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 and Technology
- Program: Electrical Engineering

Type of Change: COURSE PROPOSALS

Proposed: Change in Credits

Title Current: Electronics II

Title Proposed: Electronics II

24-Char. Abbrev: Electronics II

Proposal #: 41

Effective Date of Change: 01-07

Academic Year:

For Office Use Only:

Course Designator and Number

Number of Credits

EE 333: 4

EE 333: 3

Include a course or program description for the Bulletin (30-40 words maximum for courses, 100 for programs):
The second course of the electronics sequence presenting concepts of feedback, oscillators, filters, amplifiers, operational amplifiers, hysteresis, bi-stability, and non-linear functional circuits. MOS and bipolar digital electronic circuits, memory, electronic noise, and power switching devices will be studied. Prerequisite EE 332

Rationale or Justification for change:

Change in the Electrical Engineering Program. Course changed from 4 credit hours to 3 credit hours

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

General Education Course:

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<th>GE Category #</th>
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- 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***

(Check all that apply):

- Instructional Type: Lecture
- Course is an elective.
- Grading Format: Grade
- P/N
- Course is required for program: Electrical Engineering
- Pre- or Co-requisites: EE 332
- Other courses are being changed or eliminated. (Explain.)

Course will be offered:

- Fall Semester
- Spring Semester
- Summer Session

- 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/or 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
**Signature Page**

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<th>Department</th>
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EE 333 – ELECTRONICS II
(Spring xxxx)

Instructor: Professor M. A. Khaliq
Office: Trafton S-147
Office Hours: As posted on office door or by appointment
Telephone: 389-5267
Lecture: 11:00AM - 11:50AM, MTWH in WH 284A
E-mail: muhammad.khaliq@mnsu.edu
Course Web Site: http://www.ee.mnsu.edu/~khaliq/

Text Book:
Microelectronic Circuits (Fifth Edition), Adel S. Sedra and Kenneth C. Smith, Oxford
University Press

Reference Book:
SPICE (Second Edition), Gordon W. Roberts and Adel S. Sedra, Oxford University Press

Course Description:
This is a second course of Electronics sequence. The purpose of this course is to
introduce the feedback systems/stability; oscillator concepts and systems. Filters and
tuned amplifiers. Design of IC operational amplifier. Hysteresis, bi-stability and non-
linear functional circuits; 555 timer. A/D and D/A converters. MOS and bipolar digital
electronic circuits; memory, electronic noise, and power switching devices.

Course Outline:
The Feedback system and stability, Multistage Amplifiers, Operational Amplifier and
data converter circuits; CMOS digital logic inverter; the cascade amplifier; current mirror
circuits with improved performance; Digital CMOS logic circuits; Filters and tuned
amplifiers; signal generator and wave-shaping circuits; memory and advanced digital
circuits. SPICE simulation of operational amplifier; BJT and CMOS logic gates;
oscillator circuits; emitter-coupled logic (ECL); memory cells; and wave-shaping circuits.

Course Requirements:
EE 332 – Electronics I

Testing and Grading Policy:
Homework, Spice Assignments, and Quizzes: 20%
Examination-1: 15%
Examination-2: 15%
Examination-3: 15%
Final Examination (Comprehensive): 35%

Note:
- Homework and SPICE assignments will be given from each chapter and graded.
- Homework must be done on 8-1/2 x 11 papers, one side only, preferably on
  engineer calculation sheets or engineering calculation pads
- All assignments that are turned in should be neat, legible, written with pen or dark
  pencil, all work leading to your answer must be shown, and stapled. Failure to do
  so will result in a grade of zero on the assignment.
• On the first page of assignment write your name, assignment number, date, and course number.
• Assignments must be turned at the start of the class. Assignments handed in after the class will not be accepted.
• A weekly quiz will cover lecture topics and homework problems. Quizzes will be given in class and may or may not be announced in advance.
• There will be three in class examinations and a comprehensive final examination. The examinations will be closed book and closed notes.
• Absence during examinations and quizzes, without prior approval, will result in a zero. There will be no make-ups of examinations/quizzes for unexcused absences. Make-up of examinations/quizzes will be allowed in the event of an illness or emergency. The student requesting for make-up examination/quizzes must submit a note from doctor for illness or a document stating the emergency from an authority.
• Requests for regrading should be made within a week after an assignment/examination has been returned
• Students are expected to be regular and punctual in class attendance. Students are expected to be attentive, ask questions, and complete the required work satisfactorily.
• Students must turn off their cell phone before entering the class/lecture, and no headphones are allowed in the class/lecture.
• Any form of academic dishonesty will not be tolerated. Minimum penalty of cheating is zero on the examination/quiz, and the maximum penalty is failure in the class.
Class Schedule:
(The following schedule is based on one lecture of 50 minutes)

1. Multistage Amplifiers, and Feedback (Chapter-8) (5 Classes)
   Multistage amplifiers, four basic feedback topologies, and analysis of amplifiers
   in the four feedback topologies
2. Operational Amplifier (Chapter-9) (5 Classes)
   The two-stage CMOS Op.Amp, the Cascade amplifier (Chapter-6), the Folded-
   Cascade CMOS Op.Amp, the 741 Op.Amp circuit and its dc and ac analysis,
   SPICE simulation and design assignment. Homework assignment
3. Examination – 1 (1 Class)
4. Data Converter Circuits (Chapter-9) (3 Classes)
   Introduction to date converter, D/A, and A/D converter circuits. Homework
   assignment
5. Digital CMOS Logic Circuits (Chapter-10) (2 Classes)
   The CMOS logic inverter (Chapter-4), the BJT as a switch (Chapter-5), design
   and performance analysis of CMOS inverter, CMOS logic gate circuits, Pseudo-
   NMOS logic circuits, Pass-transistor logic circuits, Dynamic logic circuits. SPICE
   simulation and design assignment. Homework assignment
6. Examination – 2 (1 Class)
7. Filters and Tuned Amplifiers (Chapter-12) (7 Classes)
   Review of filter circuits and design, switched capacitor filters, Tuned amplifiers
   SPICE simulation and design assignment. Homework assignment
8. Signal Generator and Wave-shaping Circuits (Chapter-13) (8 Classes)
   The feedback and stability of system (Chapter-8), basic principles of oscillators,
   OP.Amp, and RC Oscillator circuits, LC and crystal oscillator circuits,
   Monostable, Bistable, and Astable Multivibrator, IC Timer circuit. SPICE
   simulation and design assignment. Homework assignment
9. Examination – 3 (1 Class)
10. Memory and Advanced Digital Circuits (Chapter-11) (8 Classes)
    Latches and flip-flop, and multivibrator circuits, semiconductor memory types –
    RAM, ROM, memories address and sense amplifier, Emitter-Coupled Logic
    (ECL), BiCMOS digital circuits, SPICE simulation and design assignment.
    Homework assignment
11. Problem Solving and Design Example Sessions (3 Classes)
12. Final Examination (1 Class)

Total Classes (45 Classes)
Upon completion of this course, students will have the ability to:

1. Understand feedback concept, and analysis of different feedback topologies
2. Analyze and understand CMOS logic and BJT logic circuits, its design and simulation with SPICE
3. Analyze and design filter circuits, and simulate with SPICE
4. Understand the fundamentals of positive feedback and its application in oscillator circuits.
5. Analysis and design of different type of oscillation circuits and their simulation with SPICE
6. Analyze and understand the operation of wave-shaping circuit and the design of monostable, bistable, and astable multivibrator. Verification of multivibrator design with SPICE.
7. Understand the operation and analysis of different types of memories.
8. Design and simulation of emitter-coupled logic
9. Understand and can analyze the elements of D/A conversion and A/D conversion.
10. Analyze and understand CMOS operational amplifier, and simulation of operational amplifier with SPICE
EE 333 - DIGITAL AND ANALOG ELECTRONIC SYSTEMS
(Spring 2006)

Instructor: Professor M. A. Khaliq
Office: Trafton S-147
Office Hours: As posted on office door or by appointment
Telephone: 389-5267
Lecture: 11:00AM - 11:50AM, MTWH in WH 284A
E-mail: muhammad.khaliq@mnsu.edu
Course Web Site: http://www.ee.mnsu.edu/~khaliq/

Text Book:
Microelectronic Circuits (Fifth Edition), Adel S. Sedra and Kenneth C. Smith, Oxford
University Press
Reference Book:
SPICE (Second Edition), Gordon W. Roberts and Adel S. Sedra, Oxford University Press
Course Description:
EE Electronics sequence with EE 332. The purpose of this course is to introduce the
feedback systems/stability; oscillator concepts and systems. Filters and tuned amplifiers.
Design of IC operational amplifier. Hysteresis, bi-stability and non-linear functional
circuits; 555 timer. A/D and D/A converters. MOS and bipolar digital electronic circuits;
memory, electronic noise, and power switching devices.
Course Outline:
The Feedback system and stability, Multistage Amplifiers, Operational Amplifier and
data converter circuits; CMOS digital logic inverter; the cascade amplifier; current mirror
circuits with improved performance; Digital CMOS logic circuits; Filters and tuned
amplifiers; signal generator and wave-shaping circuits; memory and advanced digital
circuits. SPICE simulation of operational amplifier; BJT and CMOS logic gates;
oscillator circuits; emitter-coupled logic (ECL); memory cells; and wave-shaping circuits.
Course Requirements:
EE 332 - Electronic Circuits and Devices
Testing and Grading Policy:
Homework, Spice Assignments, and Quizzes: 20%
Examination-1 (February 16, 2006. Thursday): 15%
Examination-2 (March 23, 2006. Thursday): 15%
Examination-3 (April 27, 2006. Thursday): 15%
Final Examination (Comprehensive): 35%
(May 11, 2006. Thursday 10:15AM - 12:15PM in WH284A)

Note:
- Homework and SPICE assignments will be given from each chapter and graded.
- Homework must be done on 8-1/2 x 11 papers, one side only, preferably on
  engineer calculation sheets or engineering calculation pads
- All assignments that are turned in should be neat, legible, written with pen or dark
  pencil, all work leading to your answer must be shown, and stapled. Failure to do
  so will result in a grade of zero on the assignment.
• On the first page of assignment write your name, assignment number, date, and course number.

• Assignments must be turned at the start of the class. Assignments handed in after the class will not be accepted.

• A weekly quiz will cover lecture topics and homework problems. Quizzes will be given in class and may or may not be announced in advance.

• There will be three in class examinations and a comprehensive final examination. The examinations will be closed book and closed notes.

• Absence during examinations and quizzes, without prior approval, will result in a zero. There will be no make-ups of examinations/quizzes for unexcused absences. Make-up of examinations/quizzes will be allowed in the event of an illness or emergency. The student requesting for make-up examination/quizzes must submit a note from doctor for illness or a document stating the emergency from an authority.

• Requests for regrading should be made within a week after an assignment/examination has been returned.

• Students are expected to be regular and punctual in class attendance. Students are expected to be attentive, ask questions, and complete the required work satisfactorily.

• Students must turn off their cell phone before entering the class/lecture, and no headphones are allowed in the class/lecture.

• Any form of academic dishonesty will not be tolerated. Minimum penalty of cheating is zero on the examination/quiz, and the maximum penalty is failure in the class.

• Letter grade assignment: A ≥ 90%, B ≥ 75%, C ≥ 60%, D ≥ 40%, F < 40%
Class Schedule:
(The following schedule is based on one lecture of 50 minutes)

1. Multistage Amplifiers, and Feedback (Chapter-8) (6 Classes)
   Multistage amplifiers, four basic feedback topologies, and analysis of amplifiers
   in the four feedback topologies
2. Operational Amplifier (Chapter-9) (6 Classes)
   The two-stage CMOS Op.Amp, the Cascode amplifier (Chapter-6), the Folded-
   Cascode CMOS Op.Amp, the 741 Op.Amp circuit and its dc and ac analysis,
   SPICE simulation and design assignment. Homework assignment
3. Examination – 1 (February 16, 2006. Thursday) (1 Class)
4. Data Converter Circuits (Chapter-9) (3 Classes)
   Introduction to date converter, D/A, and A/D converter circuits. Homework
   assignment
5. Digital CMOS Logic Circuits (Chapter-10) (12 Classes)
   The CMOS logic inverter (Chapter-4), the BJT as a switch (Chapter-5), design
   and performance analysis of CMOS inverter, CMOS logic gate circuits, Pseudo-
   NMOS logic circuits, Pass-transistor logic circuits, Dynamic logic circuits. SPICE
   simulation and design assignment. Homework assignment
7. Filters and Tuned Amplifiers (Chapter-12) (8 Classes)
   Review of filter circuits and design, switched capacitor filters, Tuned amplifiers
   SPICE simulation and design assignment. Homework assignment
8. Signal Generator and Wave-shaping Circuits (Chapter-13) (9 Classes)
   The feedback and stability of system (Chapter-8), basic principles of oscillators,
   OP.Amp, and RC Oscillator circuits, LC and crystal oscillator circuits,
   Monostable, Bistable, and Astable Multivibrator, IC Timer circuit. SPICE
   simulation and design assignment. Homework assignment
10. Memory and Advanced Digital Circuits (Chapter-11) (8 Classes)
    Latches and flip-flop, and multivibrator circuits, semiconductor memory types –
    RAM, ROM, memories address and sense amplifier, Emitter-Coupled Logic
    (ECL), BiCMOS digital circuits, SPICE simulation and design assignment.
    Homework assignment
11. Problem Solving and Design Example Sessions (3 Classes)
12. Final Examination
    (May 11, 2006. Thursday 10:15AM - 12:15PM in WH284A)
EE 333  Electronics II  
Course Proposal  
Staff Impact and Resource Needs  

Staff Impact – none since the course has been taught by a member of the current ECET faculty for many years  

Resource Needs – no additional resources are needed.