trip

Home department: Mining & Geological Engineering

Enrollment requirement: Adv Stdg: Engineering.

GEN 416: Field Studies in Geophysics (3 units)

Description: Seismic, magnetic, electrical, and gravity exploration techniques.

Grading basis: Regular Grades

Career: Undergraduate

Course Components: Lecture Required

Repeatable: Course can be repeated a maximum of 2 times.

Equivalent to: GEOS 416

Also offered as: GEOS 416

Co-convened with: GEN 516

Course typically offered:

Main Campus: Spring

Recommendations and additional information: GEN 448.

Field trip: Field trips.

-SA represents a Student Abroad & Student Exchange offering

-CC represents a Correspondence Course offering

May Be Offered Departments may offer this component in some semesters. See the Schedule of Classes for term-specific offerings.

GEN 426: Health and Safety in Mining (1 unit)

Description: Fundamental concepts in the recognition, evaluation and control of health and safety hazards encountered in mining operations; includes a review of engineering management responsibilities to control accidents, a review of federal regulations and standards affecting the industrial workplace, and instruction regarding the interaction of industrial hygiene, safety, fire protection and workers' compensation to control losses resulting from industrial accidents.

Grading basis: Regular Grades

Career: Undergraduate

Course Components: Lecture Required

Equivalent to: GEN 426, GEN 426A, MNE 426A

Also offered as: MNE 426

Co-convened with:

Course typically offered:

Main Campus: Fall

Home department: Mining & Geological Engineering

Enrollment requirement: Adv Stgd: Engineering.

GEN 427: Geomechanics (3 - 4 units)

Description: Mechanical behavior of rock and rock masses; response to load changes: deformations, failure, discontinuity slip; in situ stress state; rock testing; geomechanical classifications; engineering applications: slopes, pillars, tunnels, dam foundations; reinforcement design.

Grading basis: Regular Grades

Career: Undergraduate

Course Components: Laboratory May Be Offered
 Lecture Required

Equivalent to: GEN 427

Also offered as: MNE 427

Co-convened with: GEN 527

Course typically offered:

Main Campus: Fall

Recommendations and additional information: Prerequisite, CE 214. Corequisite, CE 215 or consent of instructor.

Field trip: Course may require one or more field trips.

Home department: Mining & Geological Engineering

Enrollment requirement: Adv Stgd: Engineering.

-SA represents a Student Abroad & Student Exchange offering

-CC represents a Correspondence Course offering

May Be Offered Departments may offer this component in some semesters. See the Schedule of Classes for term-specific offerings.

GEN 446: Geotechnical Earthquake Engineering (3 units)

Description: Review of plate tectonics and seismology, analysis of earthquake ground motions, travel path and distance effects, and site response effects. Soil liquefaction susceptibility, identification, and mitigation. Introduction to seismic slope stability.

Grading basis: Regular Grades

Career: Undergraduate

Course Components: Lecture Required

Equivalent to: GEN 446

Also offered as: CE 446

Co-convened with: GEN 546

Course typically offered:

Main Campus: Fall, Spring

Home department: Civil and Architectural Engineering and Mechanics

Enrollment requirement: Adv Standing: Engineering. CE 343.

Honors Course: Honors Contract

Honors Course: Honors Contract

GEN 448: Geophysical Exploration and Engineering (3 units)

Description: Principles of gravity, magnetic, seismic and electrical exploration; acquisition and interpretation of data to define geologic structure and evaluate resources.

Grading basis: Regular Grades

Career: Undergraduate

Course Components: Lecture Required

Equivalent to: GEOS 448

Also offered as: GEOS 448

Co-convened with: GEN 548

Course typically offered:

Main Campus: Fall

Recommendations and additional information: PHYS 141, PHYS 241, MATH 223.

GEN 499: Independent Study (1 - 4 units)

Description: Qualified students working on an individual basis with professors who have agreed to supervise such work.

Grading basis: Alternative Grading: S, P, F

Career: Undergraduate

Course Components: Independent Study Required

Repeatable: Course can be repeated a maximum of 99 times.

Enrollment requirement: Adv Stdg: Engineering.

-SA represents a Student Abroad & Student Exchange offering

-CC represents a Correspondence Course offering

May Be Offered Departments may offer this component in some semesters. See the Schedule of Classes for term-specific offerings.

GEN 499H: Honors Independent Study (1 - 3 units)

Description: Qualified students working on an individual basis with professors who have agreed to supervise such work.

Grading basis: Regular Grades

Career: Undergraduate

Course Components: Independent Study Required

Repeatable: Course can be repeated a maximum of 99 times.

Enrollment requirement: Adv Stdg: Engineering. Honors active.

Honors Course: Honors Course

Honors Course: Honors Course

GEN 515: Rock Excavation (3 units)

Description: Methods of excavation of rock in surface and underground mines and construction, ranging from the empiricism of conventional blasting practice to the application of the fundamental mechanics of rock fracture. Graduate-level requirements include a research project.

Grading basis: Regular Grades

Career: Graduate

Course Components: Lecture Required

Equivalent to: GEN 515

Also offered as: MNE 515

Co-convened with: GEN 415

Course typically offered:

Main Campus: Fall

Online Campus: Fall

Recommendations and additional information: Knowledge of rock mechanics or consent of instructor.

Field trip: Field trip

Home department: Mining & Geological Engineering

GEN 516: Field Studies in Geophysics (3 units)

Description: Seismic, magnetic, electrical, and gravity exploration techniques. Graduate-level requirements include additional project work requiring a more in-depth analysis.

Grading basis: Regular Grades

Career: Graduate

Course Components: Lecture Required

Repeatable: Course can be repeated a maximum of 2 times.

Equivalent to: GEOS 516

Also offered as: GEOS 516

Co-convened with: GEN 416

Course typically offered:

Main Campus: Spring

Field trip: Field trips.

-SA represents a Student Abroad & Student Exchange offering

-CC represents a Correspondence Course offering

May Be Offered Departments may offer this component in some semesters. See the Schedule of Classes for term-specific offerings.

GEN 524: Fundamentals of Geotechnics (3 units)

Description: Principles of hemispherical projections and rock joint surveys; application of stereographic projection in mechanics of discontinuous rock; shear strength of discontinuities; introduction of Block theory application of Block theory to surficial excavations; engineering solutions to problems of soil and rock slope stability. Graduate-level requirements include an in-depth research paper on an assigned topic.

Grading basis: Regular Grades

Career: Graduate

Course Components: Lecture Required

Co-convened with: GEN 424

GEN 526: Health and Safety in Mining (1 unit)

Description: Fundamental concepts in the recognition, evaluation and control of health and safety hazards encountered in mining operations; includes a review of engineering management responsibilities to control accidents, a review of federal regulations and standards affecting the industrial workplace, and instruction regarding the interaction of industrial hygiene, safety, fire protection and workers' compensation to control losses resulting from industrial accidents. Graduate-level requirements include a term paper.

Grading basis: Regular Grades

Career: Graduate

Course Components: Lecture Required

Equivalent to: GEN 526

Also offered as: MNE 526

Co-convened with: GEN 426

Course typically offered:

Main Campus: Fall

Online Campus: Fall

Home department: Mining & Geological Engineering

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-**CC** represents a Correspondence Course offering

May Be Offered Departments may offer this component in some semesters. See the Schedule of Classes for term-specific offerings.

GEN 527: Geomechanics (3 - 4 units)

Description: Mechanical behavior of rock and rock masses; response to load changes: deformations, failure, discontinuity slip; in situ stress state; rock testing; geomechanical classifications; engineering applications: slopes, pillars, tunnels, dam foundations; reinforcement design. Graduate-level requirements include either a research project or a research paper at the discretion of the instructor.

Grading basis: Regular Grades

Career: Graduate

Course Components:	Laboratory	May Be Offered
	Lecture	Required

Equivalent to: GEN 527

Also offered as: MNE 527

Co-convened with: GEN 427

Course typically offered:

Main Campus: Fall

Online Campus: Fall

Recommendations and additional information: Knowledge of mechanics of materials or consent of instructor.

Field trip: Course may require one or more field trips.

Home department: Mining & Geological Engineering

GEN 529: Rock Slope Analyses and Design (3 units)

Description: Geologic and engineering considerations in design of optimum rock slope angles; constitutive models for intact rock and joints; theoretical stability analysis, monitoring and control of existing slopes.

Grading basis: Regular Grades

Career: Graduate

Course Components:	Lecture	Required
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Equivalent to: GEN 529

Also offered as: MNE 529

Course typically offered:

Main Campus: Fall

Field trip: Field trip.

Home department: Mining & Geological Engineering

-SA represents a Student Abroad & Student Exchange offering

-CC represents a Correspondence Course offering

May Be Offered Departments may offer this component in some semesters. See the Schedule of Classes for term-specific offerings.

GEN 546: Geotechnical Earthquake Engineering (3 units)

Description: Review of plate tectonics and seismology, analysis of earthquake ground motions, travel path and distance effects, and site response effects. Soil liquefaction susceptibility, identification, and mitigation. Introduction to seismic slope stability. Graduate level requirements include a research paper and/or a comprehensive design project.

Grading basis: Regular Grades

Career: Graduate

Course Components: Lecture Required

Equivalent to: GEN 546

Also offered as: CE 546

Co-convened with: GEN 446

Course typically offered:

Main Campus: Fall, Spring

Home department: Civil and Architectural Engineering and Mechanics

GEN 548: Geophysical Exploration and Engineering (3 units)

Description: Principles of gravity, magnetic, seismic and electrical exploration; acquisition and interpretation of data to define geologic structure and evaluate resources. Graduate-level requirements include a special research project collecting and interpreting geophysical field data.

Grading basis: Regular Grades

Career: Graduate

Course Components: Lecture Required

Equivalent to: GEOS 548

Also offered as: GEOS 548

Co-convened with: GEN 448

Course typically offered:

Main Campus: Fall

GEN 580: The Mechanics of Fracture in Rock and Other Brittle Materials (3 units)

Description: Fracture mechanics theory applied to the deformation and failure of rock; numerical techniques; micromechanical damage models; flow through fractures; the mechanics of faulting and earthquake rupture.

Grading basis: Regular Grades

Career: Graduate

Course Components: Lecture Required

Equivalent to: GEN 580

Also offered as: MNE 580

Course typically offered:

Main Campus: Spring (odd years only)

Online Campus: Spring (odd years only)

Recommendations and additional information: Course may include 1 or more field trips.

Home department: Mining & Geological Engineering

-SA represents a Student Abroad & Student Exchange offering

-CC represents a Correspondence Course offering

May Be Offered Departments may offer this component in some semesters. See the Schedule of Classes for term-specific offerings.

GEN 599: Independent Study (1 - 6 units)

Description: Qualified students working on an individual basis with professors who have agreed to supervise such work.

Grading basis: Alternative Grading: S, P, F

Career: Graduate

Course Components: Independent Study Required

Repeatable: Course can be repeated for a maximum of 9.99 units.

Course typically offered:

Main Campus: Fall, Spring

GEN 696A: Research Seminar (1 - 3 units)

Description: This graduate seminar provides graduate students the opportunity to research and exchange information on technical topics in the mine life cycle. The course will feature industry speakers presenting current challenges or technology innovations in the broad area of mineral resources. Students will further develop their skills in technical writing, learn to communicate with a professional audience, learn skills to influence others, and gain a basic knowledge of the business and socioeconomic principles that impact the profession.

Grading basis: Regular Grades

Career: Graduate

Course Components: Seminar Required

Repeatable: Course can be repeated for a maximum of 6 units.

Equivalent to: GEN 696A, MNEC 696A

Also offered as: MNE 696A

Course typically offered:

Main Campus: Fall, Spring

Online Campus: Fall, Spring

Home department: Mining & Geological Engineering

GEN 699: Independent Study (1 - 5 units)

Description: Qualified students working on an individual basis with professors who have agreed to supervise such work. Graduate students doing independent work which cannot be classified as actual research will register for credit under course number 599, 699, or 799.

Grading basis: Alternative Grading: S, P, F

Career: Graduate

Course Components: Independent Study Required

Repeatable: Course can be repeated a maximum of 99 times.

Course typically offered:

Main Campus: Fall, Spring

-SA represents a Student Abroad & Student Exchange offering

-CC represents a Correspondence Course offering

May Be Offered Departments may offer this component in some semesters. See the Schedule of Classes for term-specific offerings.

GEN 900: Research (1 - 4 units)

Description: Individual research, not related to thesis or dissertation preparation, by graduate students.

Grading basis: Alternative Grading: S, P, F

Career: Graduate

Course Components: Independent Study Required

Repeatable: Course can be repeated a maximum of 99 times.

Course typically offered:

Main Campus: Fall, Spring

GEN 910: Thesis (1 - 6 units)

Description: Research for the master's thesis (whether library research, laboratory or field observation or research, artistic creation, or thesis writing). Maximum total credit permitted varies with the major department.

Grading basis: Alternative Grading: S, P, F

Career: Graduate

Course Components: Independent Study Required

Repeatable: Course can be repeated a maximum of 99 times.

Course typically offered:

Main Campus: Fall, Spring

GEN 920: Dissertation (1 - 9 units)

Description: Research for the doctoral dissertation (whether library research, laboratory or field observation or research, artistic creation, or dissertation writing).

Grading basis: Alternative Grading: S, P, F

Career: Graduate

Course Components: Independent Study Required

Repeatable: Course can be repeated a maximum of 99 times.

Course typically offered:

Main Campus: Fall, Spring

-SA represents a Student Abroad & Student Exchange offering

-CC represents a Correspondence Course offering

May Be Offered Departments may offer this component in some semesters. See the Schedule of Classes for term-specific offerings.