

# ENGINEERING (EGR)

engineering.missioncollege.edu

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 Dean: Clement Lam

## Associate in Science in Engineering

Engineers design and create the technology of the future. They use the principles of math, science, and engineering to design and build new products, or to develop large-scale systems such as transportation systems or a water treatment plant. Engineering problems usually involve teams of people, so engineers must work well with others and communicate effectively.

The Associate in Science in Engineering will assist in preparing students for transfer to engineering programs at many four-year universities. Upon completion of the Associate in Science in Engineering, students will possess the knowledge and skills required for upper-division coursework in Engineering.

### Program Learning Outcomes:

- Students will analyze and interpret experimental results and/or data to make engineering problem decisions.
- Students will use math, science, and engineering concepts to describe, formulate, and solve engineering problems.
- Students will communicate the results of design and/or analysis orally and through text and graphics.
- Students will work effectively in teams.

### Career/Transfer Opportunities:

Career opportunities include the following engineering disciplines: aerospace, architectural, bio-engineering, biomedical, chemical, civil, computer, electrical, environmental, industrial, manufacturing, materials, mechanical, software, and nuclear. More career information can be found at <https://www.bls.gov/oes/current/oes170000.htm>

### To earn this degree, students must meet the following requirements:

1. Completion of 60 degree applicable units with an overall GPA of 2.0.
2. Completion of a minimum of 18 semester units in the major with a grade of C (or P) or better.
3. Completion of the AA/AS Graduation Requirements, CSU GE-B or IGETC.

### Core Curriculum Courses Required (35 Units) +

Select One Track (13-23 Units)	Units
EGR 010 Introduction to Engineering OR	4.0
EGR 010H Introduction to Engineering - Honors AND	4.0
MAT 003A Analytic Geometry and Calculus I AND	5.0
MAT 003B Analytic Geometry and Calculus II AND	5.0
MAT 004A Multivariable Calculus AND	4.0
MAT 004B Differential Equations AND	4.0
PHY 004A Engineering Physics-Mechanics AND	5.0
PHY 004B Engineering Physics-Electricity and Magnetism AND	4.0
PHY 004C Engineering Physics-Light and Heat	4.0

### Mechanical, Aerospace, Manufacturing

Engineering Track (22-23)	Units
CHM 001A General Chemistry OR	5.0
CHM 001AH General Chemistry – Honors AND	5.0
EGR 023 Mechanics – Statics AND	3.0
EGR 024 Introduction to Circuit Analysis AND	3.0
EGR 025 Engineering Graphics and Design AND	4.0
EGR 026 Engineering Materials AND	4.0
EGR 030 Introduction to Computing for Engineers OR	4.0
MAT 005 Programming and Problem-Solving in MATLAB	3.0

### Civil Engineering Track (22-23 Units)

	Units
CHM 001A General Chemistry OR	5.0
CHM 001AH General Chemistry – Honors AND	5.0
EGR 023 Mechanics - Statics AND	3.0
EGR 024 Introduction to Circuit Analysis AND	3.0
EGR 025 Engineering Graphics and Design AND	4.0
EGR 026 Engineering Materials AND	4.0
EGR 030 Introduction to Computing for Engineers OR	4.0
MAT 005 Programming and Problem-Solving in MATLAB	3.0

### Electrical Engineering Track (13 Units)

	Units
CHM 001A General Chemistry OR	5.0
CHM 001AH General Chemistry – Honors AND	5.0
EGR 024 Introduction to Circuit Analysis AND	3.0
EGR 024L Introduction to Circuit Analysis Lab AND	1.0
EGR 030 Introduction to Computing for Engineers	4.0

### Computer, Software Engineering Track (16 Units)

	Units
CIS 044 Introduction to Data Structures w/Java AND	4.0
EGR 024 Introduction to Circuit Analysis AND	3.0
EGR 024L Introduction to Circuit Analysis Lab AND	1.0
EGR 030 Introduction to Computing for Engineers AND	4.0
MAT 019 Discrete Mathematics	4.0

### Required Units for the Major:

48.0-58.0

Completion of General Education Requirements and electives as needed to reach 60 units.

### Total Required Units:

63.0-76.0

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## Certificate of Achievement in Engineering

Engineering Certificate: Engineers design and create the future. They use the principles of math, science, and engineering to design and build new products or to develop large-scale systems such as transportation systems or a water treatment plant. Engineering problems usually involve teams of people, so engineers must work well with others and communicate effectively. The Engineering Certificate is modeled after the statewide Engineering Transfer Preparation Certificate and offers four distinct engineering tracks. It is identical to the Engineering AS degree except all general education degree requirements are omitted. In order to transfer to a 4-year college or university, students who complete one of the certificate tracks will also have to complete the minimum admissions requirements for the intended transfer institution. Upon completion of the Engineering Certificate, students will possess the knowledge and skills required for upper-division coursework in Engineering.

### Program Learning Outcomes:

- Students will analyze and interpret experimental results and/or data to make engineering problem decisions.
- Students will use math, science, and engineering concepts to describe, formulate, and solve engineering problems.
- Students will communicate the results of design and/or analysis orally and through text and graphics. Students will work effectively in teams.

### Career Opportunities:

Career opportunities for students who have completed baccalaureate degrees in Engineering include the following engineering disciplines: aerospace, architectural, bioengineering, biomedical, chemical, civil, computer, electrical, environmental, industrial, manufacturing, materials, mechanical, software, and nuclear. More career information can be found at <https://www.bls.gov/oes/current/oes170000.htm>

**To earn this certificate, students must complete the minimum required courses with a grade of C (or P) or better.**

### Core Curriculum Courses Required (35 Units) + Select One Track (13-23 Units)

	Units	
EGR010	Introduction to Engineering AND	4.0
MAT003A	Analytic Geometry and Calculus I AND	5.0
MAT003B	Analytic Geometry and Calculus II AND	5.0
MAT004A	Multivariable Calculus AND	4.0
MAT004B	Differential Equations AND	4.0
PHY004A	Engineering Physics-Mechanics AND	5.0
PHY004B	Engineering Physics-Electricity AND Magnetism AND	4.0
PHY004C	Engineering Physics-Light and Heat AND	4.0

### Mech, Aero, Manuf Track (22-23 Units)

	Units	
CHM001A	General Chemistry OR	5.0
CHM001AH	General Chemistry I - Honors AND	5.0
EGR023	Mechanics - Statics AND	3.0
EGR024	Introduction to Circuit Analysis AND	3.0
EGR025	Engineering Graphics and Design AND	4.0
EGR026	Engineering Materials AND	4.0
EGR030	Introduction to Computing for Engineers OR	4.0
MAT005	Introduction to MATLAB	3.0

### Civil Track (22-23 Units)

	Units	
CHM001A	General Chemistry	5.0 OR
CHM001AH	General Chemistry I - Honors	5.0 AND
EGR023	Mechanics - Statics	3.0 AND
EGR024	Introduction to Circuit Analysis	3.0 AND
EGR025	Engineering Graphics and Design	4.0 AND
EGR026	Engineering Materials	4.0 AND
EGR030	Introduction to Computing for Engineers	4.0 OR
MAT005	Introduction to MATLAB	3.0

### Electrical Track (13 Units)

	Units	
CHM001A	General Chemistry OR	5.0
CHM001AH	General Chemistry I - Honors AND	5.0
EGR024	Introduction to Circuit Analysis AND	3.0
EGR024L	Introduction of Circuit Analysis Laboratory AND	1.0
EGR030	Introduction to Computing for Engineers AND	4.0

### Computer, Software Track (16 Units)

	Units	
CIS044	Introduction to Data Structures Using Java AND	4.0
EGR024	Introduction to Circuit Analysis AND	3.0
EGR024L	Introduction of Circuit Analysis Laboratory AND	1.0
EGR030	Introduction to Computing for Engineers AND	4.0
MAT019	Discrete Mathematics	4.0

**Total Required Units: 48.0-58.0**

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## Associate in Science in Mechatronic Technology

Mechatronic technology is an interdisciplinary field that combines the study of mechanics, electronics, automation, and computers. The Associate in Science in Mechatronic Technology is designed to provide students with knowledge and skills required for a variety of positions in the following industries: Advanced Manufacturing/Semiconductor, Electrical/Electronics, Mechanical/Quality, Transportation/Logistics, Electric and Hybrid Vehicles, Medical Equipment, Biotechnology, Aerospace/Defense, and Construction. The program includes a wide range of skill-builder courses.

### Program Learning Outcomes:

- Students will integrate electrical, electronic, and mechanical systems and devices.
- Students will demonstrate written and verbal communication skills through technical documentation and oral presentations.
- Students will troubleshoot and repair electrical, electronic, and mechanical systems and devices.

### Career/Transfer Opportunities:

Career opportunities include the following: robotics technician, field service technician, industrial maintenance technician, engineering technician, electromechanical technician, research and development technician.

### To earn this degree, students must meet the following requirements:

1. Completion of 60 degree applicable units with an overall GPA of 2.0.
2. Completion of a minimum of 18 semester units in the major with a grade of C (or P) or better.
3. Completion of the AA/AS Graduation Requirements, CSU GE-B or IGETC.

Required Courses		Units
EGR 025	Engineering Graphics and Design AND	4.0
MTT 010	Introduction to Technology and Careers AND	2.0
MTT 012	Electronic Systems Measurement and Troubleshooting AND	2.0
MAT 001	College Algebra OR	4.0
MAT 002	Pre-Calculus Algebra and Trigonometry	6.0

Plus at least 10 units from the following electives (10 units):		Units
MTT 020	PLC Process Control Systems OR	2.0
MTT 022	PLC and Robotic System Components OR	2.0
MTT 030	Electrical Motors and Control Systems OR	2.0
MTT 032	Microcontroller Systems OR	2.0
MTT 034	Fluid Power Systems OR	2.0
MTT 040	Analog Circuits and Semiconductor Devices OR	2.0
MTT 042	Digital Logic Systems OR	2.0
MTT 050	Digital Manufacturing	2.0

**Required Units for the Major:** 22.0-30.0

Completion of General Education Requirements as needed to reach 60 units.

**Total Required Units:** 60.0

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## Certificate of Achievement in Mechatronic Technology

Mechatronic technology is an interdisciplinary field that combines the study of mechanics, electronics, automation, and computers. Certificate of Achievement in Mechatronic Technology prepares students to work in various industries. Depending on the course track selected, students gain specialized technical skills in electrical, electronic and/or mechanical industry environment.

### Program Learning Outcomes:

- Students will analyze and integrate electrical, electronic, and mechanical systems and devices.
- Students will demonstrate written and verbal communication skills through technical documentation and oral presentations.
- Students will troubleshoot and repair electrical, electronic, and mechanical systems and devices.

### Career Opportunities:

Career opportunities include the following: robotics technician, field service technician, industrial maintenance technician, engineering technician, electromechanical technician, research and development technician.

**To earn this certificate, students must complete the minimum required courses with a grade of C (or P) or better.**

Required Courses		Units
MTT 010	Introduction to Technology and Careers AND	2.0
MTT 012	Electronic Systems Measurement and Troubleshooting AND	2.0

Plus at least 14 units from the following electives (14 units):		Units
EGR 025	Engineering Graphics and Design OR	4.0
MTT 020	PLC Process Control Systems OR	2.0
MTT 022	PLC and Robotic System Components OR	2.0
MTT 030	Electrical Motors and Control Systems OR	2.0
MTT 032	Microcontroller Systems OR	2.0
MTT 034	Fluid Power Systems OR	2.0
MTT 040	Analog Circuits and Semiconductor Devices OR	2.0
MTT 042	Digital Logic Systems OR	2.0
MTT 050	Digital Manufacturing	2.0

**Total Required Units: 18.0-24.0**