

METROPOLITAN STATE UNIVERSITY OF DENVER
Office of Academic and Student Affairs

REGULAR COURSE SYLLABUS

College of: Professional Studies

Department: Engineering and Engineering Technology

Prefix & Course Number: CPE 2145 Crosslisted With*: _____

Course Title: Solid State Electronics

Transcript Course Title (30 characters): Solid State Electronics

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

To receive Title IV financial aid funds, all institutions of higher education must comply with the federal definition of a credit hour. The Higher Learning Commission requires institutions to maintain policies and procedures for verifying compliance with this definition.

Federal Credit Hour Definition: A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than:
(1) one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or ten to twelve weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time; or (2) at least an equivalent amount of work as required in paragraph (1) of this definition for other activities as established by an institution, including laboratory work, internships, practica, studio work, and other academic work leading toward to the award of credit hours. 34CFR 600.2 (11/1/2010)

Credit Hours: 3 (3+0) Schedule Type: L Grade Mode: L

Face-to-Face or Equivalent Hours per course:

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

Additional Student Work Hours per course: 90

Variable topics umbrella course: No Yes _____ If yes, number of credits/repeats allowed _____

Specified repeatable course: No Yes _____ If yes, number of credits/repeats allowed _____

Prerequisite(s): CPE 1150, or EET 1150, and CHE 1100 or CHE 1800 (with a grade of "C" or better for all prerequisites)

Corequisite(s): CPE 2165

Prerequisite(s) or Corequisite(s): _____

APPROVED:

Department Chair OR Program Director Date

Dean OR Associate Dean Date

Associate VP, Academic and Student Affairs Date

*If crosslisted, attach completed Course Crosslisting Agreement Form

Prefix and Course Number:

Banner Enforced Coding:

Prerequisite(s): CPE 1150, or EET 1150, and CHE 1100 or CHE 1800 (with a grade of "C" or better for all prerequisites)

Corequisite(s): CPE 2165

Prerequisite(s) or Corequisite(s): _____

Registration restrictions: Level _____ Class _____ Program/Major _____ Student attribute _____

Catalog Course Description:

Students in this course will study the theory, modeling and application of semiconductor based electronic circuits. Devices studied include: diodes, bipolar junction transistors, MOS field effect transistors, thyristors, voltage regulators and operational amplifiers.

Specific Variable Topics Course Description (if applicable, umbrella course description included above):

Required Reading and Other Materials will be equivalent to:

Albert Paul Malvino, David J. Bates (2016). *Electronic Principles, 8th Edition*. New York, NY: McGraw-Hill

Specific, Measurable Student Behavioral Learning Objectives:

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

1. Identify and describe the composition of semiconductor materials and devices.
2. Identify and use device parameters using appropriate research resources.
3. Analyze and design semiconductor device based circuits using diodes, bipolar junction transistors (BJT), field effect transistors (FET), voltage regulator, optoelectronic devices and operational amplifiers
4. Demonstrate a basic understanding of analog integrated devices, and power regulation and control circuits.

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

- I. Thevenin Conversion (brief review)
- II. Semiconductor Theory
 - A. Composition
 - B. Materials
- III. Course Tools
 - A. Importance of Manufacturer: Cross Reference, Datasheet, Equivalence, and Specifications
 1. Internet as a Data Book
 2. Manufacturers on the Net
 3. Down-loading Files and Data Sheets
 - B. Circuit Simulation Software
- IV. Reading Component Data Sheets
 - A. Device Parameters
- V. Diode
 - A. Device
 - B. Applications
 - C. Zener
 - D. LEDs

- E. Other Diodes
- VI. Bipolar Junction Transistor
 - A. Theory
 - B. Characteristics
 - C. Load Lines
 - D. Transistor Switch
- VII. Transistor Biasing
 - A. Base
 - B. Emitter Feedback
 - C. Collector Feedback
 - D. Voltage Divider
- VIII. Transistor Amplifiers
 - A. Common Emitter
 - B. Common Collector
 - C. Common Base
- IX. H parameters (brief)
- X. Amplifier Biasing
 - A. Class A
 - B. Class B
 - C. Class C (brief)
- XI. Field Effect Transistors and Biasing
 - A. JFET
 - B. MOSFET
- XII. Small-Signal FET Amplifiers
- XIII. Amplifier Frequency Response
 - A. General Concepts
 - B. Decibel
 - C. Frequency Response
 - D. Frequency Response Measurements
 - E. Filters
 - 1. Low Pass
 - 2. High Pass
 - 3. Band Pass
- XIV. Thyristor and Other Devices
 - A. Silicon Controlled Rectifier (SCR)
 - B. Triac

XV. Voltage Regulators (brief)

Evaluation of Student Performance:

1. Examinations
2. Written Assignments