

**LAGUARDIA COMMUNITY COLLEGE
CITY UNIVERSITY OF NEW YORK
MATHEMATICS, ENGINEERING, AND COMPUTER SCIENCE DEPARTMENT**

MAC292 – Computer Logic, Design and Implementation II

4 credits; 5 hours (3 lecture, 2 lab)

Prerequisites: MAC291

Catalog Description:

This course will introduce the students to analyze discrete and integrated logic circuits including latches, flip-flops, timers, shift registers, counters, microprocessor architecture, and to design and implement microprogramming on programmable logic devices. This course will emphasize the laboratory construction and troubleshooting of these circuits. The student should expect to pay for additional materials for this course.

Instructional Objectives:

1. Familiarize students with characteristics of latches and flip-flops
2. Enable students to describe the operations of one-shots and astable multivibrators
3. Introduce students to timing diagrams for logic circuit analysis
4. Introduce students to shift register operations and logic symbols with dependency notation
5. Enable students to design asynchronous and synchronous counters
6. Introduce students to arithmetic logic unit and its circuitry
7. Enable students to design error correction codes
8. Familiarize students with a very simple computer architecture
9. Enable students to perform microprogramming on programmable logic devices

Performance Objectives:

1. Explain characteristics of latches and flip-flops
2. Describe the operations of one-shots and astable multivibrators
3. Use timing diagrams for logic circuit analysis
4. Interpret shift register operations and logic symbols with dependency notation
5. Design asynchronous and synchronous counters
6. Explain arithmetic logic unit and its circuitry
7. Design error correction codes
8. Describe a very simple computer architecture
9. Perform microprogramming on programmable logic devices

Textbook:

Floyd, Thomas L., Digital Fundamentals, 11th Edition, Pearson, ISBN: 10-0-13-273796-5.

Evaluation:

Written Tests	45%
Class Work	10%
Project	10%
Final exam	35%
Total	100%

Academic Integrity:

This class will be conducted in compliance with LaGuardia Community College's academic integrity policy.

Attendance:

The maximum number of unexcused absences allowed is 15% of the total class meetings. Unexcused absences beyond this maximum will result in a grade of WU or F.

Comments:

The grading standards listed above and the contents listed in the course outline are both subject to modification by the instructor.

COURSE OUTLINE

Week	Topic
1	Overview of digital and analog quantities, logic gates and combinational logic
2	Latches, flip-flops, flip-flop operating characteristics
3	One-shots, astable multivibrator, timing diagrams
4	Frequency dividers and timers
5	Shift register operations, logic symbols with dependency notation
6	Asynchronous counters, synchronous counters, design and implementation
7	Synchronous and asynchronous shift registers, logic symbol with dependency notation
8	Arithmetic logic unit (ALU) and its circuitry
9	Hamming error correction code, design and implementation
10	A very simple computer architecture, decoding scheme
11	Simple programmable logic devices, complex programmable logic devices, programmable logic software
12	Microprogramming on programmable logic devices
13	Review on digital technology and microprogramming, Final Exam