METROPOLITAN STATE COLLEGE *of* DENVER
Office of Academic Affairs

REGULAR COURSE SYLLABUS

School of: Professional Studies

Department: Engineering Technology

CIP Code: 15.0303

Prefix & Course Number: EET 1150 **Crosslisted With*:** _____

Course Title: Circuits II

Check All That Apply: Required for Major: X Required for Minor: _____ Specified Elective: X

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 1140 and (MTH 1120 or MTH 1400 or higher level math course), with grades of "C" or better.

Corequisite(s): _____

Prerequisite(s) or Corequisite(s): _____

Banner Enforced:

Prerequisite(s): EET 1140 and (MTH 1120, or MTH 1400 or MTH 1410, or MTH 2410), with grades of "C" or better.

Corequisite(s): _____

Prerequisite(s) or Corequisite(s): _____

Catalog Course Description:

This course is a continuation of EET 1140, using trigonometry and complex algebra. Studies include single time constant circuits, phasors, and the j operator, RLC circuits with sinusoidal, steady-state sources, impedance and admittance, AC formulation of classic network theorems, complex network equations, complex power, frequency response, transformers, and two-port network models.

APPROVED:

Department Chair **OR** Program Director	4 Mar 08 Date
Dean **OR** Associate Dean	3/5/08 Date
Associate VP, Academic Affairs	3/7/08 Date

*If crosslisted, attach completed Course Crosslisting Agreement Form

EET 1150:
Required Reading and Other Materials will be equivalent to:

Robbins (July 19, 2006). *Circuit Analysis, 4th Edition.* Thompson Delmar Learning

Specific, *Measurable* Student Behavioral Learning Objectives:
Upon completion of this course the student should be able to:

1. Utilize Ohm's law, Kirchoff's Voltage and Current Laws, Superposition, Thevenin and Norton conversions to analyze single and three phase AC circuits using phasors.
2. Determine the theoretical value for current, voltage, power and impedance in various series, parallel and series/parallel circuits consisting of transformers, and impedance components utilizing calculators and computer simulation programs for single and three phase AC circuits.
3. Determine the impact of various frequencies on impedance circuits related to resonance and cutoff frequencies and develop the appropriate transfer function.
4. Work with a team to construct circuits and validate theoretical findings utilizing analog and digital meters, function generators, oscilloscopes, power supplies, breadboards and electrical components
5. Write laboratory finding in a concise document comparing theoretical and actual data with computer generated models.

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

I. AC Fundamentals:
   - A. AC Waveforms
   - B. Trigonometric Functions
   - C. Waveform Parameters
   - D. Phase Relations
   - E. Oscilloscope
   - F. Average and Effective Values
   - G. AC Voltage and Current in R
   - H. AC Voltage and Current in L and C
   - I. Average Power

II. General A.C. Laboratory Equipment Familiarization.
   - A. Oscilloscope.
   - B. Digital Multimeter.
   - C. Frequency Counter.

III. Computer-Aided A.C. Circuit Analysis.

IV. Complex Algebra and Phasors:
   - A. Complex Numbers
   - B. Complex Plane
   - C. Arithmetic Operations
   - D. Phasors
   - E. Phasor Form of Impedance

V. Series and Parallel AC Circuits:
   - A. Series Equivalent Impedance
   - B. Series R-L Circuits
   - C. Series R-C Circuits
   - D. Series R-L-C Circuits
   - E. Voltage Divider Rule
   - F. Admittance and Susceptance
   - G. Parallel AC Circuits
   - H. Current Divider Rule

VI. Series Parallel Circuits:
   - A. Simplified Equivalent Networks
   - B. Power in Series-Parallel Circuits
   - C. Ladder Networks
   - D. Reactive and Apparent Power

VII. AC Network Transformations:
   - A. Source Conversions
   - B. Series & Parallel Sources
   - C. AC Mesh Analysis
   - D. AC Nodal Analysis

VIII. AC Network Theorems:
   - A. Superposition
   - B. Controlled Sources
   - C. Thevenin

EET 1150:

D. Norton
E. Maximum Power Transfer

IX. Filter & Resonant Circuits:
A. RC Filters
B. Series RLC Circuits
C. Parallel RLC Circuits
D. Decibels & Logarithmic Plots

X. Transformers:
A. Basic Principles
B. Ideal Transformers
C. Impedance Transformation
D. Types & Applications
E. Losses:
1. Copper
2. Eddy Currents
3. Hysteresis
4. Efficiency
F. Limitations:
1. Leakage Flux
2. Coupling Coefficients
3. Loading Effects
4. Frequency Response
5. Mutual Inductance

XI. L, C, R Measurements
A. Impedance Bridge
B. Vector Z-Meter

Evaluation of Student Performance:

1. Written homework
2. Formal laboratory reports
3. Written exams
4. Laboratory exams