Electrical Engineering Spring Advising Series
Sophomores and Beyond

Department of Electrical and Computer Engineering

March-April 2016

Have your flowchart handy during this presentation

Judy Donahue     EERC 131
Email: eceadvise@mtu.edu

Appointments:
487-2550     EERC 121
Sophomore / Junior checklist

- Take EE3250 after completing EE3180. Adjust your Academic Plan and flowchart.
- Following the flowchart will have the least chance of time conflicts.
- Know your choices of “EE Electives”? Approved Electives? SELECT Approved Elective?
- What are focus areas and concentrations? (both are optional)
- Senior Design, Enterprise or EPS? ______________________
- Pursue a minor? No / Yes ____________________________
- Co-op? or summer internship? Highly recommended. Co-op Office is Admin 220
  - Create resume, upload to Career Services Handshake database
  - Attend career fairs and company info sessions
- Study abroad? Visit Admin 200 on a Tues 11am or Thurs 2pm.
- Notify transfer@mtu.edu if you are taking a course elsewhere in summer that is a prerequisite for a class you need in fall. Identify plans to improve your GPA’s if needed/desired.
- Know your Degree Audit – run degree audit before and after scheduling classes.
- Ensure your general education course choices are applicable to degree requirements. (run degree audit report)
- When will I graduate? ________________ Create or update your Academic Plan.
Prerequisite change for EE3250:

- New prerequisite is EE3180. EE3180 previously could be a co-requisite with EE3250.
- Move EE3250 to semester 7. (or any semester after completion of EE3180)
- Move another course from semester 7 to semester 6. (HASS, EE elective, or Approved Elective)
- Update your flowchart or print a revised flowchart from: EE Advising webpage. Update your academic plan.
What are “electives”? 

1. SELECT Approved Elective Course

2. other Approved Elective credits

3. Free Electives 0-3 credit(s)

4. EE Electives – 3-15 cr

- 2) Select fifteen (15) credits of Electrical Engineering electives, not already used, excluding EE3010, EE4000, EE3805, EE4910 and EE4910).

Needs: 15.0 credits
Not allowed: EE 3010, 4400, 4805, 4910, 4910
Course list: EE 1000 to 9999

Find in degree audit

SELECT Approved Elective Course - 3 credits

Needs: 1 sub-req

- 1) SELECT Approved Elective Course - 3 credits

Needs: 3.0 credits
Course list: EE 2600, EET 3373, ENG 2120, 2200, 3597, ENG 4510, MEEM 2110, 2150, 2200, 2700, 3210, 3220, NY 2100, 2392, PH 2300, 2400, 3300

Find in degree audit

Find in degree audit
‘SELECT’ Approved Electives for EE’s 
as suggested by our External Advisory Committee

Available:
In your online Degree audit Report (Banweb) and
ECE Blog – SELECT List

‘SELECT’ approved elective course:  Non-EE courses that require limited pre-requisite coursework and add to the knowledge and breadth of the graduate: Choose one course from this list, required AY 2013-14 and later.

EET/EE 3373 Intro to Programmable Controllers (0-2-3) Fall
[EET 1411 or (EET 2120 and EET 2141) or EET 2411 or PH 2230 or EE 2112 or EE 3010]

ENG 2120 Statics-Strength of Materials (0-4-0) Spg
[MA 2160 and PH 2100 and ENG 1102]

ENG 3200 Thermodynamics/Fluid Mechanics (0-4-0) Fall, Spg
[MA 2160 and CH 1112 or (CH 1150 and CH 1151) and PH 2100 and ENG 1102]

ENG 4510 Sustainable Futures I (3-0-0) Fall
[Junior or Senior standing and UN 2002]

MEEM 2110 Statics (0-3-0) Fall, Spg, Sum
[COE enrolled and MA 2160]

MEEM 2150 Mechanics of Materials (0-3-0) Fall, Spg, Sum
[COE enrolled and MEEM 2110]

MEEM 2200 Thermodynamics or MEEM2201 Energy-Thermal-Fluids I (0-3-0) Fall, Spg, Sum
[COE enrolled and MA 2160 and CH 1150 and CH 1151]

MEEM 2700 Dynamics (0-3-0) Fall, Spg, Sum
[PH 2100 and (MEEM 2110 or ENG 2120) and MA 3160(C)]

MEEM 3210 Fluid Mechanics (0-3-0) Fall, Spg, Sum
[MEEM 2200 and MEEM 2700(C) and (MA 3520 or MA 3521 or MA 3530 or MA 3560) Co-Req MEEM 3220]

MEEM 3220 Energy Laboratory (0-0-2) Fall, Spg, Sum
[MEEM 2200 Co-req MEEM3210]

MY 2100 Intro to Materials Science Engineering (3-0-0) Fall, Spg, Sum
[CH 1112 or CH 1122 or (CH 1150 and CH 1151) or (CH 1160 and CH 1161)]

MY 4292 Light & Photonic Materials (3-0-0) Spg
[(PH 2200 or EE 2190 or EE 3410) (JR or SR)]

PH 2300 University Physics III-Fluids and Thermodynamics (4-0-0) Spg
[PH 1160 or PH 2100]

PH 2400 University Physics IV, Waves and Modern Physics (3-0-0) Fall, Spg, Sum
[(PH 2200 or PH 2260)]

PH 3300 Thermodynamics and Statistical Mechanics (3-0-0) Spg
[PH 2300 or PH 1360]
Approved Electives for BSEE

3 credits required with Senior Design Option
1 credit required with Enterprise for Design

Choose remaining Approved Electives credits from the list above or below. Follow catalog year requirements.

- Any MA course at least 3000 level except MA3720 or MA4945.
- Any BL course except BL3990.
- Any CH course number CH1152 or higher.
- Any PH course numbered PH1600 and higher, except PH2230. MAA not accepted.
- Any CS course
- Any EE course except EE3010 (maximum of 4 credits EE)
- ENG2000-ENG4999 except ENG2990, 3530, 3993, 4160, 4900, 4905, 4910, and ENG4990
- Any BE, CE, CM except CM3410, GE, MEEM, MY course
- EET3373, EET4373
- Any ENT course except ENT1950
- UN4000 Remote Sensing Seminar
- UN3002 Co-op (6 credits maximum).

Examples:
- Co-op – UN3002-3004
- CS, Math, Physics, Chem, other Engg. Dept. courses,
  Enterprise ENT1960-ENT3980)

Available in:
Your online
Degree audit
Report (Banweb)

And in the
ECE Advising
web page

Courses graded pass/fail or taken under ‘audit’ option do not qualify. Courses must be graded A-D.
EE Elective courses and focus areas

- Control
- Electromagnetics
- Electronics
- Photonics
- Power and Energy
- Signal Processing
- Wireless Communication
- Computer Systems
EE Electives 15 credits
Listed by focus area

Available at:
ECE Advising web page and Advising Office 131

Pay close attention to pre-requisites and semester offerings

Careful planning for Co-op or Study Abroad

<table>
<thead>
<tr>
<th>Photonics</th>
<th>Special Topics vary: EE 4800 Check schedule and catalog descriptions for additional EE course offerings each semester using EE4800. Power &amp; Energy:</th>
<th>Photonics Concentration required courses EE3090, EE3190, EE3290, EE4490</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 4219 Introduction to Electric Machinery and Drives</td>
<td>EE 3090 Geometrical &amp; Wave Optics</td>
<td>choose 6 credits from the following: EE 4250, EE 4252, EE 4253, EE 4256, EE 4522, EE 4590, MV 4292, PH 4510</td>
</tr>
<tr>
<td>EE 4220 Introduction to Electric Machinery and Drives Lab</td>
<td>EE 3290 Photonic Material, Devices &amp; Appls</td>
<td>choose 3 credits of EE Electives. EE3171 and EE3120 are not required with the Photonics Concentration.</td>
</tr>
<tr>
<td>EE 4221 Power System Analysis 1</td>
<td>EE 4490 Laser Systems and Applications</td>
<td>Use Curriculum Add/Drop form to add a concentration in Photonics with BSEE.</td>
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<tr>
<td>EE 4222 Power System Analysis 2</td>
<td>EE 4496 Fourier Optics</td>
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<tr>
<td>EE 5233 Power System Protection</td>
<td>EE 4290 Optical Communication</td>
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<tr>
<td>EE 5234 Power System Protection Lab</td>
<td>Controls: EE 4219 Introduction to Electric Machinery &amp; Drives</td>
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<tr>
<td>EE 5250 Distribution Engineering</td>
<td>EE 4230 Introduction to Electric Machinery and Drives Lab</td>
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<tr>
<td>EE 5251 Distribution Engineering</td>
<td>EE 4262 Digital &amp; Non-Linear Control</td>
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<td>EE 5253 Distribution Engineering</td>
<td>EE 4777 Open-Source J-D Printing</td>
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<td>EE 5256 Distribution Engineering</td>
<td>EE 5750 Distributed Embedded Control Systems</td>
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<tr>
<td>EE 5259 Distribution Engineering</td>
<td>EE 3373 Intro to Programmable Controllers (PLCs)</td>
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<tr>
<td>EE 5260 Distribution Engineering</td>
<td>EE 4373 Advanced Programmable Controllers</td>
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<tr>
<td>EE 5269 Distribution Engineering</td>
<td>DSPs: EE 4252 Digital Signal Processing</td>
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<tr>
<td>EE 5270 Distribution Engineering</td>
<td>EE 4253 Real-time Signal Processing</td>
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<td>EE 5271 Distribution Engineering</td>
<td>EE 5512 Digital Image Processing</td>
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<tr>
<td>EE 5272 Distribution Engineering</td>
<td>Electronics: EE 4211 Physical Electronics</td>
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<tr>
<td>EE 5273 Distribution Engineering</td>
<td>EE 4232 Electronic Applications</td>
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<tr>
<td>EE 5274 Distribution Engineering</td>
<td>EE 4271 VLSI Design</td>
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<tr>
<td>EE 5281 Distribution Engineering</td>
<td>EE 4490 Introduction to MEMS</td>
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<tr>
<td>EE 5282 Distribution Engineering</td>
<td>Alternating Falls</td>
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<tr>
<td>EE 5283 Distribution Engineering</td>
<td>Communications: EE 5525 Wireless Communications</td>
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<tr>
<td>EE 5284 Distribution Engineering</td>
<td>EE 4272 Computer Networks</td>
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<tr>
<td>EE 5285 Distribution Engineering</td>
<td>EE 4365 In-Vehicle Communication Networks</td>
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<td>EE 5286 Distribution Engineering</td>
<td>Electromagnetics: EE 4411 Engineering Electromagnetics</td>
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<tr>
<td>EE 5287 Distribution Engineering</td>
<td>EE 4490 Laser Systems and Applications</td>
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<td>EE 5288 Distribution Engineering</td>
<td>Computer Systems: EE 4271 VLSI Design</td>
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<tr>
<td>EE 5289 Distribution Engineering</td>
<td>EE 4271/CS4461 Computer Networks</td>
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<tr>
<td>EE 5290 Distribution Engineering</td>
<td>EE 4495 S/H Design of Multimedia Systems</td>
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<tr>
<td>EE 5291 Distribution Engineering</td>
<td>EE 5496 GPU and Multicore Programming</td>
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<tr>
<td>EE 5292 Distribution Engineering</td>
<td>EE 4739 Embedded System Programming using Sensor Networks &amp; Mobile Robots</td>
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</tbody>
</table>
Communication: The transmission of information including voice, data, location (GPS), and sensor networks.

Skills of the communication engineer: how signals are transmitted, improve transmission performance, simultaneous communication of one point with multiple points, wireless communication technology

Prerequisites: EE3160, Signals and Systems, EE3180 Probability and Random Signal Analysis

Courses: EE3250, EE5525, EE4272, EE4365, EE4253

Other courses/areas: Electromagnetics, Signal Processing

Job types:
- GPS applications; Satellites
- Computer networks
- Radio, television, telephone
- Wireless communication

Faculty:
- Dr. Aurenice Oliviera, 712
- Dr. Reza Zekavat, 825
Controls: The design of electrical systems that control a mechanical system.

Skills of the controls engineer: control algorithm development, mathematical modeling of physical systems

Prerequisites: EE3160, Signals and Systems

Courses: EE3261, EE4262, EE4219/20, EE4777, EE5750, EE3373, EE4373

Other courses/areas: EE4252, Signal Processing and It’s Applications

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
<th>Fall</th>
<th>Spring</th>
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<tbody>
<tr>
<td>EE3160</td>
<td>EE3261</td>
<td>or EE3261</td>
<td>EE4262</td>
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<td></td>
<td></td>
<td>EE4777</td>
<td>EE4219/20</td>
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<td>EE3373</td>
<td>EE4373</td>
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<td></td>
<td></td>
<td>EE4252</td>
<td>EE5750 level</td>
</tr>
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Job types:
- Autonomous vehicles, drones, satellites
- Cruise control, auto-pilot systems
- Defense – missal guidance
- Robotics – factory automation

Faculty:
- Dr. Jeffrey Burl, 710
- Dr. Bo Chen, MEEM 824
- Dr. Jeremy Bos, 623
Computer Systems: The design of computer systems considering hardware design and interface

Skills of the computer systems engineer: Micro-controller applications, algorithm development, programming, hardware/software interface, HDL

Prerequisites: EE2174, Digital Logic C or java programming

Courses: EE3171 or EE3173, EE4173, EE4272, EE4271, EE4735

Other courses/areas: EE4252, Signal Processing and It’s Applications, EE4231 Physical Electronics, CS3421, Computer Organization, CS3411, Systems Programming, CS4321, Algorithms

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<tr>
<th>Fall</th>
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<tbody>
<tr>
<td>EE3171 EE</td>
<td>EE4173 CpE</td>
<td>EE4272 CpE</td>
<td>EE4495 CpE</td>
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<td>EE3173 CpE</td>
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<td>EE4271</td>
<td>EE5496 level</td>
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<tr>
<td>CS3421</td>
<td>CS3411</td>
<td>EE4252</td>
<td>CS4321</td>
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</tbody>
</table>

Job types:
- Computer hardware design
- Firmware development
- Data or image processing
- Computer networks
- Embedded systems

Faculty:
- Mr. Kit Cischke, 520
- Dr. Zhou Feng, 513
- Dr. Timothy Havins, 504
- Dr. Shiyan Hu, 518
- Dr. Roger Kieckhafer, 713
- Dr. Saeid Nooshabadi, 512
- Dr. Zhaohui Wang, 506
Electromagnetics: The study of electromagnetic fields and waves, and devices that control and employ them, from DC to Optics: radar, radio, TV broadcasting, MRI, maglev trains, generators, transformers, etc...

Skills of the electromagnetics engineer: Understanding concepts of electromagnetic radiation, including AM & FM, cell phone, GPS; EM problem solving for developing and operating EM devices

**Prerequisites:** PH2200, MA3160, EE2112

**Courses:** EE3140, EE4411, EE4490

Other courses/areas: Signal Processing, Communications, Physics, Power electronics, Photonics

### Job types:
- EMC Engineer in hybrid electric vehicle design
- Electromagnetic interference/compatibility
- Antenna design
  - Phased array antennas
  - Steerable antenna
  - RF antenna design
- Microwave communications
- Develop EM devices for use in defense, medicine and communications

### Faculty:
- Dr. Warren Perger, 819
- Dr. Elena Semouchkina, 711
Electronics: The study of electronic devices, systems, and equipment that use the effects produced by electrons

Skills: Understanding of electronic processes and functionalities of electronic devices, measure and control electronic systems.

Prerequisite: EE3131

Courses: EE4231, EE4271, EE4240

Other courses/areas: Photonics, Electronics Materials, Solid State Devices, Power Electronics

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<th>Fall</th>
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<tr>
<td>EE3131</td>
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<td>EE4271</td>
<td>EE4231</td>
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<td>EE4227</td>
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Job types:
- Design and maintain embedded electronic controls
- Electronic hardware design engineer
- New product development in military and aerospace electronics
- Develop electronic devices and components
- Operate and control electronic devices and systems

Faculty:
- Dr. Duane Bucheger, 731
- Dr. Elena Semouchkina, 711
- Dr. Wayne Weaver, 236
Photonics: The control of photons in terms of generating and harnessing light and other forms of radiant energy.

Skills of the photonics engineer: light emission, transmission, deflection, amplification and detection by optical components; lasers; fiber optics; electro-optical instrumentation.

**Prerequisites:** PH2200, EE2112, MA3160, EE3140 (Co-requisite)

**Courses:** EE3090, EE3190, EE3290, EE4490, EE4290, EE4256

Other courses/areas: Electronics, Electromagnetics

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<tr>
<td>EE3140</td>
<td>EE3190</td>
<td>EE4256</td>
<td>EE4290</td>
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<tr>
<td>EE3090</td>
<td>EE3290</td>
<td>EE3290</td>
<td>EE4490</td>
</tr>
</tbody>
</table>

Job types:
- Design robotic vision system
- Outer-space photography technology
- Satellite design
- Laser applications engineer
- Develop photonic IC-based telecommunication products
- Fiber-optics
- Design and test optical transponders and transceivers

**Faculty:**
- Dr. Durdu Guney, 729
- Dr. Chris Middlebrook, 628
- Dr. Mike Roggemann, 503

**Student chapter:** SPIE/OSA International Society for optics and photonics

**MTU lab:** SB 24
Power & Energy: The generation, transmission, distribution and utilization of electric power and electrical devices

Prerequisites: EE3120

Courses: EE4221, EE4222, EE4226, EE5223, EE5250, EE4227, EE4219, EE4295, EE4296

Other courses/areas: Controls, Electronics

Job types:

- Develop technologies to make our power grid more efficient, reliable and secure
- Integrate solar, wind energies into the power grid
- Design wind turbines
- Transmission line engineer
- Utilities and electrical power engineer consultant

Faculty:

- Dr. Leonard Bohmann, M7M 707
- Dr. Lucia Gaucia, 612
- Mr. Trever Hassell, 131
- Mr. John Lukowski, 233
- Dr. Bruce Mork, 614
- Dr. Sumit Paudyal, 611
- Dr. Joshua Pearce, M&M 504
- Dr. Chee-Woii Ten, 613
- Dr. Wayne Weaver, 236

Student chapter: IEEE-PES Power & Energy Society  ieee.org MTU lab: EERC 809
**ECE Focus Areas**

**Signal Processing:** The analysis, interpretation, and manipulation of sound, radar, images, video, digital data and other signals.

**Skills** of the signal processing engineer: Modeling and simulations of systems, algorithm development, probability, MatLab, C/C++

**Prerequisite:** EE3160

**Courses:** EE4252, EE4253, EE5522

Other courses/areas: Wireless communication, Control Systems, Probability & Random Signal Analysis

### Fall  | Spring  
---|---
EE3160 | EE3180

### Fall  | Spring  
---|---
EE4252  | EE4253
EE5522  | 
EE3250  | EE5525

**Job types:**
- Design signal processor systems
- Detect and exploit radar signals
- Data and signal analysis
- Sensor systems development

**Faculty:**
- Dr. Daniel Fuhrmann, 118
- Dr. Michael Roggemann, 503
- Dr. Timothy Schulz, 505
- Dr. Reza Zekavat, 825
Which focus area is for me?

Taking core EE classes and inquiring

Take a co-op or internship experience; talk with industry professionals and inquire at career center events

Join an enterprise project team that involves an area(s) you are considering

Look for undergraduate research opportunities

Talk with professors

- Having a focus area is optional, but recommended
- Not listed on the diploma
Concentrations with the BS-EE

- All catalog years - Keep your original catalog year
  - Photonics Concentration
  - Enterprise Concentration

- Change to catalog year 2015-16 and new Gen Ed requirements:
  - Biomedical Applications Concentration
  - Environmental Applications Concentration

- Change to catalog year 2016-2017 and new Gen Ed requirements:
  - Electric Power Engineering Concentration
  - Add this concentration in Fall 2016 – see Judy
Photonics Concentration
Bachelor of Science in Electrical Engineering
Classes begin in Fall of 3rd year:

1. Get a copy of the EE-Phonics Concentration flowchart and .pdf degree audit that pertain to your catalog year.

2. In 2nd year spring, postpone EE3120 into future semester. It is not required.

3. Plan to complete prerequisite courses by Fall of 3rd year, or Fall of 4th year if you are off track.

4. Take EE3090 in Fall of 3rd year. (or 4th year as needed)

5. Take EE3190 in spring of 3rd year, EE3290 in fall of 4th year and EE4490, Laser systems in spring of 3rd or 4th year.

6. Select two concentration elective courses.

7. To officially add a concentration:
   1. Complete a Curriculum Add/Drop Form
   2. Bring it to Judy Donahue, EERC 131.

Faculty:
- Dr. Durdu Guney, 729
- Dr. Chris Middlebrook, 628
- Dr. Mike Roggemann, 503

Want to know more? Join SPIE, SB 24 EERC
djburrel@mtu.edu
Enterprise Concentration

Bachelor of Science in Computer Engineering
Bachelor of Science in Electrical Engineering

1. Choose an Enterprise to join. May begin as early as Spring of 1st year (ENT1960 is optional), but is not required until Fall of 3rd year - begin in ENT3950.

2. Required project work is 4 semesters in 3rd and 4th year: ENT3950, ENT3960, ENT4950 and ENT4960.

3. Take Teaming in Enterprise (ENT2961) in Fall of 2nd or 3rd year; Take Communication Contexts (ENT2962) in Spring of 2nd or 3rd year.

4. In your 3rd year, become familiar with concentration elective courses. A list of these Enterprise Instructional modules are included in your degree audit report. Add your course selections to your academic plan.

5. To officially add a concentration:
   1. Complete a Curriculum Add/Drop Form
   2. Bring it to Judy Donahue, EERC 131
Biomedical Applications Concentration

Bachelor of Science in Electrical Engineering

Classes begin in 2nd year:

1. Get a copy of the EE-Biomedical Applications Concentration flowchart and .pdf degree audit that pertain to your catalog year.

2. Take Anatomy & Physiology I (BL2010) AND Cellular & Molecular Biology (BE2400) in Fall of 2nd year.


4. In Spring of 2nd year, decide whether to take Biomechanics I or Biomaterials I. Plan in 3rd year, for your Biomedical Applications Concentration “focus”. Become familiar with concentration elective courses and semester offered.

5. Take BE3700 and BE3701, Bioinstrumentation and Lab in Spring of 3rd year.

6. To officially add a concentration:
   1. Complete a Curriculum Add/Drop Form
   2. Bring it to Judy Donahue, EERC 131

   Faculty:
   - Dr. Chris Middlebrook, 628
   - Dr. Sean Kirkpatrick, M&M 301

Must change catalog year to 2015-16 and use new gen ed
Environmental Applications Concentration

Bachelor of Science in Electrical Engineering

Classes begin in 3rd year:

1. Get a copy of the EE-Environmental Applications Concentration flowchart and .pdf degree audit that pertain to your catalog year.

2. First 2 years of coursework are the same as the BSEE.

3. Take Environmental Engineering Fundamentals (ENVE3501) in Fall of 3rd year; Take Environmental Monitoring and Measurement Analysis (ENVE3502) in Spring of 3rd year.

4. In Fall of 2nd year or Spring of 3rd year, decide which remote sensing sequence you will take: 1) EE4252 and GE4250 OR 2) EE3090 and EE3190

5. Become familiar with the Environmental Engineering Quality elective courses and semester offerings. Choose two courses from the list.

6. To officially add a concentration:
   1. Complete a Curriculum Add/ Drop Form
   2. Bring it to Judy Donahue, EERC 131

Must change catalog year to 2015-16 and use new gen ed

Faculty:
- Dr. Ashok Ambardar, 826 (DSP)
- Dr. Durdu Guney, 729
- Dr. Chris Middlebrook, 628
Electric Power Engineering Concentration

Bachelor of Science in Electrical Engineering

Begins academic year 2016 – 2017

1. Electric Energy Systems (EE3120) is the prerequisite course to the Electric Power Engineering courses. This can be taken in Spring of 2nd year, Summer or during 3rd year.

2. Take Power Analysis 1 (EE4221) in Fall of 4th year; Take Power Analysis 2 (EE4222) and Power Engineering Lab (EE4226) in Spring of 4th year.

3. In your 3rd year, become familiar with concentration elective courses, prerequisites and semesters offered. You will choose one electric power engineering elective course which may be taken in spring of 3rd year or in the 4th year.

4. To officially add a concentration:
   1. Complete a Curriculum Add/ Drop Form
   2. Change your catalog year to 2016-17 (if currently a prior catalog year)
   3. Bring it to Judy Donahue, EERC 131

Faculty:
   • Mr. John Lukowski, 233
   • Dr. Chee-Wooi Ten, 613
   • Dr. Wayne Weaver, 236

Must change catalog year to 2016-17 and use new gen ed
Certificates

Certificates are being phased out for undergraduate students but may be pursued after graduation.

To pursue the Electric Power Engineering Certificate, you must be signed up before the end of Spring 2016 semester- see Judy.

- Hybrid Electric Drive Vehicle Engineering (CHEV)
- Electric Power Engineering (CEPE)
- Modern Language
- Advanced Modern Language
- Actuarial Science
- Coaching Endorsement
- Geographic Information Systems
- Global Technological Leadership
- Industrial Forestry
- International Sustainable Development Engineering
- Media
- Writing
- Teaching English to speakers of other languages

With a certificate, as many credits as possible may be applied to your major.
1. Year-long “senior design” project
   - EE4901 and EE4910 (fall – spring project)
   - MEEM4901 – MEEM4911 (fall – spring OR spring – fall)
   - BE4901 and BE4910 (fall – spring project)

2. Four semesters of “enterprise”
   - ENT3950, ENT3960, ENT4950, ENT4960
   - If you have 3 semesters remaining on campus, start in ENT3960.

3. EPS – European Project Semester
   Covers EE3901, EE4901 and EE4910 credits plus few HASS credits.

Pre-requisites for EE4901, ENT4950 and MEEM4901:
   EE3901, Design Fundamentals
   EE3131, Electronics and lab

Prerequisite or co-requisite with EE4910, ENT4950 or MEEM4901
   EE3171, Microcontroller Applications or EE3173, Hardware/Software Integration must be complete before EE4910, MEEM4911, or ENT4960.
EE3901, Design Fundamentals, is a Spring-only course

Take Design Fundamentals, EE3901, in the Spring semester before beginning:

ENT4950

EE4901

MEEM4901

EE3901 is not needed if you take EPS, European Project Semester.
Minors

Find [minor requirements](#) in Degree Services or [online catalog](#) webpages

At least 6 credits of upper level minor coursework cannot apply to major except in “free electives”. Some courses may apply to both major and minor.

**Technical**
- Computer Science
- Electronic Materials
- Mathematics
- Nanoscale Science & Engineering
- Physics
- Remote Sensing

**Non-technical**
- Art
- Economics
- Enterprise
- Ethics and Philosophy
- French, German, or Spanish
- Music
- Theatre Arts

View full list in [undergraduate catalog](#)

View minor requirements [on Degree Services webpage](#)

View [the list of Advisors](#)
How to add: Minor, concentration, double major, etc...

Complete a **Curriculum Add/Drop** form in the department offering the minor, double major, etc...

Add:   minor (to a major)  
        certificate  
        double-major  
        second degree  
        concentration (to a major)

Change: major

Drop:   minor  
        concentration  
        certificate  
        double-major

An online degree audit will be generated appropriately.
Co-op – 220 Admin Bldg

- Bookmark this page: career.mtu.edu
- Valuable experience to add to your resume
- Helps with career path and specialty area choices
- Co-op – go to the Career Services Center for co-op opportunities and how to apply.
  - Career Services is located in the Admin Building 2nd floor
- UN3002 – 2 credits of co-op experience
  - EE majors: co-op credits may count as free or approved electives
  - CpE/EE Double-majors: credits not needed
- Kirsti Arko, karko@mtu.edu  487-2314  Admin 220H
International Programs and Services

- Attend Study Abroad 101 workshop:
  11 am Tuesdays    2 pm Thursdays
- Fall, Spring & Summer programs
- Junior year Spring semester in Cergy France
  (core EE courses – taught in English)
- European Project Semester (EPS)
  senior design project
  (earn credit for EE3901, EE4901, EE4910)

Watch Study Abroad Video  (5 min)
Accelerated Masters - msee, mscpe

- 6 credits of 4000+ level ECE BS coursework may be applied to MSEE or MSCpE. (double-count)
- Remaining 24 credits may be completed in one year.
- Possible to complete BSEE/MSEE or BSCpE/MSCpE in 5 years.
- Maintain minimum UG GPA of 3.25

CONSIDERING AN MBA?

Contact Jodie Filpus-Paakola at mba@mtu.edu or 906-487-3055 for information about course prerequisites for admission into the Tech MBA program.
Transfer Credits

Notify transfer@mtu.edu if you are taking summer courses elsewhere that are prerequisites to courses you need in fall.

Complete a Guest Application Form (if needed)

Transfer Equivalency List to search for courses

Send syllabus to transfer@mtu.edu for evaluation

A grade of “C” or higher is required

See ~ ece undergraduate Advising ~ Transferring credits from elsewhere
GPA’s:

1. Cumulative GPA – All courses taken at MTU
2. Departmental GPA - EE credits
3. Engineering GPA  - first-year courses
4. Semester GPA

Must be 2.0 or higher to be in Good Academic Standing:
Cumulative GPA, Departmental GPA (16 +), and Semester GPA

Must be 2.0 or higher to graduate:
Cumulative GPA and Departmental GPA
Academic Honors

- Academic Honors are granted on the following basis using cumulative GPA:
  - 3.9 - 4.0   Summa Cum Laude
  - 3.7 - 3.89  Magna Cum Laude
  - 3.5 - 3.69  Cum Laude

- Details on the [Dean of Students website](#)
**Repeating a course**

**Grade of “CD” or lower**

- Students may repeat courses with a grade of CD or lower.
- The **most recent grade** is used in your GPA calculation. Even if it is lower than prior grade.
- Maximum of 3 attempts to pass a course.
- Special permission from the Dean of Students, Financial Aid *and* your academic advisor is required to repeat a course a 2nd and final time.
- If you are behind or not doing well in a course, talk with your instructor, and/or your advisor.

- **Friday March 25th** is the final day to drop a course with “W”.

See: [ECE Advising Blog](#)
Spring Semester Drop Dates

- Friday MARCH 25th, is last day to drop with a grade of “W”.
- Go to Student Services Center – Admin Building

- After March 25th, permission from Dean of Students is required if you had extenuating circumstances beyond your control.

Track B Classes begin week of February 29th.
Term B drop dates:

- March 16 is deadline to drop Term B courses without a grade.
- April 8 is deadline to drop Term B courses with a “W” grade.
- After April 8th, no dropping of Term B courses, except in extenuating circumstances.
Online Degree Audit report

- Run in Banweb or mymichigantech
  - Do not select your major from the drop down lists

- Monitor degree progress

- Run your degree audit before & after scheduling

- Verify you’ve met requirements for graduation

Watch Degree Audit Video (5 min)
General Education requirements

If you began 2013-2014 or 2014-2015:

- Watch General Education Video (5 min)

All others:

- Use the general education section of your online degree audit
Undergraduate Advising Resources

ECE undergraduate Advising Blog search topics
EE undergraduate Advising Page flowcharts, elective lists
ECE Department Web Page: faculty & courses
Registrar’s Office Web Page Prepare for Registration
Degree Services: majors, minors, degree audits
Dean of Students: Dean’s list, policies, academic issues

ECE Main Office - Schedule an Appointment: 487-2550 EERC 121
   CpE’s: Trever Hassell, EERC 131, tjhassel@mtu.edu
   EE’s: Judy Donahue, EERC 131, eceadvise@mtu.edu

“Bad planning on your part does not constitute and emergency on my part”
Anonymous (Proverb)
Course changes for 2016-2017:

New courses:

- EE3373 – Introduction to Programmable Controllers
- EE4373 – Advanced Programmable Controllers

These are co-listed with the School of Technology classes EEET3373 and EEET4373.

- EE3250 – prerequisite is EE3180 (was EE3160 + EE3180 (co-req))

- EE4232 – not offered 2016-2017 (Electronic Applications)

- CS1142 – Programming at the Hardware/Software Interface.
  Replaces CS1141. Includes Assembly programming.

- CS3421 – Comp Org - becomes 3 credits (was 4 credits)