Michigan Technological University
Geological and Mining Engineering and Sciences

Bachelor of Science in Geological Engineering

2021-2022

Revised 2/24/2021

→ PREREQUISITE (COURSE MUST BE COMPLETED PRIOR TO ENROLLMENT)

→(C) CONCURRENT RER EQUISITE, PREREQ. THAT MAY BE TAKEN SIMULTANEOUSLY WITH THE COURSE

F INDICATES COURSE IS OFFERED FALL SEMESTER

S INDICATES COURSE IS OFFERED SPRING SEMESTER

Su INDICATES COURSES IS OFFERED SUMMER SEMESTER

Year 1

Fall

MA 1160/1161 CALCULUS w/ TECH I (4/5 CREDITS) F, S, Su

PH 1100 PHYSICS LAB I (1 CREDIT) F, S, Su

CH 1150 UNIV. CHEMISTRY I (3 CREDITS) F, S, Su

co-req

CH 1151 CHEMISTRY LAB 1 (1 CREDIT) F, S, Su

ENG 1101 or (ENG 1001 & ENG 1100) ENG. ANALYSIS & PROB. SOLVING (3 CREDITS) F, S, Su

ENG 1002 (C) or pass Spac. Vis. test

GE 1100 GEO ENG & SCI ORIENTATION (1 CREDIT) F

UN 1015 COMPOSITION (3 CREDITS) F, S, Su

16 CREDITS

Co-cur Unit (0.5 UNIT) F, S, Su

Spring

MA 2160 CALCULUS w/ TECH II (4 CREDITS) F, S, Su

(C)

PH 2100 UNIV. PHYSICS I - MECH (3 CREDITS) F, S, Su

GE 2000 UNDERSTANDING THE EARTH (3 CREDITS) F, S, Su

MA 1160

ENG 1102 ENG. MODELING & DESIGN (3 CREDITS) F, S, Su

ENG 1002 or pass Spac. Vis. test

UN 1015 or UN1025 MAY BE TAKEN IN EITHER ORDER IN THE FIRST YEAR.

*ONE SEMESTER OF 3000 LEVEL OR HIGHER FOREIGN LANGUAGE MAY SUBSTITUTE FOR UN 1025

***UN 1025** GLOBAL ISSUES (3 CREDITS) F, S, Su

16 CREDITS

Co-cur Unit (0.5 UNIT) F, S, Su

Year 2

Fall

GE 2010 INTRO TO GIS (3 CREDITS) F

PH 1200 PHYSICS LAB II (1 CREDIT) F, S, Su

(C)

PH 2200 UNIV. PHYSICS II - ELEC / MAG (3 CREDITS) F, S, Su

GE 2300 INTRO TO MINERALOGY (3 CREDITS) F

GE1200 INTRO DATA SCI EARTH SYSTEMS (1 CREDIT) F

GE 3050 STRUCTURAL GEOLOGY (4 CREDITS) S

GE 2000

Critical & Creative Thinking (3 CREDITS)

HU/FA or SS/Behavioral ELECTIVES MAY BE TAKEN IN EITHER ORDER IN THE SECOND YEAR.

14 CREDITS

Co-cur Unit (0.5 UNIT) F, S, Su

Spring

ENG 1102
MA 2160
PH 2100

ENG 2120 STATICS-STRENGTH MAT'LS (4 CREDITS) S

PH 1100

GE 2310 INTRO TO PETROLOGY (3 CREDITS) S

PH 2200

GE 3040 FUNDAMENTALS OF GEOPHYSICS (3 CREDITS) S

Social Responsibility & Ethical Reasoning (3 CREDITS)

17 CREDITS

Summer

GE 2000
GE 2310
GE 3050

GE 3910 FIELD GEOLOGY w/ ENG APP (5 CREDITS) Su

GE 3040

GE 3900 FIELD GEOPHYSICS (5 CREDITS) Su

10 CREDITS

Year 3

Fall

GE 2000
GE 2310

GE 3100 DEPOSITIONAL SYSTEMS (3 CREDITS) F

MA 2160
CH 1150
PH 2100
ENG 1102

ENG 3200 THERMO / FLUIDS (4 CREDITS) F, S

GE 3890 ENG. GEO & ROCK MECHANICS (3 credits) F

JR. STDG.

HASS ELECTIVE (3 CREDITS) F, S, Su

13 CREDITS

Co-cur Unit (0.5 UNIT) F, S, Su

Spring

MA 1160

GE 3250 COMPUTATIONAL GEOSCIENCES (3 CREDITS) S

MA 2160

MA 2321 (or MA2320) ELEM LINEAR ALGEBRA (2 CREDITS) F, S

co-req

MA 2160

MA 3520 (or MA2320 later) DIFFERENTIAL EQ (2 CREDITS) F, S

GE 2000
ENG 2120
ENG 3200

CEE 3810 SOIL MECH FOR ENGINEERS (4 CREDITS) F, S, Su

GE 3850 GEOHYDROLOGY (3 CREDITS) F, S

HASS ELECTIVE (3 CREDITS) F, S, Su

17 CREDITS

Co-cur Unit (0.5 UNIT) F, S, Su

Year 4

Fall

SR STD.

GE 4900 GEO ENG DESIGN PROJECT (3 CREDITS) F

GE 4900 and **GE 4910**: WITH APPROVAL OF GEOLOGICAL ENGINEERING ABET COORDINATOR, DESIGN PROJECTS OUTSIDE OF THE DEPARTMENTMAY BE SUBSTITUTED

NOTE: LINEAR ALGEBRA & DIFFERENTIAL EQUATIONS CAN BE TAKEN DURING THE SAME SEMESTER (**MA 2321** & **MA 3521**) OR SEPARATE SEMESTERS (**MA 2320** & **MA 3520**)

ADVANCED GEOPHYSICS ELECTIVE (3 CREDITS) S, F

EC 3400 ECON DECISION ANALYSIS (3 CREDITS) F, S, Su

HASS ELECTIVE (3 CREDITS) F, S, Su

12 CREDITS

Co-cur Unit (0.5 UNIT) F, S, Su

Spring

GE 4910 GEO ENG DESIGN PROJECT II (3 CREDITS) S

GEO ENG ELECTIVE (3 CREDITS) F, S, Su

GEO ENG ELECTIVE (3 CREDITS) F, S, Su

HASS ELECTIVE (3 CREDITS) F, S, Su

12 CREDITS

Co-cur Unit (0.5 UNIT) F, S, Su

This is not an official list of degree requirements. Adjustments may be required due to curriculum changes.

BS in Geological Engineering 2021-2022

(Minimum of 127 Credits)

Geological Engineering Electives

Nine credits of Geological Engineering Electives are required. Prerequisites not normally required must be satisfied by free electives or other courses not specifically listed. With approval of Geological Engineering ABET Coordinator, Geo Eng electives may be substituted with Independent Geological Engineering Research and/or Cooperative Lab.

Enterprise Concentration (12 Credits)

With permission of Geological Engineering ABET Coordinator, enterprise may substitute 6 credits of interdisciplinary project for GE 4900 and GE 4910; 3 credits of required communication, teaming or business must be double counted as Distribution (HASS) credits; and 3 credits of enterprise instructional modules must be substituted for free electives.

Enterprise Minor: Follow concentration, plus take 6 additional credits beyond required degree as per minor requirements.

Second Degree Policy: Candidates for a second degree must meet all the coursework requirements for the major in the second degree with a minimum of 25% of the credit hours required for the degree, beyond the primary degree.

Geological Engineering Advanced Technical Electives

Course Title	Offered	Prerequisite(s)
GE 3400 Drilling and Blasting	FA	GE 2020, PH 2100
GE 4150 Natural Hazards	FA	(GE 2000 or GE 2100), UN 2002
GE 4360 Materials Handling	SP	PH 2100
GE 4504 Air Quality Engineering and Science	FA	ENVE 3501 or ENVE 3503
GE 4610 Formation Eval. & Petrol. Eng.	FA	
GE 4800 Groundwater Eng.	On Demand, typ. SP	GE 3850
GE 4860 Computer Methods in Geomechanics	SP	GE 2000, ENG 2120, (ENG 3200 or ENG 3507)
GE 3880 Mine Planning & Design	SP	GE 2320, GE 3400, GE 3870
GE 4680 Open Research for Mining Engineers	On Demand	GE 2020 or GE 2320
ENVE 3503 Environmental Engineering	FA, SU, SP	
GE 3870 Resource & Reserve Estimation	FA alternate years	GE 2020, MA 3710
CE 3331 Professional Practice	FA, SP	(MA 2150 or MA 2160), (CH 1100 or CH 1110)
CE 3332 Fund. Constr. Engineering	FA, SU, SP	
CE 3620 Water Resources Engineering	FA, SP	
CE 4010 Introduction to Consulting Eng	SP	(ENG 3200 or ENG 3507), (MA 3710(C) or ENVE 3502(C) or CE 3710(C))
CE 4820 Foundation Engineering	FA	
CE 4830 Geosynthetics Engineering	SP	CE 3201, CE 3810
CE 4850 Rock Engineering for Civil Eng	SP alternate years	CE 3810

NOTE: Special Topics Courses focusing predominantly on applications of engineering to geological engineering systems/projects may also be used with prior approval by a GE Advisor. Additionally, with prior approval from advisor, student may choose other technical electives. Many appropriate senior-level engineering courses are offered in Civil & Environmental Engineering on topics related to those listed above. Adv. Geophysics Elective Courses (see list below) can be taken as Technical Electives for BSGE students.

Advanced Geophysics Electives

Course Title	Offered	Prerequisite(s)
GE 4560 Earthquake Seismology	FA	GE 3050, PH 2100, MA 3160
GE 4600 Reflection Seismology	SP	GE 3040
GE 4610 Formation Eval. & Petrol. Eng.	FA (depends on demand)	

NOTE: a GE Advisor may also use special Topics Courses focusing predominantly on applications of geophysics in geological engineering projects with prior approval.

General Education Requirements

(https://www.mtu.edu/registrar/pdfs/core-and-hass-list-21-22.pdf)

I. Core Courses (6 Credits)

___UN 1015 ___ UN 1025*

* Or one semester of a 3000 level or higher modern language.

II. Sophomore Core Courses (6 Credits)

Creative and Critical Thinking (HU/FA) _____

Social Responsibility and Ethical Reasoning (SS) _____

III. Hass Course Requirements (12 Credits)

(https://www.mtu.edu/registrar/pdfs/core-and-hass-list-21-22.pdf)

- *6 credits 3000- or 4000- level*
- *3 credits required from each of these 3 lists: Communication and Composition, Humanities and Fine Arts (HU/FA), and Social and Behavioral Sciences (EC/PSY/SS)*
- *No more than 3 credits on the Restricted HASS List*

A. 6 credits 3000- or 4000- level:
1._____ 2._____

B. 6 credits at any level:
1._____ 2._____

IV. Co-curricular activities (3 units)

The co-curricular requirement consists of three semester units of physical education activities. These units are required for graduation, but are not included in the overall degree-credit requirement.

Note: Most physical education activities will last for 7 ½ weeks or ½ semester. A student would need **six** of these ½-semester units to fulfill the 3-semester unit co-curricular requirement.

PE_____ PE_____ PE_____

PE_____ PE_____ PE_____

BS Geological Engineering Curriculum Overview (127 Total Credits)