

Electrical Engineering, BS

Program Description

The Bachelor of Science Degree in Electrical Engineering provides students with necessary skills to design, analyze, and build electrical, electronic, and electromechanical systems. Electrical engineering emphasizes electrical system design and control and extends into the areas of analog circuits, digital circuits, embedded systems, signal processing, electromagnetics, semiconductor devices, and electrical power. A student with a degree from this program will be well prepared to pursue either advanced degrees in engineering or computer science, or to pursue a technical career in fields such as electrical power systems, communications, or electronics design.

Professional Licensure/Certification (PLC) Requirements

The curriculum for programs at Utah Tech University leading to professional licensure are designed to prepare students for Utah licensure and certification requirements. Admission into programs for professions requiring licensure and certification does not guarantee that students will obtain a license or certificate. Licensure and certification requirements are set by agencies that are not controlled by or affiliated with the University, and licensure and certification requirements can change at any time.

Licensure boards in each state establish requirements for licensure and certification for their respective state. States vary by which professions are required to be licensed and how licensure functions, and such requirements may change at any time. The terms related to licensure and certification, among others, also vary by state as well.

Students and prospective students are strongly encouraged to contact the state licensure entity in the state where they intend to work to review all licensure and certification requirements imposed by the student's state(s) of choice. The University cannot provide verification of a student's ability to meet licensure or certification requirements unrelated to its educational programming. Some states require individuals to complete additional requirements that are unrelated to educational prerequisites. For more information, visit the State Authorization and Professional Licensure (<https://academics.utahtech.edu/state-authorization/>) web page and select the program, or speak to the director of the program.

Utah Tech University shall not be held liable if a student is unable to qualify for licensure or certification in any jurisdiction.

This disclosure is made pursuant to 34 CFR §668.43(a)(5)(v)(C).

Admission Requirements

The admissions process works as follows:

1. Student applies and is accepted to Utah Tech
 2. Student designates their major as Pre-Engineering (pursuing Associate of Pre-Engineering)
 3. Student passes the following courses with a C- or better:
 - MECH 1000
 - MECH 1200/05
 - MATH 1210
 - MATH 1220
 - CHEM 1210/1215
 - PHYS 2210/2215
 4. Student meets with the engineering advisor to ensure that required courses are complete and to make an academic plan
 5. Student's major is switched from Pre-Engineering to Electrical Engineering
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Program Curriculum

123.5 credits

Utah Tech General Education Requirements

All Utah Tech General Education requirements must be fulfilled. A previously earned degree may fulfill those requirements, but courses must be equivalent to Utah Tech's minimum General Education standards in American Institutions, English, and Mathematics.

General Education Core Requirements (<https://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext>)

| Code | Title | Hours |
|------------------------------|-------|-------|
| English | | 3-7 |
| Mathematics | | 3-5 |
| American Institutions | | 3-6 |
| Life Sciences | | 3-10 |
| Physical Sciences | | 3-5 |
| Fine Arts | | 3 |
| Literature/Humanities | | 3 |
| Social & Behavioral Sciences | | 3 |
| Exploration | | 3-5 |

Electrical Engineering Required Courses

| Code | Title | Hours |
|--------------------------|--|-------|
| CHEM 1210 & CHEM 1215 | Principles of Chemistry I (PS) and Principles of Chemistry I Lab (LAB) | 5 |
| ECE 2100 | Semiconductor Devices | 3 |
| ECE 2700 & ECE 2705 | Digital Circuits and Digital Circuits Lab | 4 |
| ECE 2280 & ECE 2285 | Microelectronics and Microelectronics Lab | 4 |
| ECE 3300 & ECE 3305 | Electromagnetics & Transmission Lines and Electromagnetics & Transmission Lines Lab | 4 |
| ECE 3500 | Signals and Systems | 3 |
| ECE 3600 & ECE 3605 | Electric Machinery and Electric Machinery Lab | 4 |
| ECE 3730 & ECE 3735 | Embedded Systems I and Embedded Systems I Lab | 4 |
| ECE 4000 | EE Product Design I | 3 |
| ECE 4010 | EE Product Design II | 3 |
| ENGL 3010 | Professional Writing and Business Ethics | 3 |
| MATH 1210 | Calculus I (MA) | 4 |
| MATH 1220 | Calculus II (MA) | 4 |
| MATH 2210 | Multivariable Calculus (MA) | 4 |
| MATH 2250 | Differential Equations and Linear Algebra | 4 |
| MATH 3400 | Probability & Statistics | 3 |
| MECH 1000 & MECH 1005 | Introduction to Design & Rapid Prototyping and Introduction to Design & Rapid Prototyping Lab | 3 |
| MECH 1200 & MECH 1205 | Coding and Coding Lab | 4 |
| MECH 2210 & MECH 2215 | Circuits and Circuits Lab | 4 |
| MECH 2250 & MECH 2255 | Sensors & Actuators and Sensors & Actuators Lab | 4 |
| MECH 3200 & MECH 3205 | Systems & Controls and Systems & Controls Lab | 3.5 |

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|--------------------------|---|---|
| PHYS 2210 & PHYS 2215 | Physics/Scientists Engineers I (PS) and Physics/Scientists Engineers I Lab (LAB) | 5 |
| PHYS 2220 & PHYS 2225 | Physics/Scientists EngineersII and Physics/Scientists Engineers II Lab | 5 |

Electrical Engineering Tech Electives

| Code | Title | Hours |
|--|-------|-------|
| Complete 18 credits from the following: | | |
| Any ECE 4xxx (excluding ECE 4000, 4005, 4010, 4015) | | |
| Any MECH 4xxx (excluding MECH 4000, 4010) | | |
| Any MTRN 4xxx (excluding MTRN 4000, 4010) | | |
| NOTE: Only 3 credits may be from research and design practicum (ECE 4800R, MECH 4800R, MECH 4860R) | | |
| NOTE: 9 credits must have an ECE prefix (excludes research and design practicum) | | |
| NOTE: All other courses require approval from the Engineering Department | | |

Graduation Requirements

1. Complete 123.5 college-level credits (1000 and above)
2. Complete at least 40 upper-division credits (3000 and above)
3. Complete at least 30 upper-division credits at Utah Tech for institutional residency
4. Cumulative GPA 2.0 or higher
5. Grade C- or better in all Electrical Engineering Required Courses and Tech Elective Courses.
6. Pass the Fundamentals of Engineering (FE) Exam

Graduation Plan - 4 years

1st Year

| Fall Semester | Hours Spring Semester | Hours |
|--------------------------|---|-----------|
| MECH 1000 & MECH 1005 | 3 MECH 1200 & MECH 1205 | 4 |
| CHEM 1210 & CHEM 1215 | 5 PHYS 2210 & PHYS 2215 | 5 |
| MATH 1210 | 4 MATH 1220 | 4 |
| ENGL 2010 | 3 General Education (Life Science) (https://catalog.utahtech.edu/ programs/generaleducation/ #gerequirementstext) | 3 |
| | 15 | 16 |

2nd Year

| Fall Semester | Hours Spring Semester | Hours |
|--------------------------|----------------------------|-----------|
| ECE 2700 & ECE 2705 | 4 MECH 2250 & MECH 2255 | 4 |
| MECH 2210 & MECH 2215 | 4 ECE 2280 & ECE 2285 | 4 |
| PHYS 2220 & PHYS 2225 | 5 ECE 2100 | 3 |
| MATH 2210 | 4 MATH 2250 | 4 |
| | 17 | 15 |

3rd Year

| Fall Semester | Hours Spring Semester | Hours |
|--------------------------|--------------------------|-------|
| ECE 3730 & ECE 3735 | 4 ECE 3600 & ECE 3605 | 4 |
| MECH 3200 & MECH 3205 | 3.5 ECE 3500 | 3 |

| | | |
|---|---|--------------|
| ECE 3300 & ECE 3305 | 4 Tech Elective 1 | 3 |
| MATH 3400 | 3 Tech Elective 2 | 3 |
| | General Education (Lit / Humanities) (https://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext) | 3 |
| | 14.5 | 16 |
| 4th Year | | |
| Fall Semester | Hours Spring Semester | Hours |
| ECE 4000 | 3 ECE 4010 | 3 |
| ENGL 3010 | 3 Tech Elective 5 | 3 |
| Tech Elective 3 | 3 Tech Elective 6 | 3 |
| Tech Elective 4 | 3 General Education (American Institutions) (https://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext) | 3 |
| General Education (Fine Arts) (https://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext) | 3 General Education (Social & Behavioral Science) (https://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext) | 3 |
| | 15 | 15 |

Total Hours 123.5

Graduation Plan - 5 years (MATH 1010)

1st Year

| | | |
|--|------------------------------|--------------|
| Fall Semester | Hours Spring Semester | Hours |
| MECH 1000 & MECH 1005 | 3 MECH 1200 & MECH 1205 | 4 |
| ENGL 1010 | 3 MATH 1080 | 5 |
| General Education (Life Science) (https://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext) | 3 ENGL 2010 | 3 |
| MATH 1010 | 4 | |
| | 13 | 12 |

2nd Year

| | | |
|--------------------------|---|--------------|
| Fall Semester | Hours Spring Semester | Hours |
| ECE 2700 & ECE 2705 | 4 PHYS 2210 & PHYS 2215 | 5 |
| CHEM 1210 & CHEM 1215 | 5 MATH 1220 | 4 |
| MATH 1210 | 4 General Education (American Institutions) (https://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext) | 3 |
| | 13 | 12 |

3rd Year

| | | |
|--------------------------|------------------------------|--------------|
| Fall Semester | Hours Spring Semester | Hours |
| MECH 2210 & MECH 2215 | 4 MECH 2250 & MECH 2255 | 4 |

| | | |
|--------------------------|--------------------------|-----------|
| PHYS 2220 & PHYS 2225 | 5 ECE 2280 & ECE 2285 | 4 |
| MATH 2210 | 4 ECE 2100 | 3 |
| | MATH 2250 | 4 |
| | 13 | 15 |

4th Year

| Fall Semester | Hours Spring Semester | Hours |
|--------------------------|------------------------------|--------------|
| ECE 3730 & ECE 3735 | 4 ECE 3600 & ECE 3605 | 4 |
| MECH 3200 & MECH 3205 | 3.5 ECE 3500 | 3 |
| ECE 3300 & ECE 3305 | 4 Tech Elective 1 | 3 |
| MATH 3400 | 3 Tech Elective 2 | 3 |
| | 14.5 | 13 |

5th Year

| Fall Semester | Hours Spring Semester | Hours |
|--|---|--------------|
| ECE 4000 | 3 ECE 4010 | 3 |
| Tech Elective 3 | 3 Tech Elective 5 | 3 |
| Tech Elective 4 | 3 Tech Elective 6 | 3 |
| ENGL 3010 | 3 General Education (Lit / Humanities) (https://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext) | 3 |
| General Education (Fine Arts) (https://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext) | 3 General Education (Social & Behavioral Science) (https://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext) | 3 |
| | 15 | 15 |

Total Hours 135.5**Graduation Plan - 5 years (MATH 1050)****1st Year**

| Fall Semester | Hours Spring Semester | Hours |
|---|------------------------------|--------------|
| MECH 1000 & MECH 1005 | 3 MECH 1200 & MECH 1205 | 4 |
| ENGL 1010 | 3 ENGL 2010 | 3 |
| MATH 1050 | 4 MATH 1060 | 3 |
| General Education (Life Science) (https://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext) | 3 | |
| General Education (Lit / Humanities) (https://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext) | 3 | |
| | 16 | 10 |

2nd Year

| Fall Semester | Hours Spring Semester | Hours |
|--------------------------|------------------------------|--------------|
| ECE 2700 & ECE 2705 | 4 PHYS 2210 & PHYS 2215 | 5 |
| CHEM 1210 & CHEM 1215 | 5 MATH 1220 | 4 |

| | | |
|---|---|--------------|
| MATH 1210 | 4 General Education (American Institutions) (https://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext) | 3 |
| 13 | | 12 |
| 3rd Year | | |
| Fall Semester | Hours Spring Semester | Hours |
| MECH 2210 & MECH 2215 | 4 MECH 2250 & MECH 2255 | 4 |
| PHYS 2220 & PHYS 2225 | 5 ECE 2280 & ECE 2285 | 4 |
| MATH 2210 | 4 ECE 2100 | 3 |
| | MATH 2250 | 4 |
| 13 | | 15 |
| 4th Year | | |
| Fall Semester | Hours Spring Semester | Hours |
| ECE 3730 & ECE 3735 | 4 ECE 3600 & ECE 3605 | 4 |
| MECH 3200 & MECH 3205 | 3.5 ECE 3500 | 3 |
| ECE 3300 & ECE 3305 | 4 Tech Elective 1 | 3 |
| MATH 3400 | 3 Tech Elective 2 | 3 |
| 14.5 | | 13 |
| 5th Year | | |
| Fall Semester | Hours Spring Semester | Hours |
| ECE 4000 | 3 ECE 4010 | 3 |
| Tech Elective 3 | 3 Tech Elective 5 | 3 |
| Tech Elective 4 | 3 Tech Elective 6 | 3 |
| ENGL 3010 | 3 General Education (Social & Behavioral Science) (https://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext) | 3 |
| General Education (Fine Arts) (https://catalog.utahtech.edu/programs/generaleducation/#gerequirementstext) | 3 | |
| 15 | | 12 |

Total Hours 133.5

Electrical Engineering Program Learning Outcomes

At the successful conclusion of this program, students will be able to:

1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. Communicate effectively with a range of audiences.
4. Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.