

# CS 303- Logic and Digital System Design\*

## Fall 2024 - 2025

### Instructor Information

*Name:* Atıl Utku Ay  
*Office:* FENS L026  
*Email:* utku.ay@sabanciuniv.edu  
*Office Hours:* Monday 09:40 - 11:30

### Schedule

*Lectures:*

Monday	08:40 - 09:30	FENS G077	(A)
Thursday	12:40 - 14:30	FENS G077	(A)
Monday	16:40 - 18:30	FENS G077	(B)
Wednesday	13:40 - 14:30	FENS G077	(B)

*Recitation:*

Thursday	17:40 - 18:30	FENS G077	(A)
Thursday	16:40 - 17:30	FENS G077	(B)

*Labs:*

Monday	13:40 - 15:30	FENS 1033	(A1 & A2)
Tuesday	12:40 - 14:30	FENS 1033	(B1 & B2)
Tuesday	17:40 - 19:30	FENS 1033	(C1 & C2)
Wednesday	10:40 - 12:30	FENS 1033	(D1 & D2)
Wednesday	16:40 - 18:30	FENS 1033	(E1 & E2)
Thursday	10:40 - 12:30	FENS 1033	(F1 & F2)

### Catalogue Data

Number systems and conversion, Boolean algebra, Boolean function minimization techniques, combinational logic circuit design, state elements (flip-flops), sequential circuits, design and implementation of state machines, Mealy and Moore circuits, higher level digital system design using logic building blocks such as multiplexers/decoders, adders, memory and programmable gate arrays, hardware description languages.

### Prerequisite & Co-requisite

The class is open to any undergraduate students. There is no prerequisite. The students, who are registered with CS 303, have to be registered with (any section of) CS 303R and (any section of) CS 303L.

### Outline

- Number Systems & Arithmetic
- Boolean Algebra & Logic Operations

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\*All information in this document is tentative. The instructor reserves the right to make changes in the semester.

- 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)
- Introduction to Hardware Description Languages

### Textbook

M. Morris Mano and Michael D. Ciletti. Digital Design. (Any edition)

### Exam Dates

*Midterm 1:* will be scheduled by FENS Dean's Office (possibly 5<sup>th</sup> or 6<sup>th</sup> week of the term)  
*Midterm 2:* will be scheduled by FENS Dean's Office (possibly 10<sup>th</sup> or 11<sup>th</sup> week of the term)  
*Final:* will be scheduled by SR

### Grading

- Midterm Exams 36%
- Final Exam 40%
- Lab Assignments (Total 4( $\pm$ 1)) 14% <sup>1</sup>
- Term Project 10% <sup>2</sup>

The instructor has the right to have an oral interview for any grading item given in the syllabus.

- Students who will have the oral interview may be selected randomly or according to a suspicious situation observed by TAs or the instructor.
- Performance of the student in an oral examination may affect their grades of the grading item they have been called upon.
- If a student fails to show up at an oral exam, (s)he will automatically get 0 (zero).

The letter grade boundaries will be determined by the instructor at the end of the term. In order to pass the course:

- The overall grade has to be higher than D/F boundary.

<sup>1</sup>The highest grade you can get from an individual lab assignment is **1.8** times of your weighted exam average. For example, if your weighted exam average is 40%, then maximum of each take-home exam grade is 72% even if you get more than that.

<sup>2</sup>The highest grade you can get from term project is **1.7** times of your weighted exam average. For example, if your weighted exam average is 40%, then maximum of each take-home exam grade is 68% even if you get more than that.

- The Final Exam grade must be at least 25/100.
- The Weighted Exam Average (given below) must be at least 35/100.

$$\text{WeightedExamAverage} = \frac{(\text{Midterm1} \times 0.18) + (\text{Midterm2} \times 0.18) + (\text{Final} \times 0.36)}{0.72}$$

### **Make-up Policy**

- There will be no make-up for the lab sessions. Students automatically get 0 (zero) from the respective assignment grade if any of them is missed.
- Make-up is only allowed for the midterm and final examinations to those with an official report and to those with an official permission notice from the university on the date of the exam in question.
- Make-up examinations may be written and/or oral.

### **Time Conflict Permission Policy**

In general, time conflict permission requests are approved in this course <sup>3</sup>. However, time conflict permission is not a permission for you not to attend some classes. Moreover, it does not mean that, time conflicts will be taken into account when planning any activity (exam, quiz, etc.) for the corresponding hour. It is the responsibility of the student, who took time conflict permission, to manage potential problems that may arise due to time conflict.

It is assumed that the students, who are registered to this course with time conflict permission, accept these terms.

### **Plagiarism Policy (Academic Integrity)**

Plagiarism means presenting someone else's work as yours. This is a very serious and ethical problem. A plagiarized work may or may not be a verbatim copy of another submission. Verbatim copies are of course plagiarized ones. However, if a submission is derived from another one by partially changing or rephrasing some parts, this action is also plagiarism. When a plagiarism case is detected, sanctions are applied to all parties regardless of the actual source of the submission. These sanctions are as follows:

- For the midterm/final examinations,
  - students directly fail the course, even in the first offense.<sup>4</sup>
- For the labs, take-home exams and term project
  - for the first time, all plagiarized submission owners receive 0,
  - the second time, the student fails the course automatically.<sup>5</sup>

<sup>3</sup>The instructor reserves the right to reject any request.

<sup>4</sup> Additionally, the case will be referred to the Dean's Office for disciplinary action. This course does not tolerate any breach of academic integrity (more info on <https://www.sabanciuniv.edu/en/academic-integrity-statement>)

<sup>5</sup>See footnote 4