ENGINEERING

PROGRAMS

- **Associate of Science (A.S.)**

DESCRIPTION

Engineering is the science and art of applying scientific and mathematical principles, experience, judgment, and common sense to design things that benefit society. Engineers are problem-solvers who make things work faster, cheaper, and more efficiently. Technologies developed by engineers improve the ways that we live, communicate, work, travel, stay healthy, and entertain ourselves. From computer chips to cellphones and buildings to automobiles, engineering makes every aspect of our modern life possible.

Hartnell College offers a two-year lower division engineering program that prepares students for transfer in all engineering disciplines to colleges and universities in California and across the United States. The Associate in Science in Engineering offers course work in all fields of engineering from civil through mechanical and electrical and computer engineering. Students who are seeking to transfer to a four-year university and complete their Bachelor of Science in Engineering can find the courses needed to transfer in the Engineering program, as can students who are seeking employment in related fields as engineering technologists, surveyors, or construction managers. Positions for which four-year graduates in engineering are qualified can be found in the fields of engineering, engineering technology, construction management, business, programming, teaching, and research.

The first two years of the engineering curriculum at most colleges and universities have a shared core of mathematics and physics plus a programming course. Beyond that, there is specialization in several areas. As there are different disciplines within engineering, four different tracks have been developed, and each one feeds into one or more majors at the baccalaureate level. The fifth track is appropriate for engineering majors who are not explicitly listed in the first four tracks, such as chemical engineering or biomedical engineering. The five discipline clusters are:

1. Mechanical, Aerospace, and Manufacturing Engineering
2. Civil Engineering
3. Electrical Engineering
4. Computer and Software Engineering
5. General Engineering

LEADS TO CAREER OPPORTUNITIES SUCH AS:

- Aerospace Engineer
- Agricultural Engineer
- Biomedical Engineer
- Chemical Engineer
- Civil Engineer
- Computer Engineer
- Construction Engineer
- Electrical Engineer
- Environmental Engineer
- Industrial Engineer
- Manufacturing Engineer
- Materials Engineer
- Mechanical Engineer
- Nuclear Engineer
- Software Engineer

TRANSFER PREPARATION

Courses that fulfill major requirements for an associate degree may differ from those needed to prepare for transfer. Students who plan to transfer to a four-year college or university should schedule an appointment with Hartnell College counselor to develop a student education plan before beginning their program.

TRANSFER RESOURCES

www.ASSIST.org – CSU and UC Articulation Agreements and Major Search Engine

CSU System Information - http://www2.calstate.edu

FINANCIAL AID

Paying for the cost of a college education requires a partnership among parents, students and the college. As the cost of higher education continues to rise we want you to know that Hartnell College offers a full array of financial aid programs, federal loan programs, and fee waivers.

https://www.hartnell.edu/students/fa/net-price-calculator.html

ENGINEERING (AS.EGN)

ASSOCIATE OF SCIENCE

Program Outcomes: Upon successful completion of this program a student will be able to:

- employ science and mathematical skills commonly used in engineering fields.
- design a system, component, or process to meet engineering requirements.
- examine engineering problems and determine a strategy.
- describe and differentiate modern engineering tools and practices.

REQUIRED MAJOR COURSES:

COURSES SHARED BY ALL TRACKS

Course Name and Number	Units
EGN 1R Introduction to Engineering	2
MAT 3A Analytical Geometry and Calculus I	4
MAT 3B Analytical Geometry and Calculus I	4
PHY 4A General Physics I/Mechanics	4
PHY 4B General Physics II/Electricity and Magnetism	4
A programming class: Choice of EGN 5 or CSS 2A or CSS 1	3-4

Subtotal: 21-22 units

MECHANICAL/AEROSPACE/MANUFACTURING ENGINEERING TRACK

EGN 8 Statics	3

CIVIL ENGINEERING TRACK

EGN 8 Statics	3

ELECTRICAL ENGINEERING TRACK

EGN 6 Circuit Analysis	4

COMPUTER/SOFTWARE ENGINEERING TRACK

EGN 6 Circuit Analysis	4
CSS 2A Object Oriented Programming	4
EGN 7L Computer Interface with the Physical World Laboratory	1

GENERAL ENGINEERING TRACK

Choose ONE of the following:

EGN 4 Materials Science and Engineering	4
EGN 6 Circuit Analysis	4
EGN 8 Statics	3

REQUIRED MAJOR ELECTIVES

SELECT ONE EMPHASIS TO FOLLOW →	Units	Mechanical/ Aerospace/ Manufacturing	Civil	Electrical	Computer	General
Number of ADDITIONAL units to choose		**23**	**22**	**12**	**15**	**20**
☐ EGN-1L – Introduction to Engineering Lab	1	X	X	X	X	X
☐ EGN-2 – Engineering Graphics	3	X	X			X
☐ EGN-4 – Materials Science and Engineering	4	X	X			X
☐ EGN-5 – Programming and Problem-Solving in MATLAB	3			X	X	X
☐ EGN-6 – Circuit Analysis	4	X				X
☐ EGN-7L – Computer Interface with the Physical World Laboratory	1	X		X		X
☐ EGN-8 – Statics	3					X
☐ EGN-11 – Surveying	3		X			X
☐ BIO-1 – Fundamental Biological Concepts	5					X
☐ BIO-2 – General Zoology	5					X
☐ BIO-3 – General Botany	5					X
☐ CHM-1A – General Chemistry I	5	X	X	X	X	X
☐ CHM-1B – General Chemistry II	5					X
☐ CHM-12A – Organic Chemistry I	5					X
☐ CHM-12B – Organic Chemistry I	5					X
☐ PHY-4C – General Physics III/ Waves, Heat, Light, Sound, and Modern Physics	4	X	X	X	X	X
☐ MAT-3C – Analytical Geometry and Calculus III	4	X	X	X	X	X
☐ MAT-5 – Differential Equations	3	X	X	X	X	X
☐ MAT-4 – Linear Algebra	3	X	X	X	X	X
☐ CSS-1 – Intro to Computer Science & Programming Fundamentals	4					X
☐ CSS-2A – Object Oriented Programming	4			X		X
☐ CSS-2B – Data Structures and Algorithms	4			X	X	X
☐ CSS-3 – Computer Architecture and Assembly Language Programming	4				X	X
☐ CSS-7 – Discrete Structures	4				X	X

SUBTOTAL: 37-48 UNITS

General Education –Required Courses

Students must complete one of the following General Education Plans:

CSU-GE for STEM *(see page 72)* **33 units**

IGETC for STEM (*see page 74)* **31 units**

Students can double-count required courses and courses for General Education

Partial IGETC-CSU or CSU-GE certification is approved to meet the AS- Engineering general education. For the partial certification: (IGETC/CSU - All AREAS will be completed with minimum units/courses as required and listed on IGETC except AREAS 3 and 4, which is approved with 6 units/2 courses. CSU-GE All AREAS will be completed with minimum units/courses as required and listed on CSU-GE except AREAS C and D, which are approved with 6 units/2 courses). These GE courses are not waived but will be completed after transfer

TOTAL: 61-74 UNITS