# Civil and Structural/Earthquakes Engineering SF Scholars Roadmap

## Course Title Units

### First Year

#### Fall Semester

Select One (Major Core): 3-5

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 115</td>
<td>General Chemistry I: Essential Concepts of Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 180</td>
<td>Chemistry for the Energy and the Environment (B1, B3, ES)</td>
<td>1</td>
</tr>
<tr>
<td>ENG 114</td>
<td>Writing the First Year: Finding Your Voice (A2)</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 100</td>
<td>Introduction to Engineering (Major Core)</td>
<td>1</td>
</tr>
<tr>
<td>ENGR 101</td>
<td>Engineering Graphics (Major Core)</td>
<td>1</td>
</tr>
<tr>
<td>MATH 226</td>
<td>Calculus I (Major Core, B4)</td>
<td>4</td>
</tr>
<tr>
<td>GE Area A: Oral Communication (A1)</td>
<td>3,4</td>
<td>3</td>
</tr>
</tbody>
</table>

**Spring Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 271</td>
<td>Introduction to MATLAB (Major Core)</td>
<td>1</td>
</tr>
<tr>
<td>MATH 227</td>
<td>Calculus II (Major Core)</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 220</td>
<td>General Physics with Calculus I and General Physics with Calculus I Laboratory (Major Core, B1, B3)</td>
<td>4</td>
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</tbody>
</table>

**Third Year**

#### Fall Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 300</td>
<td>Engineering Experimentation (Major Core)</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 304</td>
<td>Mechanics of Fluids (Major Core)</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 309</td>
<td>Mechanics of Solids (Major Core)</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 434</td>
<td>Principles of Environmental Engineering (Major Core)</td>
<td>3</td>
</tr>
<tr>
<td>GE Area C</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>GE Area D</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**Spring Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 302</td>
<td>Experimental Analysis (Major Core)</td>
<td>1</td>
</tr>
<tr>
<td>ENGR 323</td>
<td>Structural Analysis (Major Core)</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 429</td>
<td>Construction Management (Major Core)</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 430</td>
<td>Soil Mechanics (Major Core)</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 436</td>
<td>Transportation Engineering (Major Core)</td>
<td>3</td>
</tr>
</tbody>
</table>

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1. **Units**: 15-17

2. **Units**: 15

3. **Units**: 16

4. **Units**: 18

5. **Units**: 1
GE Area B: Life Science (B2) 3

Fourth Year
Summer Semester
GE Area C 3
GE Area D 3

Units 6

Fall Semester
ENGR 425 Reinforced Concrete Structures (Major Core) 3
ENGR 696 Engineering Design Project I (Major Core) 1
ENGR 800 Engineering Communications (Graduate Core) 3

Major Upper-Division Electives (12 Units Total) - Take Two 7 6
Graduate Electives (12-15 Units) - Take One 8 3

Units 16

Spring Semester
ENGR 697GW Engineering Design Project II - GWAR (Major Core) 2
ENGR 801 Engineering Management (Graduate Core) 3

Major Upper-Division Electives (12 Units Total) - Take Two 7 6
GE Area UD-C: Upper-Division Arts and/or Humanities (Consider SF State Studies Course) 3
GE Area UD-D: Upper-Division Social Sciences (Consider SF State Studies Course) 3

Units 17

Fifth Year
Fall Semester
ENGR 833 Principles of Earthquake Engineering (Graduate Core) 3

Select One (Culminating Experience): 3
ENGR 897 Research

Graduate Elective 8
Graduate Electives (12-15 Units) - Take Two 8 6

Units 12

Spring Semester
ENGR 836 Structural Design for Earthquakes (Graduate Core) 3
ENGR 895 or ENGR 898 Applied Research Project (Culminating Experience) or Master’s Thesis 3

Graduate Electives (12-15 Units) - Take One 8 3

Units 9

Total Units 157-159

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1. ENG 114 can only be taken if you complete Directed Self-Placement (DSP) and select ENG 104/ENG 105 through DSP you will satisfy A2 upon successful completion of ENG 105 in the second semester; multilingual students may be advised into alternative English courses.

2. Depending on courses completed through Early Start, students in Pathway/Category III or IV may be required to enroll in a support course to complement their Quantitative Reasoning/B4 requirement. There are multiple course options for this pathway. Before enrolling in a B4 course, students should verify their MATH Pathway/Category in their Student Center (http://cms.sfsu.edu/content/student-center). Information regarding the courses that correspond with your MATH Pathway/Category can be found on the Developmental Studies Office Website (http://developmentalstudies.sfsu.edu).

3. To avoid taking additional units, it is recommended that you meet SF State Studies requirements (AERM, GP, ES, SJ) within your GE.

4. GE Area A: Critical Thinking (A3) is satisfied upon completion of ENGR 205 and either ENGR 201 or ENGR 213.

5. GE Area UD-B: Upper-Division Physical and/or Life Sciences is satisfied upon completion of ENGR 300 and either ENGR 301 or ENGR 302.

6. You must complete 21 units of upper-division Engineering units before registering for ENGR 696.

7. Major Electives (12 units)
   - ENGR 303 Engineering Thermodynamics (3 units) (Prerequisite for ENGR 469)
   - ENGR 426 Steel Structures (3 units)
   - ENGR 427 Wood Structures (3 units)
   - ENGR 431 Foundation Engineering (3 units)
   - ENGR 432 Finite Element Methods in Structural and Continuum Mechanics (3 units)
   - ENGR 435 Environmental Engineering Design (3 units)
   - ENGR 439 Construction Engineering (3 units)
   - ENGR 441 Fundamentals of Composite Materials (3 units)
   - ENGR 461 Mechanical and Structural Vibrations (3 units)
   - ENGR 468 Applied Fluid Mechanics and Hydraulics (3 units)
   - ENGR 469 Alternative and Renewable Energy Systems (3 units)
   - ENGR 610 Engineering Cost Analysis (3 units)
   - ENGR 699 Independent Study (1-3 units)
   - ENGR 826 Seismic Hazard Analysis (3 units)
   - ENGR 827 Structural Design for Fire Safety (3 units)
   - ENGR 829 Advanced Topics in Structural Engineering (3 units)
   - ENGR 831 Advanced Concrete Structures (3 units)
   - ENGR 832 Advanced Topics in Seismic Design (3 units)
   - ENGR 833 Principles of Earthquake Engineering (3 units)
   - ENGR 835 Advanced Steel Structures (3 units)
   - ENGR 836 Structural Design for Earthquakes (3 units)
   - ENGR 837 Geotechnical Earthquake Engineering (3 units)
Engineering Electives (6-15 units)
Units selected on advisement from:
- ENGR 425 Reinforced Concrete Structures (3 units)
- ENGR 426 Steel Structures (3 units)
- ENGR 427 Wood Structures (3 units)
- ENGR 431 Foundation Engineering (3 units)
- ENGR 461 Mechanical and Structural Vibrations (3 units)
- ENGR 826 Seismic Hazard Analysis (3 units)
- ENGR 827 Structural Design for Fire Safety (3 units)
- ENGR 828 Seismic Isolation and Energy Dissipation (3 units)
- ENGR 829 Advanced Topics in Structural Engineering (3 units)
- ENGR 831 Advanced Concrete Structures (3 units)
- ENGR 832 Advanced Topics in Seismic Design (3 units)
- ENGR 835 Advanced Steel Structures (3 units)
- ENGR 837 Geotechnical Earthquake Engineering (3 units)
- ENGR 838 Smart Structures Technology (3 units)

A program cannot contain more than 9 units of courses with a course number below 700. Some upper-division Engineering courses may also be used as electives if not used in the undergraduate degree program and approved by the Graduate Coordinator.

Non-Engineering Electives (0-6 units)
Courses, either graduate or upper-division, selected primarily from science, mathematics, social science, or business, upon approval of the Graduate Coordinator.