Bachelor of Science in Geological Engineering
2019-2020

Year 1
Fall
MA 1160/1161 CALCULUS w/ TECH (4 credits)
ENG 1002 (C) for pass Spac. Vid. test
PH 1100 PHYSICS LAB I (1 credit)
CH 1150 CHEMISTRY I (3 credits)

Spring
MA 2160 CALCULUS w/ TECH II (4 credits)
ENG 2120 STATISTICAL STRENGTH OF MATERIALS (4 credits)
PH 1200 PHYSICS II (1 credit)

Year 2
Fall
MA 2160 MULTIVARIABLE CALCULUS w/ TECH (4 credits)
PH 2200 UNIV. PHYSICS II w/ ELEC. MAG (3 credits)
ENG 2000 Understanding the Earth (3 credits)

Spring
ENG 3040 FUNDAMENTALS OF GEOPHYSICS (3 credits)
PH 3900 FIELD GEOPHYSICS (4 credits)

Year 3
Fall
GE 2310 INTRO TO MINERALOGY (3 credits)
MA 2160 INTRO TO METROLOGY (3 credits)
ENG 3650 THERMAL FLUIDS (4 credits)

Spring
GE 3910 FIELD GEOLOGY w/ ENG APP (5 credits)
MA 2160 INTRO TO GEOPHYSICS (3 credits)

Year 4
Fall
MA 3710 ENGINEERING STATISTICS* (3 credits)
MA 3520 DIFFERENTIAL EQ (3 credits)
MA 3520 ADVANCED GEOPHYSICS ELECTIVE (3 credits)

Spring
GE 4910 GEO ENG ELECTIVE (3 credits)
MA 3921 MULTIVARIABLE CALCULUS w/ TECH (4 credits)

Notes:
- Courses marked with an asterisk (*) may be taken during the same semester.
- Courses marked with an exclamation mark (!) may be taken in either order.
- Courses marked with a dagger (†) may be taken in either order in the second year.
- Courses marked with a double dagger (‡) may be taken in either order in the first year.
- Courses marked with a triple dagger (§) may be taken in any order.
- Courses marked with a quadruple dagger (¶) may be taken in any order.
- Courses marked with a quintuple dagger (‖) may be taken in any order.
- Courses marked with a sextuple dagger (¶¶) may be taken in any order.
- Courses marked with a septuple dagger (¶¶¶) may be taken in any order.
- Courses marked with an octuple dagger (¶¶¶¶) may be taken in any order.
- Courses marked with a nonuple dagger (¶¶¶¶¶) may be taken in any order.
- Courses marked with a decuple dagger (¶¶¶¶¶¶) may be taken in any order.
- Courses marked with an undecuple dagger (¶¶¶¶¶¶¶) may be taken in any order.
- Courses marked with a dodecuple dagger (¶¶¶¶¶¶¶¶) may be taken in any order.
- Courses marked with a tetradecuple dagger (¶¶¶¶¶¶¶¶¶) may be taken in any order.
- Courses marked with a hexadecuple dagger (¶¶¶¶¶¶¶¶¶¶) may be taken in any order.
- Courses marked with a octadecuple dagger (¶¶¶¶¶¶¶¶¶¶¶) may be taken in any order.
- Courses marked with a vigintuple dagger (¶¶¶¶¶¶¶¶¶¶¶¶) may be taken in any order.
- Courses marked with a triacontuple dagger (¶¶¶¶¶¶¶¶¶¶¶¶¶) may be taken in any order.
- Courses marked with a tesseracontuple dagger (¶¶¶¶¶¶¶¶¶¶¶¶¶¶) may be taken in any order.
- Courses marked with a telluriclorite dagger (¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶) may be taken in any order.
- Courses marked with a tercetriple dagger (¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶) may be taken in any order.
- Courses marked with a quattuorplex dagger (¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶) may be taken in any order.
- Courses marked with a quintupleplex dagger (¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶) may be taken in any order.
- Courses marked with a sextupleplex dagger (¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶) may be taken in any order.
- Courses marked with a septupleplex dagger (¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶) may be taken in any order.
- Courses marked with an octupleplex dagger (¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶) may be taken in any order.
- Courses marked with a nongynoplex dagger (¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶) may be taken in any order.
- Courses marked with a dodecaplex dagger (¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶) may be taken in any order.

This is not an official list of degree requirements. Adjustments may be required due to curriculum changes.
**BS in Geological Engineering 2019-2020**

**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 interdiscipline 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.

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### 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>
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<tr>
<td>GE 4150 Natural Hazards</td>
<td>FA</td>
<td>(GE 2000 or GE 2100), UN 2002</td>
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<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>
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<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>
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<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>
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<tr>
<td>ENVE 3503 Environmental Engineering</td>
<td>FA, SU, SP</td>
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<tr>
<td>GE 3870 Resource &amp; Reserve Estimation</td>
<td>FA alternate years</td>
<td>GE 2020, MA 3710</td>
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<tr>
<td>CE 3331 Professional Practice</td>
<td>FA, SP</td>
<td>(MA 2150 or MA 2160), (CH 1100 or CH 1110)</td>
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<tr>
<td>CE 3332 Fund. Const. Engineering</td>
<td>FA, SU, SP</td>
<td></td>
</tr>
<tr>
<td>CE 3620 Water Resources Engineering</td>
<td>FA, SP</td>
<td></td>
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<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>
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<tr>
<td>CE 4830 Geosynthetics Engineering</td>
<td>SP</td>
<td>CE 3201, CE 3810</td>
</tr>
<tr>
<td>GE 4850 Rock Engineering for Civil Eng</td>
<td>SP alternate years</td>
<td>CE 3810</td>
</tr>
</tbody>
</table>

**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:** 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.

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### General Education Requirements

(http://www.mtu.edu/registrar/pdfs/core-and-hass-list-17-18-v2.pdf)

**I.  Core Courses (6 Credits)**

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**II. Sophomore Core Courses (6 Credits)**

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**III. Hass Course Requirements (12 Credits)**

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**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.

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**BS Geological Engineering Curriculum Overview (132 Total Credits)**

- **General Education, Free & Physical Education 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**