# Bachelor of Science in Geological Engineering

**2017-2018**

## Year 1

### Fall
- MA 1160/1161 Calculus w/ TECH I (4/5 CREDITS)
- MA 2160 Calculus w/ TECH II (4 CREDITS)
- PH 1100 PHYSICS LAB I (1 CREDIT)
- CH 1150 UNIV. CHEMISTRY I (3 CREDITS)
- MA 1160 Multivariable Calculus w/ TECH (4 CREDITS)
- PH 1200 UNIV. PHYSICS II - MECH (3 CREDITS)
- PH 2100 PHYSICS LAB II (1 CREDIT)
- CH 1151 CHEMISTRY LAB I (1 CREDIT)
- ENG 1102 ENG. ENGL & SCI ORIENTATION (1 CREDIT)
- ENG 1102 ENG. ANALYSIS & PROB. SOLVING (3 CREDITS)
- ENG 1101 or ENG 1101 & ENG 1102 ENG. ANALYSIS & PROB. SOLVING (3 CREDITS)
- UN 1015 or UN 1025 MAY BE TAKEN IN EITHER ORDER IN THE FIRST YEAR.
- HUFA or SS/Behavioral ELECTIVE MAY BE TAKEN IN EITHER ORDER IN THE SECOND YEAR.

### Spring
- MA 2160 Calculus w/ TECH II (4 CREDITS)
- MA 2160 Calculus w/ TECH II (4 CREDITS)
- GE 2300 INTRO TO MINERALOGY (3 CREDITS)
- PH 2200 UNIV. PHYSICS II - ELEC / MAG (3 CREDITS)
- PH 2100 PHYSICS LAB II (1 CREDIT)
- CH 1150 UNIV. CHEMISTRY I (3 CREDITS)
- ENG 1102 ENG. ENGL & SCI ORIENTATION (1 CREDIT)
- ENG 1102 ENG. ANALYSIS & PROB. SOLVING (3 CREDITS)
- ENG 3050 STRUCTURAL GEOLOGY (4 CREDITS)
- UN 1015 or UN 1025 MAY BE TAKEN IN EITHER ORDER IN THE FIRST YEAR.
- HUFA or SS/Behavioral ELECTIVE MAY BE TAKEN IN EITHER ORDER IN THE SECOND YEAR.

## Year 2

### Fall
- ENG 2120 STATISTICAL STRENGTH MAT'Ls (4 CREDITS)
- MA 3160 PHYSICS LAB II (1 CREDIT)
- MA 3710 ENGR STATISTICS (3 CREDITS)
- GE 3040 FUNDAMENTALS OF GEOPHYSICS (3 CREDITS)
- GE 1102 ENG. ENGL & SCI ORIENTATION (1 CREDIT)
- MA 2160 Calculus w/ TECH II (4 CREDITS)
- MA 2160 Calculus w/ TECH II (4 CREDITS)
- GE 2300 INTRO TO MINERALOGY (3 CREDITS)
- PH 2200 UNIV. PHYSICS II - ELEC / MAG (3 CREDITS)
- CH 1151 CHEMISTRY LAB I (1 CREDIT)
- MA 3160 PHYSICS LAB II (1 CREDIT)
- MA 3160 PHYSICS LAB II (1 CREDIT)
- ENG 1102 ENG. ENGL & SCI ORIENTATION (1 CREDIT)
- ENG 1102 ENG. ANALYSIS & PROB. SOLVING (3 CREDITS)
- GE 3050 STRUCTURAL GEOLOGY (4 CREDITS)
- UN 1015 or UN 1025 MAY BE TAKEN IN EITHER ORDER IN THE FIRST YEAR.
- HUFA or SS/Behavioral ELECTIVE MAY BE TAKEN IN EITHER ORDER IN THE SECOND YEAR.

### Spring
- MA 2160 Calculus w/ TECH II (4 CREDITS)
- MA 2160 Calculus w/ TECH II (4 CREDITS)
- GE 2300 INTRO TO MINERALOGY (3 CREDITS)
- PH 2200 UNIV. PHYSICS II - ELEC / MAG (3 CREDITS)
- CH 1151 CHEMISTRY LAB I (1 CREDIT)
- MA 3160 PHYSICS LAB II (1 CREDIT)
- MA 3160 PHYSICS LAB II (1 CREDIT)
- ENG 1102 ENG. ENGL & SCI ORIENTATION (1 CREDIT)
- ENG 1102 ENG. ANALYSIS & PROB. SOLVING (3 CREDITS)
- GE 3050 STRUCTURAL GEOLOGY (4 CREDITS)
- UN 1015 or UN 1025 MAY BE TAKEN IN EITHER ORDER IN THE FIRST YEAR.
- HUFA or SS/Behavioral ELECTIVE MAY BE TAKEN IN EITHER ORDER IN THE SECOND YEAR.

## Year 3

### Fall
- MA 2160 Calculus w/ TECH II (4 CREDITS)
- MA 2160 Calculus w/ TECH II (4 CREDITS)
- GE 2300 INTRO TO MINERALOGY (3 CREDITS)
- PH 2200 UNIV. PHYSICS II - ELEC / MAG (3 CREDITS)
- CH 1151 CHEMISTRY LAB I (1 CREDIT)
- MA 3160 PHYSICS LAB II (1 CREDIT)
- MA 3160 PHYSICS LAB II (1 CREDIT)
- ENG 1102 ENG. ENGL & SCI ORIENTATION (1 CREDIT)
- ENG 1102 ENG. ANALYSIS & PROB. SOLVING (3 CREDITS)
- GE 3050 STRUCTURAL GEOLOGY (4 CREDITS)
- UN 1015 or UN 1025 MAY BE TAKEN IN EITHER ORDER IN THE FIRST YEAR.
- HUFA or SS/Behavioral ELECTIVE MAY BE TAKEN IN EITHER ORDER IN THE SECOND YEAR.

### Spring
- MA 2160 Calculus w/ TECH II (4 CREDITS)
- MA 2160 Calculus w/ TECH II (4 CREDITS)
- GE 2300 INTRO TO MINERALOGY (3 CREDITS)
- PH 2200 UNIV. PHYSICS II - ELEC / MAG (3 CREDITS)
- CH 1151 CHEMISTRY LAB I (1 CREDIT)
- MA 3160 PHYSICS LAB II (1 CREDIT)
- MA 3160 PHYSICS LAB II (1 CREDIT)
- ENG 1102 ENG. ENGL & SCI ORIENTATION (1 CREDIT)
- ENG 1102 ENG. ANALYSIS & PROB. SOLVING (3 CREDITS)
- GE 3050 STRUCTURAL GEOLOGY (4 CREDITS)
- UN 1015 or UN 1025 MAY BE TAKEN IN EITHER ORDER IN THE FIRST YEAR.
- HUFA or SS/Behavioral ELECTIVE MAY BE TAKEN IN EITHER ORDER IN THE SECOND YEAR.

## Year 4

### Fall
- MA 2160 Calculus w/ TECH II (4 CREDITS)
- MA 2160 Calculus w/ TECH II (4 CREDITS)
- GE 2300 INTRO TO MINERALOGY (3 CREDITS)
- PH 2200 UNIV. PHYSICS II - ELEC / MAG (3 CREDITS)
- CH 1151 CHEMISTRY LAB I (1 CREDIT)
- MA 3160 PHYSICS LAB II (1 CREDIT)
- MA 3160 PHYSICS LAB II (1 CREDIT)
- ENG 1102 ENG. ENGL & SCI ORIENTATION (1 CREDIT)
- ENG 1102 ENG. ANALYSIS & PROB. SOLVING (3 CREDITS)
- GE 3050 STRUCTURAL GEOLOGY (4 CREDITS)
- UN 1015 or UN 1025 MAY BE TAKEN IN EITHER ORDER IN THE FIRST YEAR.
- HUFA or SS/Behavioral ELECTIVE MAY BE TAKEN IN EITHER ORDER IN THE SECOND YEAR.

### Spring
- MA 2160 Calculus w/ TECH II (4 CREDITS)
- MA 2160 Calculus w/ TECH II (4 CREDITS)
- GE 2300 INTRO TO MINERALOGY (3 CREDITS)
- PH 2200 UNIV. PHYSICS II - ELEC / MAG (3 CREDITS)
- CH 1151 CHEMISTRY LAB I (1 CREDIT)
- MA 3160 PHYSICS LAB II (1 CREDIT)
- MA 3160 PHYSICS LAB II (1 CREDIT)
- ENG 1102 ENG. ENGL & SCI ORIENTATION (1 CREDIT)
- ENG 1102 ENG. ANALYSIS & PROB. SOLVING (3 CREDITS)
- GE 3050 STRUCTURAL GEOLOGY (4 CREDITS)
- UN 1015 or UN 1025 MAY BE TAKEN IN EITHER ORDER IN THE FIRST YEAR.
- HUFA or SS/Behavioral ELECTIVE MAY BE TAKEN IN EITHER ORDER IN THE SECOND YEAR.

This is not an official list of degree requirements. Adjustments may be required due to curriculum changes.
BS in Geological Engineering 2017-2018
(Minimum of 133 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 technical electives 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, - alternate yrs</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>On Demand</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>GE 2310, GE 3050, GE 3910</td>
</tr>
<tr>
<td>GE 4760 Mining Geology</td>
<td>On Demand, typ. SP</td>
<td>GE 3850</td>
</tr>
<tr>
<td>GE 4800 Groundwater Eng.</td>
<td>SP</td>
<td>GE 2000, ENG 2120, (ENG 3200 or ENG 3507)</td>
</tr>
<tr>
<td>GE 4860 Computer Methods in Geomechanics</td>
<td>FA, SU, SP</td>
<td>(MA 2150 or MA 2160), (CH 1100 or CH 1110)</td>
</tr>
<tr>
<td>ENVE 3503 Environmental Engineering</td>
<td>FA, SP</td>
<td>(MA 2150 or MA 2160), (CH 1100 or CH 1110)</td>
</tr>
<tr>
<td>CE 3331 Professional Practice</td>
<td>FA, SU, SP</td>
<td>(MA 2150 or MA 2160), (CH 1100 or CH 1110)</td>
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<tr>
<td>CE 3332 Fund. Constr. Engineering</td>
<td>FA</td>
<td>(ENG 3200 or ENG 3507)</td>
</tr>
<tr>
<td>CE 3620 Water Resources Engineering</td>
<td>FA, SP</td>
<td>(MA 3160(C) or ENVE 3502(C) or CE 3700(C))</td>
</tr>
<tr>
<td>CE 4010 Introduction to Consulting Eng.</td>
<td>SP</td>
<td>CE 3201, CE 3810</td>
</tr>
<tr>
<td>CE 4820 Foundation Engineering</td>
<td>SP</td>
<td>CE 3810</td>
</tr>
<tr>
<td>CE 4830 Geosynthetics Engineering</td>
<td>- alternate yrs</td>
<td>CE 3810</td>
</tr>
<tr>
<td>CE 4850 Rock Engineering for Civil Engineers</td>
<td>- alternate yrs</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>FA</td>
<td>GE 3040</td>
</tr>
<tr>
<td>GE 4610 Formation Eval. &amp; Petrol. Eng.</td>
<td>FA or SP</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

I. Core Courses (6 Credits)
___ UN 1015                        ___ UN 1025*
* Or one semester of a 3000 level or higher modern language.

II. Sophomore Electives (6 Credits)
___ HU/FA ______________    ___ SS/Behavioral ________________

III. Hass Course Requirements (12 Credits)
(http://www.mtu.edu/registrar/pdfs/core-and-hass-list-17-18-v2.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. ______________

VI. 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 (133 Total Credits)

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

15 29 7 11 22 17 24 10