INSTITUTION   **Sind Madressatul Islam University, Karachi**

PROGRAM (S)TO
BE EVALUATED
BS (CS)
Section 2A, 2B, 2C, 2D, 2E, 2F **(Fall 2023)**

A. Course Description

Objectives: This course that provides Computer Science students with material fundamental to the design and analysis of digital circuits. This course introduces the logic operators and gates to lay the framework for strengthening the understanding of computer building blocks. Combinational and sequential circuits are studied along with their constituent elements comprising adders, encoders and multiplexers as well as flip-flops, latches and registers etc. The course provides necessary information to the students for future study of computer Architecture, Organization and Embedded Systems.

Course Code	CEN201
Course Title	Digital Logic and Design
Credit Hours	4(3+1)
Prerequisites by Course(s) and Topics	CEN101
Assessment Instruments with Weights (homework, quizzes, midterms, final, programming assignments, lab work, etc.)	Quiz = 10 Assignment+Presentation=10 Class Partipation = 05 Lab = 15 Midterm= 20 Final Exam = 40
Course Coordinator	Dr. Haque Nawaz Lashari
URL (if any)/Email// contact	hnlashari@smiu.edu.pk/03013431762
Current Catalog Description	This course is designed to teach students, An overview & number systems, Number systems & codes, Logic gates, Digital circuits and operational characteristics, Boolean algebra and logic simplification, Karnaugh map & Boolean expression simplification, Comparator, Odd-Prime Number detector, Implementation of an odd-parity generator circuit, BCD adder, 16-bit ALU, the 74xx138 3-to-8 decoder, 2-input 4-bit multiplexer, Demultiplexer, Implementing constant 0s and 1s, the gal16v8, Abel input file of a quad 1-of-4 MUX, Application of S-R Latch, Flip-Flops, the 555 Timer, Up-Down counter, Digital Clock, Shift Registers, Memory, Analog to Digital Converters
Textbook (or **Laboratory Manual** for Laboratory Courses)	**Text Book:** 1. Introduction to Logic and Computer Design By Markowitz Alan B McGraw Hill. 2. Logic and Computer Design Fundamentals Second Edition Updated M.Morris Mano, Charles R Kime 3. R. H. Katz, Contemporary Logic Design, Prentice-Hall.
Reference Material	**Reference Book:** 1. Hayes, Introduction to Digital Logic Design, Addison-Wesley. 2. M. Mano, Digital Design, 2nd Ed., Prentice-Hall. 3. C. H. Roth, Jr., Fundamentals of Logic Design, 3rd Ed. 4. Digital Fundamentals (Eighth Edition), by Floyd. 5. Digital Systems: Principles and Applications (Seventh Edition) by Tocci. Widmer

NCEAC.FORM.001-D

Course Learning Outcomes	Students by the end of this course shall be able to: 1. Know about the Basics concepts of the Digital logic and Design 2. Identify and explain fundamental concepts of digital logic design including basic and universal gates, number systems, binary coded systems, basic components of combinational and sequential circuits 3. Design digital circuits by using discrete components. 4. Analyze the digital circuits 5. Demonstrate the acquired knowledge. 6. Know the applications of digital logic circuitsand best practices of digital electronics in modern age.

Topics Covered in the Course, with Number of Lectures on Each Topic (assume 15-week instruction and 3-hour lectures)	Yes Please see annexure A, Attached along with this document.			
Laboratory Projects/Experiments Done in the Course	For Laboratory work see Lab Manual.			
Programming Assignments Done in the Course	N/A			
Class Time Spent on (in credit hours)	**Theory**	**Problem Analysis**	**Solution Design**	**Social and Ethical Issues**
	48	35	8	5
Oral and Written Communications	Every student is required to submit at least onewritten assignments , one written report of typically10 - 20 pages and to make one oral presentations of typically 5 -10 minute's duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.			

Annexure - A

NCEAC.FORM.001–D

Course Title: Digital Logic and Design- Course Code: CEN-201

Week	Cr. Hours	TOPICS
01	3	Introduction of course outline, Introduction of Digital Logic Design
	1	**Lab-1**
02	3	Number systems & codes
	1	**Lab-2**
03	3	Behavioral Models of Gates: Truth Table and Logical Expressions, Logic gates
	1	**Lab-3**
04	3	Boolean Algebra, logic simplification, Boolean Functions. Canonical and Standard Forms **Quiz-1**
		Assignment 1
	1	**Lab-4**
05	3	Karnaugh map & Boolean expression simplification
	1	**Lab-5**
06	3	Comparator, Odd-Prime Number detector
	1	**Lab-6**
07	3	Comparator, Odd-Prime Number detector, Implementation of an odd-parity generator circuit, BCD adder **Quiz-2**
		Review **Assignment 2**
	1	**Lab-7**
8.		**MID TERM EXAMINATION**
09	3	Combinational-circuit Building Blocks, Signals, Decoders, Multiplexers (MUX) Encoders
	1	**Lab-8**
10	3	Programmable Logic Device, (PLAs), Programmable Array Logics (PALs)
	1	**Lab-9**
11	3	Flip-Flop , Types of Flip-Flop, Latch Flip-Flop, D Flip Flops, JK Flip-flops , SR Latches
	1	**Lab-10**
12	3	Register and Types of the registers
		Quiz-3
	1	**Lab-11**
13	3	555 Timer, Up-Down counter, Digital Clock, Memory **Assignment 3**
	1	**Lab-12**
14	3	Analog to Digital Converters
		Project Assignment Presentations
	1	**Lab-13**
15	3	Project Assignment Presentations
		Review
	1	**Lab-14**
16		
		FINAL TERM EXAMINATION

Instructor Name _____Dr. Haque Nawaz Lashari_____

Instructor Signature _____

Date ____18/ 09/2023_____

3

NCEAC.FORM.001.D