



CALIFORNIA STATE UNIVERSITY
FULLERTON

Department of Electrical and Computer Engineering
EGEC 180 – Digital Logic and Computer Structures
Spring 2024

Location: CS 301

Lecture: Monday – 11:30 am to 1:20 pm

Lab timing: Wednesday – 11:30 am to 1:20 pm

Instructor: Rakesh Mahto, Ph.D.

Office: E-314

E-mail: ramahto@fullerton.edu

Phone: (657)-278-7274

Office hours: Monday and Wednesday – 2:00 pm to 3:30 pm or by appointment

Zoom Meeting ID: 891 2907 5346

Technical support: (657) 278-8888

COURSE COMMUNICATION

All course announcements and individual email are sent through Canvas, which only uses CSUF email accounts. Therefore, you **MUST** check your CSUF email on a regular basis (several times a week) for the duration of the course.

COURSE DESCRIPTION FROM THE CATALOG

Binary number system and arithmetic, computer codes, Boolean algebra, logic gates, K-map minimization, sequential circuits, memory devices, state diagram and table, computer architecture, memory, Arithmetic Logic Unit, and control unit. Prerequisite: CPSC 120 (Introduction to Programming).

COURSE OBJECTIVES

This course introduces digital logic design and applies digital logic concepts to the design of computer structures. Topics include binary number system and arithmetic, computer codes, Boolean algebra, logic gates, K-map minimization, sequential circuits, memory devices, state diagram, state tables, computer architecture, memory, arithmetic and logic unit, and control unit. The lab component of this course will give students an opportunity to design and simulate digital circuits.

STUDENT LEARNING GOALS

The specific student learning goals for this course are as follows:

1. An understanding of binary number systems and binary arithmetic
2. An understanding of Boolean algebra
3. An ability to minimize Boolean functions
4. An ability to analyze, design and simulate combinational and sequential logic circuits

5. An understanding of computer organization and instruction set architecture (ISA) of a simple computer

This course ties into University-wide Student Learning Goal I (Intellectual Literacy). The University-wide Student Learning Goals can be accessed at

http://www.fullerton.edu/senate/publications_policies_resolutions/ups/UPS%20300/UPS%20300.021.pdf

REQUIRED TEXTBOOK (required)

Digital Design and Computer Architecture, 2nd Edition.

Authors: **David Harris** and **Sarah Harris Jr**; Publisher: **Morgan Kaufmann**, 2012

REFERENCE TEXTBOOK

Fundamentals of Logic Design, 7th Edition.

Authors: **Charles H. Roth** and **Larry L Kinney**; Publisher: **Cengage Learning**, 2013

GRADING STANDARDS, AND CRITERIA

In this course the plus/minus system will be used.

The grade breakdown is as follows:

98 – 100% = A+

93 - 97% = A (outstanding performance)

90 – 92% = A-

87 – 89% = B+

83 – 86% = B (good performance)

80 – 82% = B-

77 – 79% = C+

73 – 76% = C (acceptable performance)

70 – 72% = C-

67- 69% = D+

63 – 66% = D (poor performance)

60 – 62% = D-

0 – 59% = F

In the electrical and computer engineering major must earn a grade of C or higher in this course to receive credit. The electrical and computer engineering majors earning grades of C- or lower must repeat the course.

GRADING POLICY

Undergraduate	
Category	% of Final Grade
Homework and lab assignment	18%
Attendance	3%
Quizzes	4%
Mid-term Exam (2 exams)	25%
Final Exam	25%

EXAM AND QUIZZES

All exams are closed books, however, students will be allowed one page of hand-written notes unless specified otherwise. The midterms will cover specific topics and the final exam will be comprehensive. Prior notification is required if the student is unable to take the midterms for any compelling reason. A grade of zero will be incurred for any unexcused missed midterm exams. Exams and quizzes cannot be taken after they have been given in class. Due to an act of nature, personal medical emergency, a family crisis, an act of terrorism, severe civil unrest, etc. students have 10 calendar days to petition the instructor to retake any exam/quiz without late penalty. Exceptions will be made on a case by case basis, provided there is time to evaluate the merits of such an application. However, the final exam is mandatory for successful completion of the course. Quizzes may be given at unannounced times to assess the progress (and attendance) of the class.

Extra Credit Policy

Extra credit options, if any, will be announced in class during the semester. Such options will be available to all students on an equitable basis.

Late Assignments

After a deadline has passed, a late submission with a 10% penalty will be allowed only under extenuating circumstances such as a personal or family emergency, subject to the following conditions:

- The solutions for the assignment/homework etc. have not been distributed by the instructor, and
- The submission is made by the beginning of the class period immediately following the specified deadline

Please note that any homework/assignment/report etc. that is due during the last week of instruction or on the day of the final exam must be submitted on the specified deadline. There will be no relaxed deadline (with 10% penalty) in such cases.

ATTENDANCE POLICY

Attendance is mandatory. If a student cannot attend a class for any compelling reason, he/she should notify the instructor on the same day (in advance, if applicable) and provide appropriate documentation as soon as possible.

ASSIGNMENT DESCRIPTIONS

Class assignments will be posted on the Canvas. Students will be required to convert their homework solution into PDF form and submit it through Canvas. Hard copy submission and emailing me the homework assignment won't be accepted and it will be considered as incomplete.

In case of technical difficulties with Canvas, the instructor will communicate with students directly through CSUF email, and assignments can be sent through email, faxed or mailed to the Department of Secondary Education. In the case email doesn't work, students should call the department coordinator at 657-278-5987 for further direction.

POLICY ON RETENTION OF STUDENT WORK

Work is submitted through the Canvas course site and shall be retained on the course website for a reasonable time after the semester is completed.

TECHNICAL REQUIREMENTS

Students are expected to

1. Have basic computer competency which includes:
 - a. the ability to use a personal computer to locate, create, move, copy, delete, name, rename, and save files and folders on hard drives, secondary storage devices such as USB drives, and cloud such as Google Drive (Titan Aps) and Dropbox;
 - b. the ability to use a word processing program to create, edit, format, store, retrieve, and print documents;
 - c. the ability to use their CSUF email accounts to receive, create, edit, print, save, and send an e-mail message with and without an attached file; and
 - d. the ability to use an Internet browser such as Chrome, Safari, Firefox, or Internet Explorer to search and access web sites in the World Wide Web.
2. Have ongoing reliable access to a computer with Internet connectivity for regular course assignments
3. Utilize Microsoft® Office 2013 (for P.C.) or 2011 (for Mac) including Word, PowerPoint, and Excel to learn content and communicate with colleagues and faculty; have the ability to regularly print assignments
4. Maintain and access three times weekly their CSUF student email account
5. Use Internet search and retrieval skills to complete assignment
6. Apply his/her educational technology skills to complete expected competencies
7. Utilize other software applications as course requirements dictate
8. Utilize Canvas to access course materials and complete assignments

Students with Special Needs

Please inform the instructor during the first week of classes about any disability or special needs that you may have that may require specific arrangements related to attending class sessions, carrying out class assignments, or writing papers or examinations. According to California State University policy, students with disabilities must document their disabilities at the Disability Support Services (DSS) Office in order to be accommodated in their courses. Additional information can be found at the [DSS website](#) , by calling 657-278-3112 or email dsservices@fullerton.edu.

Academic Dishonesty Policy

Academic dishonesty includes such things cheating, inventing false information or citations, plagiarism, and helping someone else commit an act of academic dishonesty. It usually involves an attempt by a student to show a possession of a level of knowledge or skill, which he/she in fact does not possess. Cheating is defined as the act of obtaining or attempting to obtain credit for work by the use of any dishonest, deceptive, fraudulent, or unauthorized means. Plagiarism is defined as the act of taking the work of another and offering it as one's own without giving credit to that source. An instructor who believes that an act of academic dishonesty has occurred (1) is obligated to discuss the matter with the student(s) involved; (2) should possess reasonable evidence such as documents or personal observation; and (3) may take whatever action (subject to student appeal) he/she deems appropriate, ranging from an oral reprimand to an F in the course. Additional information on this policy is available from [University Policy Statement 300.021](#).

Emergency Preparedness

To be able to respond effectively in an emergency, be sure to note (a) fire alarm pull station locations, (b) evacuation map including the class's outside meeting area, (c) emergency procedures for fire, medical emergency, hazardous materials release, earthquake and dangerous situations, and (d) location of nearest emergency phone. Any person with special needs is encouraged to speak with the instructor privately. All campus personnel are required to participate in all campus-wide drills. More emergency preparedness information can be found at the [Classroom Preparedness website](#). The emergency procedures (c above) that you need to follow in our class are detailed in the classroom guide at the end of this syllabus.

If an emergency disrupts normal campus operations or causes the University to close for a prolonged period of time (more than three days), students are expected to complete the course assignments listed on the syllabus as soon as it is reasonably possible to do so.

LAB/CLASSROOM SAFETY AND EQUIPMENT CARE

All safety practices, policies and protocols of the University must be followed. More information can be obtained at <http://riskmanagement.fullerton.edu/laboratorysafety/>.

Students are also expected to follow all in-class instructions, audio-visual instructions, tutorials and user manuals for the safe, efficient and proper handling of classroom and lab facilities including computers, monitors, cables, keyboards, mouse, computer desk, chairs, computer desks, cabinets, microcontroller boards, FPGA boards etc.

OTHER COURSE-RELATED POLICIES

1. Any disruptive classroom behavior that can adversely affect the learning environment will be reported and dealt with seriously.
2. Cell-phones, laptops, tablets, and other such devices should be turned off while the class is in session.
3. Although the consumption of solid food is not encouraged while the class is in session, it is OK to do so due to another class or an urgent commitment immediately before or after this class.
4. You must bring your own calculator, pen, pencil eraser, sharpener, ruler etc. for exams and quizzes.
5. The final grading percentage for calculating final grades might change. If it happens the students will notified in the class.

TENTATIVE COURSE OUTLINE

Week	Textbook chapter (s)	Topics
1	1	Number Systems
2	1	Logic Gates
3	2	Boolean Algebra; Boolean Function Minimization
4	2	Boolean Function Minimization
5	2	Elementary Combinational Logic Design
6	3	Sequential Logic; First Midterm
7	3	Sequential Logic
8	5	Sequential Logic
9	5	Combinational Logic (ALU blocks)
10	5	Combinational Logic (ALU blocks)
11	5	Registers and Counters; Second Midterm
12	5	Registers and Counters
13	6	Computer Organization; Instruction Set Architecture
14	6	Instruction Set Architecture
15		Control Unit
16		Final exam