CS 303 - Logic and Digital System Design
Fall 2020

This is a 4-credit, introductory course on logic and digital system design.

Catalogue Data: Number systems and conversion, Boolean algebra, the assertion level concept; minterm and maxterm expansions, Karnaugh maps, and Quine McCluskey minimization, combinatorial logic circuit design, NAND and NOR gate based design. State machines and sequential circuits flip-flops, minimization of state tables, state assignment. Higher-level digital system design using SSI-MSI blocks such multiplexers/decoders, adders, memory and programmable gate arrays; bus oriented systems. Asynchronous sequential circuits, flow tables, timing hazards.

Prerequisite / Co-requisite: The class is open to undergraduate students / CS 303R and CS303L

Instructor: Erdinç Öztürk, FENS 1089, erdinco@sabanciuniv.edu

           Office Hours: TBD

Schedule:

       Tuesday: 13:40 – 15:30

       Wednesday: 11:40 – 12:30

Textbook: M. Morris Mano and Michael D. Ciletti. Digital Design: With an Introduction to the Verilog HDL.

Fifth Edition, Pearson, 2013, ISBN 978-0-273-76452-6.

Tentative Outline

       Number Systems & Arithmetic

       Boolean Algebra & Logic Operations

       Gate-Level Minimization

       Analysis & Design of Combinational Logic Circuits

       Analysis & Design of Synchronous Sequential Logic Circuits

       Registers & Counters

       Memory & Design with Programmable Logic

       Design with Algorithmic State Machines (ASM)

Student Responsibilities (tentative)

       Lab & Homework assignments: There will be a minimum number of four laboratory and homework assignments. You will be required to use Foundation tools for schematic design and FPGA as the target device for your designs.

CS 303 class projects: In addition to lab and homework assignments, the students are required to work on a big development project. It is essential for students to meet the time schedule of the projects. Each student must provide a demonstration of their work.

Students will work alone for lab assignments and class projects.

Grading

Midterm exams : 35% (15% + 20%)

Final exam : 35%

Short Homework : 5%

Lab Assignments : 15%

Project : 10%