

# CIVIL AND STRUCTURAL/ EARTHQUAKES ENGINEERING SF SCHOLARS ROADMAP

This roadmap is a suggested plan of study and does not replace meeting with an advisor. Please note that students may need to adjust the actual sequence of courses based on course availability. Please consult an advisor in your major program for further guidance.

Course	Title	Units
<b>First Year</b>		
<b>Fall Semester</b>		
Select One (Major Core):		3-5
CHEM 115	General Chemistry I: Essential Concepts of Chemistry	
CHEM 180	Chemistry for Energy and the Environment (B1, B3, ES)	
ENG 114	Writing the First Year. Finding Your Voice (A2) <sup>1</sup>	3
ENGR 100	Introduction to Engineering (Major Core)	1
ENGR 101	Engineering Graphics (Major Core)	1
MATH 226	Calculus I (Major Core, B4) <sup>2</sup>	4
GE Area A: Oral Communication (A1) <sup>3,4</sup>		3
		<b>Units 15-17</b>
<b>Spring Semester</b>		
ENGR 271	Introduction to MATLAB (Major Core)	1
MATH 227	Calculus II (Major Core)	4
PHYS 220 & PHYS 222	General Physics with Calculus I and General Physics with Calculus I Laboratory (Major Core, B1, B3)	4
GE Area D		3
GE Area E		3
		<b>Units 15</b>
<b>Second Year</b>		
<b>Fall Semester</b>		
ENGR 102	Statics (Major Core)	3
ENGR 200	Materials of Engineering (Major Core)	3
MATH 228	Calculus III (Major Core)	4

PHYS 230 & PHYS 232	General Physics with Calculus II and General Physics with Calculus II Laboratory (Major Core)	4
GE Area C		3
		<b>Units 17</b>
<b>Spring Semester</b>		
ENGR 201	Dynamics (Major Core)	3
ENGR 205	Electric Circuits (Major Core)	3
ENGR 235	Surveying (Major Core)	3
MATH 245	Elementary Differential Equations and Linear Algebra (Major Core)	3
PHYS 240 & PHYS 242	General Physics with Calculus III and General Physics with Calculus III Laboratory (Major Core)	4
		<b>Units 16</b>
<b>Third Year</b>		
<b>Fall Semester</b>		
ENGR 300	Engineering Experimentation (Major Core) <sup>5</sup>	3
ENGR 304	Mechanics of Fluids (Major Core)	3
ENGR 309	Mechanics of Solids (Major Core)	3
ENGR 434	Principles of Environmental Engineering (Major Core)	3
GE Area C		3
GE Area D		3
		<b>Units 18</b>
<b>Spring Semester</b>		
ENGR 302	Experimental Analysis (Major Core) <sup>5</sup>	1
ENGR 323	Structural Analysis (Major Core)	3
ENGR 429	Construction Management (Major Core)	3
ENGR 430	Soil Mechanics (Major Core)	3
ENGR 436	Transportation Engineering (Major Core)	3

GE Area B: Life Science (B2)		3
<b>Units</b>		<b>16</b>
<b>Fourth Year</b>		
<b>Summer Semester</b>		
GE Area C		3
GE Area F		3
<b>Units</b>		<b>6</b>
<b>Fall Semester</b>		
ENGR 425	Reinforced Concrete Structures (Major Core)	3
ENGR 696	Engineering Design Project I (Major Core) <sup>6</sup>	1
ENGR 800	Research Methodology (Graduate Core)	3
Major Upper-Division Electives (12 Units Total) - Take Two <sup>7</sup>		6
Graduate Electives (12-15 Units) - Take One <sup>8</sup>		3
<b>Units</b>		<b>16</b>
<b>Spring Semester</b>		
ENGR 697GW	Engineering Design Project II - GVAR (Major Core)	2
ENGR 801	Engineering Management (Graduate Core)	3
Major Upper-Division Electives (12 Units Total) - Take Two <sup>7</sup>		6
GE Area UD-C: Upper-Division Arts and/or Humanities (Consider SF State Studies Course) <sup>9</sup>		3
GE Area UD-D: Upper-Division Social Sciences (Consider SF State Studies Course) <sup>9</sup>		3
<b>Units</b>		<b>17</b>
<b>Fifth Year</b>		
<b>Fall Semester</b>		
ENGR 833	Principles of Earthquake Engineering (Graduate Core)	3
Select One (Culminating Experience):		3
ENGR 897	Research Graduate Elective <sup>8</sup>	
Graduate Electives (12-15 Units) - Take Two <sup>8</sup>		6
<b>Units</b>		<b>12</b>
<b>Spring Semester</b>		
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 <sup>8</sup>	3
<b>Units</b>	<b>9</b>
<b>Total Units</b>	<b>157-159</b>

- <sup>1</sup> ENG 114 can only be taken if you complete Directed Self-Placement (DSP) and select ENG 114; if you choose 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.
- <sup>2</sup> 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/>).
- <sup>3</sup> To avoid taking additional units, it is recommended that you meet **SF State Studies** (AERM, GP, ES, SJ) and **Ethnic Studies requirements** within your GE or major.
- <sup>4</sup> GE Area A: Critical Thinking (A3) is satisfied upon completion of ENGR 205 and either ENGR 201 or ENGR 213.
- <sup>5</sup> 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.
- <sup>6</sup> You must complete 21 units of upper-division Engineering units before registering for ENGR 696.
- <sup>7</sup> **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)

<sup>8</sup> **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.

- <sup>9</sup> To avoid taking additional units, it is recommended that you meet **U.S. and California Government** (USG/CSLG) within Upper-Division GE.