Electrical Engineering

**Freshman Year**

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
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<tbody>
<tr>
<td>Math 1371 Calculus I (placement into course or pre-req)</td>
<td>Math 1372 Calculus II (1371)</td>
</tr>
<tr>
<td>Phys 1301W Intro Physics I (&amp;Math 1371)</td>
<td>Phys 1302W Intro Physics II (1301, &amp;Math 1372)</td>
</tr>
<tr>
<td>Lib Ed or Writ 1301/1401</td>
<td>EE 1301 Intro to Computing Systems (Math 1371)</td>
</tr>
<tr>
<td>Liberal Education course</td>
<td>EE 1001 Intro to EE and CompE optional</td>
</tr>
<tr>
<td>CSE 1001: 1st Yr Experience</td>
<td>Lib Ed or Writ 1301/1401</td>
</tr>
</tbody>
</table>

| Total Credits Needed for Degree: 126 |

**Sophomore Year**

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<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
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<tr>
<td>Chem 1061/65 Chem Princ I (placement into course, or 1015)</td>
<td>EE 2011 LinSys, Circ, &amp; Elec (2001)</td>
</tr>
<tr>
<td>EE 2001 Intro to Circ &amp; Elec (&amp;Math 2373, &amp;Phys 1302)</td>
<td>EE 2361 Intro to Microcontrollers (1301, 2301, or CSci 1113, or CSci 1138)</td>
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<tr>
<td>EE 2301 Intro Dig Sys Desig (Math 1372)</td>
<td>OR</td>
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<tr>
<td>Math 2373 Lin Alg/Diff Eq. (1372)</td>
<td>Phys 2503 or 2303 Physics III (2303 offered Fall; 2303 offered Spring) (1302, Math 1372)</td>
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**Junior Year**

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<th>Fall Semester</th>
<th>Spring Semester</th>
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<tr>
<td>EE 3015 Signals &amp; Systems (2011)</td>
<td>EE 3025 Statistical Methods (3015)</td>
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<tr>
<td>EE 3101 Circ &amp; Electr Lab I (3115 or &amp;3115)</td>
<td>EE 3102 Circ &amp; Electr Lab II (3101)</td>
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<tr>
<td>EE 3115 Analog Electronics (3015 or &amp;3015)</td>
<td>EE 3161 Semiconductor Dev (2015, Phys 3002, &amp;Phys 2303 or &amp;Phys 2503 or &amp;Chem 2063/2066)</td>
</tr>
<tr>
<td>Technical Elective</td>
<td>EE 3601 Transmission Lines (2011, Phys 1302, Math 2373)</td>
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<tr>
<td>Liberal Education course</td>
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**Senior Year**

<table>
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<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
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<tr>
<td>Technical Elective</td>
<td>EE 4951W Senior Design Proj (3015, 3102, 3115)</td>
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<td>Technical Elective</td>
<td>Liberal Education course</td>
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<tr>
<td>Liberal Education course</td>
<td>Technical Elective</td>
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**About This Plan**

- This plan is not a contract. Curriculum can change.
- Shaded courses are only offered in the indicated semester.
- Course pre-requisites and co-requisites (designated by &) are listed below the course number and title.
- Students can take either the CSE-only or University-wide versions of the math course (Math 1371/1271, 1372/1272, 2373/2243, 2374/2263).
- Double boxed courses are required for application to this major.
- Chemical Principles labs (1065/1066) must be taken concurrently with the lectures (1061/1062).
- Liberal Education and Writing requirements with an (*) will be fulfilled by taking courses required for this major at UM-TC.

**Applying to your Major**

Students who have completed the required courses for admission to this major and have a 3.2 UM-TC technical GPA at the end of the fall semester will be guaranteed admission. All other students who have completed the required courses will be considered for admission on a space-available basis. Admission following the spring semester is only based on space availability. The major application database is available at z.umn.edu/csemajorapp.

**Department Contact Information**

- Website: www.ece.umn.edu/undergraduate/
- Additional Information: z.umn.edu/ecematrix
- Main Office: 3-166 Keller; Main Phone: 612-624-7777
- Director of Undergraduate Studies: Professor Rhonda Franklin
- Department Advisors: Frances Wood and Roopa Sukumaran Berzins
- Department Advising Email: f.k.wood@umn.edu

**Liberal Education Information**

All students must complete the following Writing & Liberal Education requirements, as noted on their APAS report. See link for full Core & Theme names: z.umn.edu/liberaleducation

**Writing Requirements**

- University Writing: Writ 1301/1401 or equivalent
- Writing Intensive (WI): Two: 1xxx or 2xxx level **
- One: 3/4/5xxx level (in major)*
- One: 3/4/5xxx level (any dept.)

**SAS Core Courses**

<table>
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<tr>
<th>CORES:</th>
<th>THEMES:</th>
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<tbody>
<tr>
<td>Bio</td>
<td>4 of 5:</td>
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<tr>
<td>Phy*</td>
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<tr>
<td>Hist</td>
<td>CIV</td>
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<tr>
<td>SocS</td>
<td>DSJ</td>
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<tr>
<td>Env</td>
<td>GP</td>
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<tr>
<td>Lit</td>
<td>AH</td>
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<tr>
<td>AH</td>
<td>TS</td>
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</table>

**Total Credits Needed for Degree:** 126
What can I do with a major in electrical engineering?

From geographical information systems that can provide the location of a vehicle to giant electric power generators, electrical and electronics engineers are responsible for a wide range of technologies. Electrical engineers design, develop, document, and test electrical and electronic equipment and systems. This includes utility systems, electric motors, and machinery as well as wiring in buildings, automobiles, and airplanes. Electronic equipment includes radar, computers, communication equipment and home entertainment. They apply the concepts and knowledge of science to help solve problems, generally specializing in fields such as power distribution, integrated circuits, computers, manufacturing or communications. There is a growing need for electrical engineers specializing in industrial robots and automation systems as well as lasers and electro-optics.

**Employers** *(sample listing)*

Caterpillar  
Cargill  
Cummins  
Tata Consultancy Services  
Avery Dennison  
LasX  
Beckman Coulter  
Alliant Techsystem  
Boston Scientific  
3M  
Boeing Company  
Cummins Inc  
Dow Chemical Company  
Eaton Corp.  
Flint Hills Resources  
Garmin International  
Dell  
General Mills Inc.  
Mayo Clinic  
IBM  
Ingersoll Rand  
ExxonMobil  
Siemens  
Dupont  
Accenture  
Microsoft Co.  
Logic PD  
Lockheed Martin  
Medtronic  
National Instruments  
Polaris Industries  
Schlumberger  
Seagate Technology

**Industries** *(sample listing)*

Acoustics  
Antennas and propagation  
Broadcasting  
Electrical insulation  
Geoscience  
Circuits and systems  
Magnetics  
Power electronics  
Robotics  
Consulting  
Ultrasonics  
Oceanic engineering  
Automotive  
Nuclear and plasma sciences  
Industrial/food products  
Lasers and electro-optics  
Supercomputing  
Telecommunications  
Automation  
Genetics  
HVAC systems  
Medical technologies  
Healthcare  
Supercomputing

**Positions** *(sample listing)*

**Computer Hardware Engineer:** Designs and develops computer hardware, such as computer chips, circuit boards, modems, and printers. Computer hardware engineers also test hardware and supervise its installation.

**Power Engineer:** Deals with the generation, transmission and distribution of electricity as well as the design of related devices, including transformers, electric generators, electric motors, high voltage engineering, and power electronics.

**Control Engineer:** Focuses on the modeling of a diverse range of dynamic systems and the design of controllers that will cause these systems to behave in the desired manner.

**Electronic Engineer:** Focuses on the modeling of a diverse range of dynamic systems and the design of controllers that will cause these systems to behave in the desired manner.

**Telecommunication Engineer:** Focuses on the transmission of information across a channel such as a coax cable, optical fiber, or free space.

*Some positions may require an advanced degree.*

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**Career Center**

cse.umn.edu/career

**Salary Information**

z.umn.edu/csesalary

**More Information on Undergraduate Majors**

cse.umn.edu/majors