

ENGINEERING

Applying the principles of science and mathematics, engineers design and build systems, structures, and products that solve practical problems and meet human needs. Engineers continue to be in high demand worldwide in a broad range of industries, and job prospects are strong in the foreseeable future. The pre-engineering degree program includes core courses in mathematics and physics and provides students with a set of skills that prepares them for transfer into engineering programs at baccalaureate degree-granting institutions.

Contact Information

Division

Mathematics and Business

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Discipline Website

<https://www.citruscollege.edu/academics/programs/engr> (<https://www.citruscollege.edu/academics/programs/engr/>)

Learning Outcomes

This discipline prepares students to do the following:

- Understand how engineering serves society by solving practical problems and meeting human needs.
- Be prepared to transfer to a 4-year engineering program.
- Understand and apply fundamental physics principles and standard methods of mathematical analysis.
- Work effectively in a group to accomplish an objective and make a significant contribution to its outcome.
- Demonstrate problem-solving, decision-making, and critical thinking skills and their ability to apply them to the complex problems involved in engineering.
- Appreciate the importance of professional ethics as practiced by engineers as they apply their knowledge and skills to serve society.

Courses

ENGR 101

Introduction to Engineering

3 Units (AA/AS; CSU; UC)

36 lecture hours, 54 lab hours

Grade Mode: Standard Letter

Strongly recommended: MATH 175.

Introduction to the field of engineering with emphasis on engineering activities characterized in different engineering disciplines and functions. Topics include education and training requirements, ethical and environmental concerns, tools and problem solving techniques used in engineering, historical and engineering design activities and effective communication skills specific to the field of engineering.

ENGR 130

Engineering Graphics

4 Units (AA/AS; CSU)

36 lecture hours, 108 lab hours

Grade Mode: Standard Letter

Prerequisite(s): MATH 144 or higher or AUTO 295.

Strongly recommended: ENGL 101.

2D and 3D Computer-aided design (CAD) for students seeking to enter the engineering and engineering technology fields. This course covers the principles of engineering drawing and sketching for mechanical design, the use of computer graphics and solid modeling in design representation of 3D objects along with assemblies and simulations as well as ASME standards on geometric dimensioning and tolerances.

ENGR 132

Introduction to Surveying

3 Units (AA/AS; CSU)

36 lecture hours, 54 lab hours

Grade Mode: Standard Letter

Prerequisite(s): MATH 175 or higher.

Strongly recommended: ENGL 101.

Surveying methods along with the care and use of instruments such as steel tape, engineer's level, theodolite and total station are introduced. Includes route location, layout and staking, earthwork, horizontal and vertical measurements, area and volume computations. Analysis and adjustments of systematic and random errors, stadia surveying and mapping are also introduced.

ENGR 135

Engineering Mechanics: Statics

3 Units (AA/AS; CSU; UC)

54 lecture hours

Grade Mode: Standard Letter

Prerequisite(s): MATH 191; PHYS 201 or PHYS 201H.

Strongly recommended: ENGL 101.

A vectorial treatment of the principles of statics with application to engineering problems. Composition and resolution of co-planar force systems; equilibrium of rigid bodies; distributed forces in trusses; frames and cables; shear and bending moments in beams; moments of inertia of areas and bodies and graphical methods are used to model force systems and equilibrium conditions as applied to engineering statics problems.

ENGR 138

Computer Programming and Numerical Methods for Engineers

4 Units (AA/AS; CSU)

54 lecture hours, 54 lab hours

Grade Mode: Standard Letter

Prerequisite(s): MATH 190 or higher.

Strongly recommended: ENGL 101.

Engineering computation using MATLAB and VBA. Topics include programming fundamentals, matrix computation, statistical analysis, data graphing, data extraction from spreadsheets and solving mathematical problems using numerical methods.

ENGR 140

Mechanics of Materials

4 Units (AA/AS; CSU)

72 lecture hours

Grade Mode: Standard Letter

Prerequisite(s): ENGR 135.

Strongly recommended: ENGL 101.

Mechanics of deformable bodies that are subjected to loads such as tension, compression, bending, shearing and torsion. Subjects include combined stresses, strain, Mohr's Circle, statically indeterminate structures, deflection of beams, stability of columns and strain energy methods. Hooke's Law for isotropic materials and shear and moment diagrams will also be studied.

Programs

Associate Degree

- A.S. in Pre-Engineering (<http://catalog.citruscollege.edu/disciplines/engineering/pre-engineering-as/>)
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