C3A (10)

Department of Computer Science and Engineering
Lesson Plan:

Course Title: Digital Electronics
Level/Term: 3rd
Credit: 03
Prerequisite: Not Applicable
Session: February 2019

Course Code: EEE-311
Section: A
Contact Hours: 39
Type: Core

Instructor: Sabrina Tarannum
Class schedule: Saturday (1.00-2.30)
Sunday (1.00-2.30)
Counseling Time: Saturday 11.30-1.00

Room No: 408, 507

Rationale: To empower the learner to inspect and perceive the fundamental knowledge of digital electronics and develop sufficient background for advanced digital electronic courses.

Course Objectives:
The main objectives of this course are:

- To provide a modern introduction to logic design and the basic building blocks used in technical areas in particular digital computers.
- To familiarize the student with fundamental principles of 21st century's digital design.
- To provide coverage of classical hardware design for both combinational and sequential logic circuits.
- To develop research skills and aspects of professional practice through group-bases assignments and team works that leads them to become successful self-employed, motivator, entrepreneur and manager.

Course Outcomes (COs):
By the end of the course, students will be able to:

1. Understand the fundamental concepts, theories and techniques used in digital electronics.
2. Translate descriptions of logical problems to efficient digital logic circuits.
3. Analyze and design various combinational and sequential circuits.
4. Integrate previously designed components into a large-scale system to meet specified requirements.

Assessment:
Class tests, quizzes/assignments/home works, class attendance and class participation, midterm exam.

Text and Reference books:

Text Book:

1. Digital Logic and Computer Design by M. Morris Mano

Reference book:

1. Computer Engineering by M. M. Mano,
2. Digital Computer Electronics by A.P. Malvino.

Daily schedule: (Class test syllabus is denoted by *)

Day	Topic	Teaching strategy	Course outcome	Assessment Strategy
1	**Binary System:** Digital Computers and Digital Systems, Binary Numbers.	Lectures, Notes.	CO1	*Class Test 1
2	Number Base Conversion and 1 and 2's complement	Lectures, Notes.	CO1	*Class Test 1
3	**Boolean Algebra and Logic Gates:** Basic Definitions, Axiomatic Definition of Boolean Algebra	Lectures, Notes.	CO1	*Class Test 1
4	Basic Theorem and Properties of Boolean Algebra. Boolean Functions,	Lectures, Notes.	CO1	*Class Test 1
5	Canonical and Standard Forms, Other Logic Operations, digital Logic Gates, IC Digital Logic Families, Problems	Lectures, Notes.	CO1	*Class Test 1
6	**Simplification of Boolean Functions:** Introducing the map method and solving examples, Two- and Three-Variable Maps	Lectures, Notes, Presentation Slide.	CO2	
7	The Map Method, Four Variable Maps, Five Variable Maps.	Lectures, Notes.	CO2	
8	Product of Sums Simplification, NAND and NOR Implementation and problem solving	Lectures, Notes.	CO2	Assignment
9	Other Two-Level Implementations and examples.	Lectures, Notes.	CO1,CO2	
10	Simplification with don't care condition	Lectures, Notes.	CO2	**Class test 01**
11	The Tabulation Method, Determination of Prime-Implicants **Solution of assignment.**	Lectures, Notes.	CO2	
12	Selection of Prime Implicants, Problems **Combinational Logic:** Introduction, Design Procedure	Lectures, Notes, Problem solution	CO2,CO3	*Class Test 2
13	Adders.Sub tractors. Code Conversion. Analysis Procedure and code conversion examples	Practice example	CO3	*Class Test 2

14	Multilevel NAND Circuits, Multilevel NOR Circuits	Lectures, Notes, Practice Problems	CO3	*Class Test 2
15				**Midterm Examination**
16	Exclusive-or and Equivalence Functions, Problems **Combinational Logic with MSI and LSI:** Introduction, Binary Parallel Adder	Lectures, Notes, Problem solving	CO3	*Class Test 2
17	Decimal Adder, Magnitude Comparator	Lectures, Notes	CO3	
18	Decoders, Encoder, Multiplexers.	Problem solving	CO3	
19	Demuliplexer, Read only memory and PLA **Sequential Logic:** Introduction, Flip-Flops, Triggering of Flip-Flops	Lectures, Notes	CO3,CO4	**Class test 02**
20	Analysis of Clocked Sequential Circuits, Design Procedure	Lectures, Notes, Problem solution	CO3,CO4	
21	Design with State Equations State Reduction	Lectures, Notes.	CO3,CO4	
22	Flip-Flop Excitation Tables, problems	Practice Problems	CO3,CO4	
23	Design of Counters.	Lectures, Notes.	CO3,CO4	
24	**Counters and Registers**: registers, shift register, problems	Lectures, Notes.	CO3,CO4	
25	Review class	Lectures, Notes.		
26	Review class			