

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 3400 Crosslisted With*: _____

Course Title: Signals & Systems

Transcript Course Title (30 characters): Signals & Systems

Check All That Apply: Required for Major: X 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 X Yes _____ If yes, number of credits/repeats allowed _____

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

Prerequisite(s): CPE 1150, CPE 2310 and MTH 2410 (with a grade of "C" or better for all prerequisites)

Corequisite(s): _____

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, CPE 2310 and MTH 2410 (with a grade of "C" or better for all prerequisites)

Corequisite(s): _____

Prerequisite(s) or Corequisite(s): _____

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

Catalog Course Description:

This course provides an introduction to the student to the basic concepts of signals and system modeling. The students will develop and understand time-domain and frequency-domain analysis of both continuous and discrete systems and signals.

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

Required Reading and Other Materials will be equivalent to:

Phillips, Parr and Riskin, (2014) *Signals, Systems, & Transforms*, 5th edition, or latest edition, Pearson.

Specific, Measurable Student Behavioral Learning Objectives:

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

1. Understand the difference between continuous and discrete time signals
2. Analyze systems and signals using Laplace transformations
3. Analyze systems and signals using Z-transforms
4. Analyze systems and signals using Fourier transformations

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

- I. Ordinary differential equations
 - A. First order circuits
 - B. Second order circuits
 - C. Convolution

- II. Laplace Transformation
 - A. Definition
 - B. Properties and Constraints
 - C. Determining the transformation
 - D. Inverse transforms
 - E. Initial and Final value theorems
 - F. Pole-zero plots
 - G. Bode plots
 - H. Applications

- III. Difference equations
 - A. Similarity and differences with differential equations
 - B. Solving difference equations

- IV. Z-Transformation
 - A. Definition
 - B. Properties and Constraints
 - C. Determining the transformation

- D. Inverse transforms
- E. Initial and Final value theorems
- F. Pole-zero plots
- G. Applications

V. Fourier Series

- A. Frequency response and importance
- B. Properties and constraints
- C. Computation and analysis of results

VI. Fourier-Transformation

- A. Definition
- B. Properties and Constraints
- C. Determining the transformation
- D. Inverse transforms
- E. Applications

Evaluation of Student Performance:

1. Written Assignments
2. Examinations