

ENGINEERING SCIENCES

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Program Description

Engineering Sciences is a broad-based general engineering degree program. As such, it provides the graduate flexibility, breadth of technical knowledge, and communication skills so important in today's rapidly changing multidisciplinary and multicultural work environment. The student may opt for a BS in Engineering Sciences with an Emphasis on Biosystems and Agricultural Engineering, Engineering Management, or Petroleum Engineering by the appropriate choice of electives.

The Engineering Sciences program provides a curriculum and course of training that prepares the student not only for today's challenges, but also for future ones in a fast-paced, global, and diverse society. The program emphasizes the fundamentals of engineering and modern methods, processes and technologies, and also gives the students the tools to learn by themselves and to pursue life-long learning. Furthermore, the program and the faculty strive to ensure that graduates also attain a global understanding of the environmental, ethical and societal impacts of the technologies they help develop.

The program offers opportunities for team-based design projects in collaboration with local industries and public institutions, thus preparing students for careers in for-profit and non-profit organizations, or to further their education in graduate school. Faculty members of the Department of Physics and Engineering will be pleased to advise any students who may wish to pursue this major. For student learning objectives and more information, visit our website at www.csub.edu/engineering.

Requirements for the Bachelor of Science Degree in Engineering Sciences

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|---|------------------|
| Total Units Required to Graduate | 120 units |
| Major Requirements | 98 units |
| Cognates | 36 |
| Core Curriculum | 49 |
| Electives | 13 |
| Minor Requirement | 0 units |
| General Education Requirements | 22 units |
| First-Year Seminar | 0* |
| LD Area A Foundational Skills | 6** |
| LD Area B Natural Sciences | 0* ** |
| LD Area C Arts and Humanities | 6 |

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| LD Area D Social and Behavioral Sciences | 0* ** |
| American Institutions | 6 |
| SELF | 0* |
| Junior Year Diversity Requirement | 3 |
| UD Thematic Area C | 0* |
| UD Thematic Area D | 0** |
| Capstone | 1 |
| GWAR (Exam) or Class | 0* |

Additional Units **0 units**

*Some major requirements may be used to satisfy GE: ENGR 1618 along with ENGR 1628 satisfy FYS, PHYS 2210 satisfies Area B1 and B3, MATH 2310 or 2510 satisfies Area A4, ECON 2018 satisfies LD Area D, and PHIL 3318 satisfies UD Thematic Area C. The SELF requirement is met by completing a LD Area B, C, or D course with a SELF component. The GWAR may be satisfied by exam.

**A modification to the standard GE program has been approved. Completion of the BS in Engineering Sciences major requirements will satisfy Area A3, B2 and UD Area D, and will reduce LD Area D by 3 units.

Major Requirements for the Bachelor of Science Degree in Engineering Sciences

- Lower Division (23 units)**
ENGR 1618, 1628, 2070, 2110, 2120, 2130, 2140, 2350
- Upper Division required (26 units)**
ENGR 3300, 3310, 3110, 3120, 4110, 4120, 4900, 4910
- Upper Division Electives (13 units)**
ENGR 3070, 3400, 3410, 4200, 4220, 4240, 4260, 4410, 4420, 4520, 4530, 4540, 4700
- Cognate Requirements (36 units)**
MATH 2310, 2320, or MATH 2510, 2520, and PHYS 2210, 2220, CHEM 1000, 1001, 1600, ECON 2018, PHIL 3318 (satisfies UD Theme Area C), and a total of at least 7 units from the following list: any majors level BIOL, CHEM, GEOL, or PHYS course, MATH 2530, 2540, 4500 (Biosystems and Agricultural Engineering Emphasis students must take BIOL 2010, 2110, or 2120, and Petroleum Engineering Emphasis students must take GEOL 4060)

Requirements for the Major in Engineering Sciences with Biosystems and Agricultural Engineering Emphasis

The Biosystems and Agricultural Emphasis is obtained by taking the courses required above for the BS degree in Engineering Sciences, but choosing the following 13 units of Upper Division electives:

- ENGR 3400, 3410, 4410, and 4420
- In addition, students pursuing this emphasis must take one of the following courses: BIOL 2010, 2110, or 2120
- In addition, students pursuing this emphasis are encouraged to undertake a design project related to biosystems and agricultural engineering, when available, in ENGR 4900 and 4910
- Although not required for the emphasis, students are strongly advised to take ENGR 3070 and 4260

Requirements for the Major in Engineering Sciences with Engineering Management Emphasis

The Engineering Management Emphasis is obtained by taking the courses required above for the BS degree in Engineering Sciences, but choosing the following Upper Division electives:

1. ENGR 4200, 4220, 4240, 4260
2. One additional unit of electives that apply towards the BS in Engineering Sciences
3. In addition, students pursuing this emphasis must take one of the following courses: BIOL 2010, 2110, or 2120

Requirements for the Major in Engineering Sciences with Petroleum Engineering Emphasis

The Petroleum Engineering Emphasis is obtained by taking the courses required above for the BS degree in Engineering Sciences, but choosing the following 13 units of Upper Division electives:

1. ENGR 4520, 4530, 4540
2. Two additional units of electives that apply towards the BS in Engineering Sciences
3. Students pursuing this emphasis are encouraged to take ENGR 4260, and to undertake a design project related to petroleum engineering, when available, in ENGR 4900 and 4910
4. In addition, students pursuing this emphasis must take GEOL 4060

Information on General Education Courses

- ENGR 1618 and 1628 satisfy the FYS requirement for entering Freshmen
- The required Physics courses (PHYS 2210, 2220) or CHEM 1000, 1001 will satisfy Areas B1
- Areas A3 and B2 are satisfied by completion of the major in Engineering Sciences
- Any of the required calculus courses (MATH 2310, 2320, or MATH 2510, 2520) will satisfy Area A4
- Only 3 units of Area D courses are required upon completion of the Engineering Sciences major
- UD Theme Area D is satisfied by completion of the Engineering Sciences major
- PHIL 3318 Professional Ethics must be taken and will satisfy UD Theme Area C