

# A.S. IN PRE-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 A.S. Degree in Pre-Engineering 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.

## Learning Outcomes

### A.S. Degree Level Student Learning Outcomes

Students completing the Pre-Engineering A.S. Degree will:

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

## Requirements

Students receiving this degree must meet the following requirements:

1. Complete the District General Education Pattern (<http://catalog.citruscollege.edu/programs-study/graduation-requirements-associate-degree/general-education-requirements-option-i/>), CSUGE (<http://catalog.citruscollege.edu/programs-study/graduation-requirements-associate-degree/general-education-requirements-transfer-csu-csuge-option-ii/>) or IGETC (<http://catalog.citruscollege.edu/programs-study/graduation-requirements-associate-degree/general-education-requirements-transfer-csu-uc-igetc-option-iii/>).
- If transferring to a CSU or UC students are strongly recommended to complete the CSUGE or IGETC General Education Patterns. Students looking to transfer to an out of state or private college should consult with a counselor for the appropriate GE pattern selection.*
2. Complete with a "C" or better each course as specified by the major.
  3. Maintain an overall GPA of a 2.0 or better in all degree applicable coursework.
  4. Meet the local area requirement of Kinesiology/Dance.
  5. Meet the 12-unit residency requirement.

Courses that complete the Associate Degree in Pre-Engineering might not include all required or recommended courses for transfer into some impacted programs and specific branches of engineering.

Students should consult a STEM counselor in order to select the most comprehensive course plan for their personal transfer goals.

Code	Title	Units
<b>Required courses:</b>		
ENGR 101	Introduction to Engineering	3
ENGR 130	Engineering Graphics	4
ENGR 135	Engineering Mechanics: Statics	3
ENGR 138	Computer Programming and Numerical Methods for Engineers	4
MATH 190	Calculus with Analytic Geometry I	5
MATH 191	Calculus with Analytic Geometry II	5
MATH 210	Calculus with Analytic Geometry III	5
PHYS 201 or PHYS 201H	Physics A: Mechanics Physics A: Mechanics - Honors	5
PHYS 202 or PHYS 203	Physics B: Thermodynamics and Electromagnetism Physics C: Waves, Optics & Modern Physics	5
<b>Select two (2) of the following courses:</b>		
CHEM 111	General Chemistry I	5
ENGR 132	Introduction to Surveying	4.5
ENGR 140	Mechanics of Materials	4
MATH 211	Differential Equations	5
MATH 212	Introduction to Linear Algebra	4
<b>Total Units</b>		<b>46-49</b>

## Curriculum Map

### 2-Year Curriculum Map Example

This map represents one possible pathway through the program and is only for reference.

\*It is highly recommended that you make an appointment (<https://www.citruscollege.edu/stdntsrvcounsel/Pages/ApptSchedule.aspx>) to create a customized education plan that fits your needs.

Note: Co-requisite MATH course (2 units) and/or substitute ENGL 101E (5 units) may be needed based on placement.

Course	Title	Units
<b>Fall Term 1</b>		
MATH 190	Calculus with Analytic Geometry I	5
COUN 206	Pathways to Careers in STEM	3
ENGR 101	Introduction to Engineering	3
ENGL 101 or ENGL 101H	Reading and Composition or Reading and Composition - Honors	4
	<b>Units</b>	<b>15</b>
<b>Winter Term 1</b>		
MATH 191	Calculus with Analytic Geometry II	5

Course	Title	Units
ANTH 210 or ANTH 210H or PSY 101 or PSY 101H or SOC 201 or SOC 201H	Introduction to Cultural Anthropology or Introduction to Cultural Anthropology - Honors or Introduction to Psychology or Introduction to Psychology - Honors or Introduction to Sociology or Introduction to Sociology - Honors	3
<b>Units</b>		<b>8</b>
<b>Spring Term 1</b>		
MATH 210	Calculus with Analytic Geometry III	5
ENGR 130	Engineering Graphics	4
PHYS 201 or PHYS 201H	Physics A: Mechanics or Physics A: Mechanics - Honors	5
ENGL 104 or ENGL 104H	Argumentative Writing and Critical Thinking or Argumentative Writing and Critical Thinking - Honors	3
<b>Units</b>		<b>17</b>
<b>Summer Term 1</b>		
MATH 211	Differential Equations	5
POLI 103 or POLI 103H	American Government and Politics or American Government and Politics - Honors	3
<b>Units</b>		<b>8</b>
<b>Fall Term 2</b>		
PHYS 202	Physics B: Thermodynamics and Electromagnetism	5
CHEM 110	Beginning General Chemistry	5
ENGR 135	Engineering Mechanics: Statics	3
ENGL 290 or ENGL 293 or ENGL 293H or ENGL 298 or KIN 166 or PHIL 101 or SOC 130	Ethnic Voices in Film or Children's Literature or Children's Literature - Honors or Literature of the Bible or American Food And Culture: Global Origins, History, and Current Impacts or Great Religions of the World or Introduction to LGBTQ Studies	3
<b>Units</b>		<b>16</b>
<b>Winter Term 2</b>		
MATH 212	Introduction to Linear Algebra	4
ETHN 101 or ETHN 116	Introduction to Ethnic Studies or Introduction to Chicano/Latino Studies	3
<b>Units</b>		<b>7</b>
<b>Spring Term 2</b>		
CHEM 111	General Chemistry I	5
ENGR 138	Computer Programming and Numerical Methods for Engineers	4
ARCH 250 or ARCH 251 or ART 100 or ART 105 or ART 108 or ART 110 or ART 199 or ART 199H or DANC 102 or MUSE 113 or THEA 101 or THEA 101H	History of Architecture: Prehistory to Mannerism or History of Architecture: Baroque to the Present Day or Art History - Fundamentals of Global Art History or Art History - Topics in Contemporary Art or History of Photography or Introduction to the Visual Arts or Motion Picture Appreciation or Motion Picture Appreciation - Honors or History of Dance or History of Rock and Roll or Introduction to Theatre Arts or Introduction to Theatre Arts - Honors	3
HIST 107 or HIST 107H or HIST 108 or HIST 108H or HIST 111 or HIST 112 or HIST 160	History of the United States before 1877 or History of the United States before 1877 - Honors or History of the United States since 1877 or History of the United States since 1877 - Honors or History of the African-Americans to 1876 or History of the African-Americans since 1876 or History of Women in the United States	3
<b>Units</b>		<b>15</b>

Course	Title	Units
<b>Summer Term 2</b>		
KIN 170 or KIN 171 or KIN 171H or KIN 173	Fitness for Life or Health and Wellness in Society or Health and Wellness - Honors or Introduction to Nutrition	3
<b>Units</b>		<b>3</b>
<b>Total Units</b>		<b>89</b>

## Career Information

### Career Opportunities

There are a variety of careers you can do with this major.

To explore more about this major, schedule an appointment (<https://www.citruscollege.edu/stdntsrvc/ctcenter/Pages/ApptSchedule.aspx>) with a career counselor.