

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 4600 Crosslisted With*: _____

Course Title: VLSI Circuits and Systems

Transcript Course Title (30 characters): VLSI Circuits and 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 (2+2) Schedule Type: B Grade Mode: L

Face-to-Face or Equivalent Hours per course:

Lecture 30 Lab 30 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 3500 and CPE 4020 (with a grade of "C" or better for all prerequisites)

Corequisite(s): _____

Prerequisite(s) or Corequisite(s): _____

Banner Enforced Coding:

Prerequisite(s): CPE 3500 and CPE 4020 (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 will explore the fundamentals of digital integrated circuit design. The following design specifications will be addressed, such as functionality, performance, reliability, manufacturability, testability, cost, design layout rules and checking, circuit extraction, simulation, and verification.

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

Required Reading and Other Materials will be equivalent to:

J. Uyemura. (2002). *Introduction to VLSI Circuits and Systems*. Wiley.

Specific, Measurable Student Behavioral Learning Objectives:

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

1. Understand the basics of device operation and device physics
2. Know the steps of VLSI circuit design
3. Use CAD tools to build and analyze VLSI circuits
4. Simulate and verify VLSI circuits

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

- I. An Overview of VLSI
- II. Silicon Logic
- III. Logic Design with MOSFETs
- IV. Physical Structure of CMOS Integrated Circuits
- V. Fabrication of CMOS Integrated Circuits

- VI. Elements of Physical Design
- VII. The Logic-Electronics Interface
- VIII. System Specifications Using Verilog HDL
- IX. General VLSI System Components
- X. Arithmetic Circuits in CMOS VLSI
- XI. Memories and Programmable Logic
- XII. System Level Physical Design
- XIII. VLSI Clocking and System Design
- XIV. Reliability and Testing of VLSI Circuits

Evaluation of Student Performance:

1. Examinations
2. Written Assignments
3. Design Demonstrations/ Lab Reports