



## Undergraduate Degree Map for Completion in Four Years

<b>College:</b>	College of Science, Engineering & Technology <input type="button" value="v"/>
<b>Department:</b>	Elec. & Computer Engineering <input type="button" value="v"/>
<b>Name of Program:</b>	ELECTRICAL ENGINEERING <input type="button" value="v"/>
<b>Degree Designation:</b>	BSEE <input type="button" value="v"/>
<b>Emphasis/Concentration:</b>	<input type="text"/> <input type="button" value="v"/>
<b>Option:</b>	<input type="text"/>
<b>Version:</b>	N/A <input type="button" value="v"/>
<b>Version Explanation:</b>	<input type="text"/>
<b>Type of Program:</b>	Standard Major <input type="button" value="v"/>
<b>Minor Required:</b>	No <input type="button" value="v"/>
<b>Specific Minor (if required):</b>	<input type="text"/>

**Program Description:**

Electrical Engineering (EE) encompasses research, development, design, and operation of electrical and electronic systems and their components. This program leads to a Bachelor of Science in Electrical Engineering (BSEE). The primary objective of the Electrical Engineering program is to educate engineering professionals who possess a sound design and analytical background coupled with a strong laboratory experience. This means that the department prepares its Electrical Engineering graduates for:

1. Entry into the engineering work environment with well-developed design and laboratory skills.
2. Further study toward advanced degrees in engineering and other related disciplines.
3. Advancement into managerial ranks and/or entrepreneurial endeavors.

The educational objectives for our Bachelor of Science in Electrical Engineering degree are to prepare our graduates to:

1. Function as responsible members of society with an awareness of social, ethical, and economic ramifications of their work.
2. Become successful practitioners in engineering and other diverse careers.
3. Succeed in full time graduate and professional studies.
4. Pursue continuing and life-long learning opportunities.
5. Pursue professional registration.
6. Provide foundational education that allows for personal growth and flexibility through their career.

Our metrics for determining success in meeting these objectives will include:

1. Assessment of societal, economic awareness, and ethical performance of our graduates by the graduate and employer.
2. Monitoring the success of our graduates in the work force.
3. Monitoring of the success of our graduates in graduate and professional programs.
4. Assessment of continuing and life-long learning by the graduate (and their employer as applicable).
5. Reviewing the number and success of our students completing professional registration to advance their careers.

The Electrical Engineering degree curriculum includes the following components:

1. A strong background in physical sciences, mathematics, and the engineering sciences including extensive hands-on laboratory instruction.
2. An integrated design component including instruction in basic practices and procedures, creativity, control, economics, and synthesis. The process begins with basic instruction during the first year and concludes with a capstone design project.
3. A choice of several sub-disciplines in their senior level elective offering (digital, controls, communications, microelectronics design and fabrication).
4. Opportunities for students to develop sensitivity to the social and humanistic implications of technology and motivate them to make worthwhile contributions to the profession and society, while upholding the highest standards of professional ethics.
5. Courses in business and economics to promote awareness of management and the economic aspects of engineering.
6. Preparation for continuing study and professional development.

The curriculum offers students the opportunity to emphasize a number of specialized areas including digital systems, communications, controls, and microelectronic design and fabrication.

During the senior year, students must take the first step toward registration as a professional engineer by taking the Fundamentals of Engineering, (FE) examination as described in the GPA Policy below.

Minnesota State Mankato offers a 3/2 program with regional Liberal Arts colleges. Contact the department for more information. Recommended high school preparation is two years of algebra, one year of geometry, one-half year of trigonometry, one-half year of college algebra, and a year each of physics and chemistry. Without this background it may take longer than four years to earn the degree. The first two years students take science and mathematics courses common to all branches of engineering (pre-engineering), as well as supporting work in English, humanities and social sciences. Second-year electrical engineering students complete physics, mathematics and 200-level engineering science courses. Some specialization for a particular engineering major occurs in the second year.

Accreditation. The Electrical Engineering program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>.

#### **Admission Requirements:**

Admission to the college is necessary before enrolling in 300- and 400-level courses. Minimum college requirements are:

- a minimum of 32 earned semester credit hours.
- a minimum cumulative GPA of 2.00 ("C").

Please contact the department for application procedures.

During the spring semester of the sophomore year, students should submit an application form for admission to the Electrical Engineering program. Admission to the program is selective and, following applications to the department, subject to approval from the faculty. The department makes a special effort to accommodate transfer students. Only students admitted to the program are permitted to enroll in upper-division electrical engineering courses. No transfer credits are allowed for upper-division engineering courses except by faculty review followed by written permission.

Before being accepted into the program and admitted to 300-level engineering courses (typically in the fall semester), a student must complete a minimum of 62 semester credits including the following:

- General Physics (calculus-based) (12 credits)
- Calculus and Differential Equations (16 credits)
- Electrical Engineering Circuit Analysis I and II (including lab) (7 credits)
- Chemistry (3 credits)
- English Composition (4 credits)
- Statics (3 credits)
- Introduction to Electrical and Computer Engineering (6 credits)
- Technical Communication (4 credits)
- Microprocessor course and lab (3 credits)
- Digital Systems and Test (including lab) (4 credits)

A cumulative GPA of 2.5 for all science and math courses must have been achieved for program admittance. Grades must be 1.65

#### Advising:

You are expected to meet with your advisor on a regular basis to ensure courses are taken in an order that will lead to successful completion of the degree.

Faculty staffed general advising occurs once per semester over the course of about a week. One of the scheduled sessions must be attended by every student (undergraduate and graduate) to get the necessary access code required for registration. Sign up sheets will be available. Come to your designated session with a current copy of your DARS report and a completed curriculum advising sheet for your major.

Individual advising at other times can be arranged through your designated faculty advisor as necessary.

A complete listing of program faculty, policies, and course descriptions is available in the undergraduate bulletin.

### TERM 1 - FALL

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
				Overall GPA $\geq$ 2.0 Course Completion Rate $\geq$ 67% Completion of $\geq$ 15 credit hours
ENG	101	English Composition	4	
CHEM	191	Chemistry for Engineers	3	
MATH	121	Calculus I	4	
EE	106	Introduction to Electrical/Computer Engineering I	3	

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
		General Education	3	Overall GPA $\geq$ 2.0 Course Completion Rate $\geq$ 67% Completion of $\geq$ 15 credit hours

Insert item

**Term 1 Notes:**

### TERM 2 - SPRING

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
				Overall GPA $\geq$ 2.0 Course Completion Rate $\geq$ 67% Completion of $\geq$ 30 credit hours Advance to Sophomore status
ENG	271W	Technical Communication	4	
MATH	122	Calculus II	4	
PHYS	221	General Physics I	4	
EE	107	Introduction to Electrical/Computer Engineering II	3	
		General Education	3	

Insert item

**Term 2 Notes:**

### TERM 3 - FALL

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
				Overall GPA $\geq$ 2.0 Course Completion Rate $\geq$ 67%
MATH	321	Ordinary Differential Equations	4	
ME	212	Statics	3	
PHYS	222	General Physics II	3	
PHYS	232	General Physics II Laboratory	1	
EE	230	Circuit Analysis I	3	
EE	234	Microprocessor Engineering I	2	
EE	235	Microprocessor Engineering I Laboratory	1	

Insert item

**Term 3 Notes:**

### TERM 4 - SPRING

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
				Overall GPA $\geq 2.0$ Course Completion Rate $\geq 67\%$ Completion of $\geq 60$ credit hours Advance to Junior status
MATH	223	Calculus III	4	
PHYS	223	General Physics III	3	
PHYS	233	General Physics III Laboratory	1	
EE	231	Circuit Analysis II	3	
EE	240	Evaluation of Circuits	1	
EE	281	Digital System Design with Testability	3	
EE	282	Digital System Design with Testability Laboratory	1	

Insert item

**Term 4 Notes:**

**TERM 5 - FALL**

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
				Overall GPA $\geq 2.0$ Course Completion Rate $\geq 67\%$ Apply for Graduation
MATH	354	Concepts of Probability and Statistics	3	or ME 291 (3)
EE	303	Introduction to Solid State Devices	3	
EE	304	Lab: Introduction to Solid State Devices	1	
EE	332	Electronics I	3	
EE	342	Electronics Laboratory	1	
EE	336	Principles of Engineering Design I	1	
EE	341	Signals and Systems	3	

Insert item

**Term 5 Notes:**

**TERM 6 - SPRING**

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
				Overall GPA $\geq 2.0$ Course Completion Rate $\geq 67\%$ Completion of $\geq 90$ credit hours Advance to Senior status
EE	333	Electronics II	3	
EE	350	Engineering Electromagnetics	3	
EE	353	Communications Systems Engineering	3	

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
				Overall GPA $\geq$ 2.0 Course Completion Rate $\geq$ 67% Completion of $\geq$ 90 credit hours Advance to Senior status
EE	363	Communication Systems Laboratory	1	
EE	358	Control Systems	3	
EE	368	Control Systems Laboratory	1	
EE	337	Principles of Engineering Design II	1	

Insert item

**Term 6 Notes:**

### TERM 7 - FALL

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
				Overall GPA $\geq$ 2.0 Course Completion Rate $\geq$ 67%
ECON	201	Macroeconomics	3	or ECON 202 (3)
EE	450	Engineering Economics	3	
EE	467W	Principles of Engineering Design III	1	
EE	482	Electromechanics	3	
EE	471	Advanced Control Systems	3	or EE elective courses (3 or 4 credits)
		General Education	3-4	

Insert item

**Term 7 Notes:**

### TERM 8 - SPRING

<i>Designator:</i>	<i>Course:</i>	<i>Course Name:</i>	<i>Credits:</i>	<i>Milestones:</i>
				Overall GPA $\geq$ 2.0 Course Completion Rate $\geq$ 67%
ME	299	Thermal Analysis	2	
EE	477W	Principles of Engineering Design IV	1	
MRKT	310	Principles of Marketing	3	or one of the following: BLAW 200 (3), FINA 362 (3), MGMT 330 (3)
EE	489	Real-Time Embedded Systems	4	or EE elective courses (3 or 4 credits)
		General Education	3-4	

Insert item

**Term 8 Notes:**

## PROGRAM NOTES

- Must complete 7 credit hours of approved EE elective courses. It is strongly recommended that at least two elective courses be taken from one sequence.

-Courses for EE elective sequences include:

- A. EE 453, EE 476, EE 487, EE 498 DSP Communications
- B. EE 334, EE 471, EE 472
- C. EE 475, EE 479, EE 484
- D. CS 350 or EE 498: Network Architectures, EE 489 Realtime Embedded
- E. EE 473, EE 474

Laboratories available to support course offerings include EE 344, EE 480, EE 481.

- A total of 13 credits of H/SS courses is required including humanities (6-7 credits) and social science (6-7 credits)
- Diverse culture course requirements apply to this degree program.
- At least three credits of humanities (H)/social science (SS) courses must be at the 300-level.
- All courses in Major must be completed with a "C-" or better. All others must be "C" or better.
- Must complete a minimum of 20 credits of upper division Major courses and senior design at MSU, Mankato.
- Must have GPA  $\geq$  2.25 on upper division Major courses.
- Must have GPA  $\geq$  2.5 for all science, engineering and mathematics courses.

## DEGREE MAP CHECKLIST: GRADUATION REQUIREMENTS

<input checked="" type="checkbox"/>	1. Minimum of 15 credits per semester
<input type="checkbox"/>	2. General Education = 44 credits
<input checked="" type="checkbox"/>	3. Diverse Cultures = 2 course (6 credits minimum) from two disciplines
<input checked="" type="checkbox"/>	4. Writing Intensive = 2 courses (6 credits minimum)
<input type="checkbox"/>	5. Major = <input type="text"/> credits
<input checked="" type="checkbox"/>	6. Upper-Division Requirements = 40 credits minimum
<input checked="" type="checkbox"/>	7. Professional Education (if required) = 30 credits
<input checked="" type="checkbox"/>	8. Language Requirements (if BA) = 8 credits minimum
<input type="checkbox"/>	9. Minor = <input type="text"/> credits
<input checked="" type="checkbox"/>	10. Total credits required for degree <input type="text" value="128"/>

## DEGREE MAP COMPLETE

<input checked="" type="checkbox"/>	Map is complete and ready for review <ol style="list-style-type: none"> <li>1. Faculty please send an email to your Department Chair when map is ready to review.</li> <li>2. Department Chair please send an email to your Dean when map is ready to review.</li> <li>3. Dean please send an email to the Assistant Vice President for Undergraduate Studies when map is ready to review.</li> </ol>
-------------------------------------	---

## DEAN APPROVAL

<input checked="" type="checkbox"/>	Map reviewed and approved by Dean
-------------------------------------	-----------------------------------

Save and Close

