

METROPOLITAN STATE COLLEGE of DENVER
Office of Academic Affairs

REGULAR COURSE SYLLABUS

School of: Professional Studies

Department: Engineering Technology

Prefix & Course Number: EET 3120 Crosslisted With*: _____

Course Title: Advanced Analog Electronics

Check All That Apply: Required for Major: Required for Minor: _____ Specified Elective: _____
Required for Concentration: _____ Elective: _____ Service Course: _____

Credit Hours: 4 (3+2)

Total Contact Hours per semester (assuming 15-16 week semester):

Lecture 45 Lab 30 Internship _____ Practicum _____ Other (please specify type and hours): _____

Schedule Type(s): B Grading Mode(s): L

Variable Topics Courses (list restrictions, including the maximum number of hours that can be earned**):

** NOTE: This information must be included in the course description.

Restrictions (Variable Topics Course): _____

Prerequisite(s): EET 2145, EET 3110 and MTH 2410, with grades of "C" or better.

Corequisite(s): _____

Prerequisite(s) or Corequisite(s): _____

Banner Enforced:

Prerequisite(s): EET 2145, EET 3110 and MTH 2410, with grades of "C" or better.

Corequisite(s): _____

Prerequisite(s) or Corequisite(s): _____

Catalog Course Description:

This course is an advanced analog electronics course with emphasis on the operational amplifier and other advanced analog circuits. Advanced mathematical techniques and computer simulations are developed for circuit analysis.

APPROVED: Rubend Pizzi 3/1/2011
 Department Chair OR Program Director _____ Date

Debra A. Thompson 3-11-11
 Dean OR Associate Dean _____ Date

Debra A. Thompson 6/2/11
 Associate VP, Academic Affairs _____ Date

*If crosslisted, attach completed Course Crosslisting Agreement Form

Prefix and Course Number: EET 3120

Required Reading and Other Materials will be equivalent to:

Kudeki, Munson (2008). *Analog Signals and Systems*, or latest edition. Upper Saddle Hill, NJ: Prentice Hall

Specific, Measurable Student Behavioral Learning Objectives:

Upon completion of this course the student should be able to:

1. Research and effectively use operational amplifier parameters
2. Design and analyze operational amplifiers circuits, in a number of configurations:
 - a. Linear op amp applications
 - b. Non-linear op amp applications
 - c. Oscillators
 - d. Active filters
 - e. Multiple op amp configurations
 - f. Dual and single supply circuits
3. Collaborate to construct, troubleshoot, and measure circuits
 - a. Analyze circuits by calculation
 - b. Model circuits using circuit simulation software
 - c. Construct and measure circuits with respect to design and software models
 - d. Document results in formal laboratory reports

Detailed Outline of Course Content (Major Topics and Subtopics) or Outline of Field Experience/Internship (experience, responsibilities and supervision):

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| <ol style="list-style-type: none"> I. General Amplifier Concepts <ol style="list-style-type: none"> A. Dependent Sources B. Frequency Response Considerations C. Amplifier II. Ideal Op. Amp. Amplifiers <ol style="list-style-type: none"> A. The Ideal Op. Amp. B. Simplified Design C. Current-Controlled Sources D. Linear Combination Circuit E. Closed-Loop Differential Amplifier III. Practical Op. Amp. Amplifiers <ol style="list-style-type: none"> A. Inverting and Noninverting Amplifiers <ol style="list-style-type: none"> 1. Gain 2. Input and Output Impedances B. Noise Gain C. Closed-Loop Frequency D. Slew Rate E. Offset Voltage and Current F. Common-Mode Rejection IV. Linear Op. Amp. Circuits <ol style="list-style-type: none"> A. Instrumentation Amplifier B. Integrator | <ol style="list-style-type: none"> C. Differentiator D. Phase Shift Circuits E. Single Power Supply Operation V. Nonlinear Op. Amp. Circuits <ol style="list-style-type: none"> A. Comparators B. Precision Rectifiers C. Holding Circuits D. Limiters E. Voltage Regulators VI. Oscillators and Waveform Generators: <ol style="list-style-type: none"> A. Classification B. Barkhausen Criteria C. Programmable Timers D. Wein Bridge Oscillator E. Waveform Generator F. Voltage Controlled Oscillators VII. Active Filters <ol style="list-style-type: none"> A. Classifications B. Low Pass C. High Pass D. Band Pass |
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Evaluation of Student Performance:

1. Written exams
2. Computer simulations
3. Homework
4. Laboratory reports