Minnesota State University, Mankato

Curriculum Proposal

Please type or select the requested information. Print completed forms, add appropriate paper attachments, and route through MSU's curricular process for recommendations and decisions.

(Check all that apply):
- College: Science, Engineering and Technology
- Department: Electrical and Computer Engineering
- Program: Electrical Engineering/Computer Engineering

Proposal # 19
Effective Date of Change: 05
Academic Year
(For Office Use Only)

Course Designator: EE
Number of Credits: 254

Include a course or program description for the Bulletin (30-40 words maximum for courses, 100 for programs):

Delete the last sentence of the catalog copy as shown on attached copy.

Rationale or Justification for change:
This change reflects the refinement of the course content as a result of the Fall 2004 ECET outcome review process.

***For General Education or Cultural Diversity Courses Only***

General Education Course:

<table>
<thead>
<tr>
<th>GE Category #</th>
<th>GE Category Name (Maximum of 3 Categories)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

* For Writing Intensive Courses, attach a description of the kind and quantity of writing.
* For Upper Division Courses, include a description of the respects in which it is broad and general rather than narrow and specific, and so suitable as GE.

Attach paper copies of the following:
- a. Syllabus or course outline.
- b. Course's student learning outcomes associated with each GE competency or CD designation.
- c. List of strategies to be used to assess students' achievement of each GE competency or CD designation.

***For New Courses***

Instructional Type: Lecture
Grading Format: [ ] Grade [ ] P/N

Course will be offered:
- [ ] Fall Semester
- [ ] Spring Semester
- [ ] Summer Session

- Other courses are being changed or eliminated. (Explain.)

Course content or title is similar to courses in other departments. (Attach copy of letter of agreement with other program(s) contacted. Indicate the nature of the discussions and resolution of differences or potential conflicts.)

Attach paper copies of the following:
- a. Syllabus or course outline.
- b. Course's student learning outcomes.
- c. A list of resources required to offer and support this course.
- d. A description of how teaching this course will affect department staffing.
- e. If 400/500 level course, an explanation of added expectations of graduate students.

Revised September 2002
# Minnesota State University, Mankato

## Curriculum Proposal

### Signature Page

<table>
<thead>
<tr>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended</strong> (Category/ies)</td>
</tr>
<tr>
<td><strong>Not Recommended</strong> (Category/ies)</td>
</tr>
</tbody>
</table>

Comments:

**Department Chair**  
**Date**

<table>
<thead>
<tr>
<th>College Curriculum Committee</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended</strong> (Category/ies)</td>
</tr>
<tr>
<td><strong>Not Recommended</strong> (Category/ies)</td>
</tr>
</tbody>
</table>

Comments:

**Committee Chair**  
**Date**

<table>
<thead>
<tr>
<th>College Dean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended</strong> (Category/ies)</td>
</tr>
<tr>
<td><strong>Not Recommended</strong> (Category/ies)</td>
</tr>
</tbody>
</table>

Comments:

**Dean**  
**Date**

<table>
<thead>
<tr>
<th>General Education Subcommittee</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended</strong> (Category/ies)</td>
</tr>
<tr>
<td><strong>Not Recommended</strong> (Category/ies)</td>
</tr>
</tbody>
</table>

Comments:

**General Education Subcommittee Chair**  
**Date**

<table>
<thead>
<tr>
<th>Undergraduate Curriculum and Academic Policy Committee</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended</strong> (Category/ies)</td>
</tr>
<tr>
<td><strong>Not Recommended</strong> (Category/ies)</td>
</tr>
</tbody>
</table>

Comments:

**UCAP Faculty Chair**  
**Date**

<table>
<thead>
<tr>
<th>Faculty Association Graduate Committee</th>
</tr>
</thead>
</table>
| **Recommended**  
**Not Recommended** |

Comments:

**Faculty Association Graduate Chair**  
**Date**

<table>
<thead>
<tr>
<th>Graduate Dean</th>
</tr>
</thead>
</table>
| **Recommended**  
**Not Recommended** |

Comments:

**Graduate Dean**  
**Date**

<table>
<thead>
<tr>
<th>Academic Affairs Council</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended</strong> (Category/ies)</td>
</tr>
<tr>
<td><strong>Not Recommended</strong> (Category/ies)</td>
</tr>
</tbody>
</table>

Comments:

**Assistant Vice President**  
**Date**

<table>
<thead>
<tr>
<th>Senior Vice President and Vice President for Academic Affairs</th>
</tr>
</thead>
</table>
| **Approved** (Category/ies)  
**Not Approved** (Category/ies) |

Comments:

**Sr. Vice President / Vice Pres. Academic Affairs**  
**Date**

Revised September 2002
Electrical Engineering

Required Core for Major (Engineering, 48 credits):

- EE 101: Introduction to Engineering I (1)
- ME 103: Introduction to Engineering III (1)
- EE 244: Introduction to Digital Systems (2)
- EE 254: Digital and Circuits Lab (1)
- EE 303: Introduction to Solid State Devices (3)
- EE 304: Introduction to Solid State Devices Lab (1)
- EE 332: Electronic Circuits and Devices (4)
- EE 333: Digital and Analog Electronic Systems (4)
- EE 334: Microprocessor Engineering (3)
- EE 337: Principles of Engineering Design (1)
- EE 341: Signals and Systems (3)
- EE 342: Electromagnetics (1)
- EE 344: Electronic Circuits Laboratory (1)
- EE 345: Design and Evaluation of Microprocessors (1)
- EE 350: Engineering Electromagnetics (4)
- EE 353: Communication Systems Engineering (2)
- EE 358: Control Systems (3)
- EE 363: Communication Systems Laboratory (1)
- EE 368: Control Systems Laboratory (1)
- EE 467: Principles of Engineering Design I (2)
- EE 477: Principles of Engineering Design II (2)
- EE 482: Electromechanics (3)
- EE 498: Thermal Systems Engineering (2) or EE 259: Thermal Analysis (2)
- ME 291: Engineering Analysis (3) or MATH 354: Concepts of Probability and Statistics (3)

Required for Major (Business, 5 credits):

- EE 250: Engineering Economics (2)

Choose one course from the following list:

- BLAW 200, FINA 362, MGMT 330 or 440, MRKT 310

Required Electives for Major (9 credits):

Choose a minimum of 9 credits from the following courses. Two courses must be in sequence (same subject area):

- EE 451, EE 462, EE 471, EE 472, EE 475
- EE 476, EE 479, EE 480, EE 481, EE 484
- EE 487

Required Minor: None.

No minor or other major accepted toward degree.

Course Descriptions

EE 101 (1) Introduction to Engineering I

Discussion of historical, educational, and professional aspects of engineering. Problem solving, study approaches and techniques, and the motivation behind modern engineering education and practices. Lab sessions cover the basics of word processing, spreadsheets, databases, drawing, and graphing programs, as well as preparation of plans to graduation, and study techniques.

EE 230 (3) Circuit Analysis I

This course is meant to develop Electrical Engineering Circuit Analysis skills in DC and AC circuits. It includes circuit laws and theorems, mesh and node analysis. Natural and step response of RL, RC, and RLC circuits.

EE 231 (3) Circuit Analysis II

Continuation of Circuit Analysis I to include special topics in circuit analysis.

EE 240 (1) Evaluation of Circuits


EE 244 (2) Introduction to Digital Systems

A study of digital systems including number conversion, and the mathematical operations of addition, subtraction, and multiplication using signed and unsigned binary numbers. The use of flip-flops, counters and shift registers and software tools to simulate digital circuit behavior.”

EE 250 (2) Engineering Economics

Overview of accounting and finance and their interactions with engineering, manufacturing, marketing, R&D and sales. Lectures include the development and analysis of financial statements, time value of money, decision making tools, ratio analysis, cost of capital, depreciation, taxes, cash flow, rate of return and forecasting.

EE 253 (1) Logic Circuits Lab

Laboratory support to complement EE 244. Use of laboratory instrumentation to measure characteristics of various logic circuits and digital subsystems. Experimental evaluation of digital logic devices and circuits including logic gates, flip flops, and sequential machines. Some simulation and testing of programmable logic devices and digital integrated circuits will be included.

EE 254 (1) Digital and Circuits Lab

Laboratory support for EE 253 and EE 244. Experimental evaluation of AC and transient circuits, digital logic devices including logic gates, flip flops, and sequential machines. Some simulation and testing of programmable logic devices and digital integrated circuits will be included.

EE 305 (3) Introduction to Solid State Devices

Introduction to crystal structure, energy band theory, conduction and optical phonons in semiconductors, metals and insulators. Study of equilibrium and non-equilibrium charge distribution, generation, recombination, and recombination. Analysis and design of PN junctions, (bipolar transistor, junction) and MOS field-effect transistors. Introduction to transferred electron devices and semiconductor diode lasers.

EE 306 (1) Lab: Introduction to Solid State Devices

Laboratory support for EE 305. Experiments include resistivity and sheet resistance measurements of semiconductor material, probing material, probing of IC chips, PN junction IV and CV measurements, BJT testing to extract its parameters, MOSFET testing and evaluating its parameters, ev-measurements of MOS structure, and familiarization with surface analysis tools.

EE 332 (4) Electrons I

Semiconductor device characteristics of diodes, BJTs, IGBTs, MOSTs, and GaAs FETs will be examined. DC bias circuits small signal, large signal, and PSPICE device modeling and analysis will be studied. Design and analysis will be conducted on small-signal amplifiers (single and multi-stage), power amplifiers, differential amplifiers, and feedback amplifier concepts.

EE 333 (4) Electrons II

This is the second course of the electronics sequence. Design and analysis skills will be developed by examining the 741 and related devices. Additional course topics include filters, tuned circuits, signal generators, and wave-shaping. Digital circuits including the basics of various forms of MOS and bipolar digital logic and memory will be studied.

EE 334 (3) Microprocessor Engineering

Use of microprocessors and microcontrollers in engineering applications. Topics include assembly language programming, smart and programmable controllers, memory design including dynamic memory and direct memory access, bus
Minutes of the meeting of the Department of Electrical and Computer Engineering and Technology, 13 October 2004

Present: Gale Allen, Suraj Amatya, Mark Dvorak, William Hudson, Rajiv Kapadia, Muhammad Khaliq, Pentti Lappalainen, Paul Lindfors, Julio Mandojana, Andrew Miner, RA Nair.

The meeting was called to order by Department Chairman, William Hudson

1. The minutes of the meeting of 6 October were approved with a minor technical correction.

2. Good News:
   a. May '04 EET graduate Aaron Dahlen had an article published in Circuit Cellar magazine regarding his senior design project.
   b. The IEEE Section in Rochester presented a check for $500 to the students attending the section meeting in Rochester on Monday. This funding I believe will be used to pay for the attendance of the Student Branch president and vice-president to a leadership training conference at Purdue University 16-18 October.

3. There was continuing discussion of the Spring Semester teaching schedule and scheduling in general for the future. A spreadsheet was distributed so faculty could make known their preferences for teaching or not-teaching courses. This spreadsheet will be available in the office for review an faculty input. It was noted that scheduling was very tight with the spring semester EET courses used as an example.

4. Hudson advocated publication of a policy for evaluation of transfer credit by the department not later than the first semester the student is enrolled. This was approved with any exceptions requiring approval of the department faculty.

5. Course outcomes described in Attachment #2 for the courses listed below were reviewed.

   EET-452 Outcomes were approved
   EE-332 Outcomes were approved
   EET-101 Addition of interpretation of graphs and statistics was discussed but not accepted. The outcomes were approved
   EET-355 Outcomes were approved
   EE-333 Outcomes were approved
   EET-456 Outcomes were approved
   EET-430 Outcomes were approved
   EET-431 Outcomes were approved
   EET-488 There was spirited discussion of individual vs. team projects. The outcomes describe team projects and they were approved
   EET-489 Same comments as for EET-488
   EE-254 Outcomes were approved