Bachelor of Science in Geological Engineering

2022-2023

Year 1

Fall

MA 1160/1161/1032
CALCULUS w/ TECH 1
(4 CREDITS)
F, S, Su

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

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

ENG 1001
ENG 1002 (C)
or pass Spac. Vis. test

Year 2

Fall

GE 2010
INTRO TO GIS
(3 CREDITS)
F

MA 2160
CALCULUS w/ TECH 2
(4 CREDITS)
F, S, Su

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

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

Year 3

Fall

GE 2300
INTRO TO MINERALOGY
(3 CREDITS)
F

PH 2300
INTRO TO MINERALOGY
(3 CREDITS)
F

MA 2320
ELEM LINEAR ALGEBRA
(2 CREDITS)
F, S, Su

Year 4

Spring

MA 2160
PH 2310

MA 3250
COMPUTATIONAL GEOSCIENCES
(3 CREDITS)
F

MA 3220
ELEM LINEAR ALGEBRA
(2 CREDITS)
F, S, Su

ENG 2120
STATISTICAL MATHS
(4 CREDITS)
F, S, Su

GE 2010
MA 2160
ENGG 3100
INTRO TO FIELD PETROLOGY
(3 CREDITS)
S

GE 2310
PH 2200

MA 3520
INTRO TO FIELD METHODS
(1 CREDIT)
F

ENG 3050
GROUNDWATER
(3 CREDITS)
F

EC 3480
ECON. DECISION ANALYSIS
(3 CREDITS)
F, S, Su

This is not an official list of degree requirements. Adjustments may be required due to curriculum changes.
BS in Geological Engineering 2022-2023
(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

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

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

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Offered</th>
<th>Prerequisite(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE 4560 Earthquake Seismology</td>
<td>FA</td>
<td>GE 3050, PH 2100, MA 3160</td>
</tr>
<tr>
<td>GE 4600 Reflection Seismology</td>
<td>SP</td>
<td>GE 3040</td>
</tr>
<tr>
<td>GE 4610 Formation Eval. &amp; Petrol. Eng.</td>
<td>FA</td>
<td>(depends on demand)</td>
</tr>
</tbody>
</table>

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)
- General Education & Free Electives
- Chemistry
- Physics & Geophysics Fundamentals
- Calculus, Statistics, Linear Algebra, Differential Equations, & Economics
- Physical Geology, Mineralogy, Petrology, Structure & Depositional Systems
- Applied Engineering Fundamentals, Geohydrology & Geotechnics
- Field Geology & Geophysics
- Professional Electives & Capstone Experience