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 1140            **Crosslisted With\*:** _____

**Course Title:** Circuits I

**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):** An intermediate algebra course or one and one-half years of secondary school algebra or equivalent and appropriate score on the mathematics preassessment placement test or higher level math course, with a grade of "C" or better.
**Corequisite(s):**

**Prerequisite(s) or Corequisite(s):** _____

**Banner Enforced:**
    **Prerequisite(s):** ACT Math 25 or SAT Mathematics 570 or Accuplacer Elementary Algebra 100 or Accuplacer Elem Alg. transfer 100, or MTH 1110, or MTH 1120, or MTH 1400 or MTH 1410, or MTH 2410, with a grade of "C" or better.
    **Corequisite(s):** _____
    **Prerequisite(s) or Corequisite(s):** _____

**Catalog Course Description:**
This course covers DC circuit analysis, including mesh analysis, nodal analysis, Thevenin conversion, Norton conversion, power, magnetism and magnetic circuits, capacitance, and inductance. An introduction to electrical laboratory procedures and the measurement of basic circuit parameters is also included.
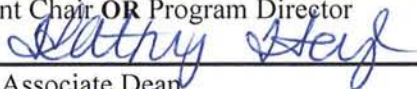
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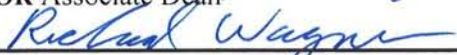_____    12Feb08
Department Chair OR Program Director          Date

_____    2/13/08
Dean OR Associate Dean                        Date

_____    3/7/08
Associate VP, Academic Affairs                Date

\*If crosslisted, attach completed Course Crosslisting Agreement Form

EET 1140:

**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 DC circuits.
2.  Determine the theoretical value for current, voltage, power and resistance in DC series, parallel and series parallel circuits utilizing calculators and computer simulation programs.
3.  Work with a team to construct circuits and validate theoretical findings utilizing analog and digital meters, power supplies, breadboards and electrical components
4.  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.  Units and Notation:
    A.  SI System
    B.  Scientific Notation
    C.  Review of Inequalities
    D.  Approximations

II. Nature of Electricity:
    A.  Structure of Matter
    B.  Electric Properties of Matter:
        1.  Conductors
        2.  Insulators
        3.  Semiconductors
    C.  Current
    D.  EMF and Voltage
    E.  Resistance
    F.  Conventional Current
    G.  DC and AC

III. Familiarization:
    A.  Voltmeter
    B.  Ammeter
    C.  Ohmmeters
    D.  Digital Multimeters

IV. Fundamental Relations:
    A.  Ohm's Law
    B.  Measuring Voltage, Current and Resistance
    C.  Work, Energy and Power
    D.  Resistors:
        1.  Types
        2.  Ratings
        3.  Color Code
    E.  Conductance
    F.  Efficiency
    G.  Sources:
        1.  Ideal
        2.  Real
    H.  Linearity

V.  Series and Parallel Circuits:
    A.  Electric Circuits
    B.  Series Circuits
    C.  Kirchhoff's Voltage Law
    D.  Open Circuits
    E.  Voltage Divider Principle
    F.  Parallel Circuits

EET 1140:
    G. Kirchhoff's Current Law
    H. Current Divider Principle
    I. Short Circuits

VI. Series-Parallel Circuits

VII. Network Transformation:
    A. Balanced Bridges
    B. Voltage-Current Source Transformation
    C. Solving Simultaneous Equations
        1. Cramer's Rule
        2. Matrix Method
    D. Mesh Analysis
    E. Nodal Analysis

VIII. Network Theorems:
    A. Superposition
    B. Thevenin
    C. Norton
    D. Maximum Power Transfer
    E. Millman

IX. Intro to Fields and Electrical Physics:
    A. Coulomb's Law
    B. Electric Fields
    C. Breakdown
    D. Resistance of Conductors:
        1. Basics
        2. AWG
    E. Resistance of Semiconductors
    F. Temperature Dependence

X. Familiarization with Oscilloscope:
    A. Time Axis
    B. Scope Used as a Voltmeter

XI. Capacitance:
    A. Nature of Capacitance
    B. Dimensions and Dielectrics
    C. Types and Ratings
    D. Series and Parallel
    E. RC Networks
    F. Energy Storage

XII. Magnetic Fields and Currents:
    A. Magnetic Fields
    B. Flux Density and Field Intensity
    C. Permeability
    D. Reluctance
    E. B-H Curves and Hysteresis
    F. Magnetic Circuits

XIII. Inductance:
    A. Electromagnetic Induction
    B. Self-inductance
    C. Inductors
    D. RL Circuits
    E. Energy Stored

XIV. Soldering, Splicing, Crimping

**Evaluation of Student Performance**:
1. Written exams
2. Laboratory exam
3. Formal laboratory reports
4. Homework.