UNITED INTERNATIONAL UNIVERSITY Department of Computer Science and Engineering (CSE) **Course Syllabus**

1	**Course Title**	Digital Logic Design
2	**Course Code**	CSE 1325
3	**Trimester and Year**	Spring 2024
4	**Pre-requisites**	None
5	**Credit Hours**	3
6	**Section**	H
7	**Class Hours**	Saturday & Tuesday: 11:11 AM - 12:30 PM
8	**Class Room**	0630
9	**Instructor's Name**	Syed Eftasum Alam
10	**Email**	salam201133@bscse.uiu.ac.bd
11	**Office**	Room: 637
12	**Counselling Hours**	Saturday: 9:50 AM-11:10AM 1:50 PM- 3:0 PM Tuesday: 9.50 AM-11:10AM 1:50 PM-3:10 PM
13	**Text Book (TB)**	Logic and Computer Design Fundamentals. M. Morris Mano and Charles R. Kime, 5th Edition.
14	**Reference**	Digital Logic and Computer Design. M. Morris Mano (1979).
15	**Course Contents (approved by UGC)**	Digital logic, Boolean algebra, De-Morgan's law, logic gates and their truth tables, canonical forms, Combinational logic circuits, minimization techniques, Arithmetic and data handling logic circuits, decoders and encoders, Multiplexers and demultiplexers, Combinational Circuit design, Flip-flops, race around problems, Counters and their applications, PLA design, Synchronous and asynchronous logic design: state diagram, Mealy and Moore machines, State minimizations and assignments, Pulse mode logic, Fundamental mode design. Diode logic gates, transistor switches, transistor transistor gates, MOS gates, Logic families: TTL, ECL, IIL and CMOS logic with operation details, Propagation delay, product and noise immunity, Open collector and High impedance gates, memory systems, A/D and D/A converters with applications

16	**Course Outcomes (COs)**	**COs**	**Description**
		CO1	Understand various number systems, binary logic, gates and Boolean algebraic structures.
		CO2	Apply Boolean algebra and Karnaugh Map to minimize Boolean expressions.
		CO3	Understand, analyze, design various combinational logic circuits using functional blocks like decoder, encoder, multiplexer, demultiplexer and adder.
		CO4	Understand the basic functions and design of various sequential logic circuits using flip-flops and latches.

17 **Teaching Methods** Lecture, Case Studies, Project Developments.

18 **CO with Assessment Methods**

CO	Assessment Method	(%)
-	Attendance	5
-	Assignments	5
-	Class Tests	20
CO1, CO2	Midterm exam	30
CO2, CO3, CO4	Final exam	40

19 **Mapping of COs and Program outcomes**

COs	**Program Outcomes(POs)**											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	C											
CO2	C											
CO3		C										
CO4		C										

20 **Lecture Outline**

Class	**Topics/Assignments**	**COs**	**Reading Reference**	**Lecture Outcomes/Activities**
1	Digital Logic Design, Number System	CO1	Sec 1.1, 1.2	• Understand Digital Logic Design • Understand Number System
2	Number System Conversion, BCD Coding, Arithmetic Operations	CO1	Sec 1.2, 1.3	• Convert decimal to other number system, and vice versa. • Able to do BCD Addition. • Able to do arithmetic operations.
3	More on arithmetic Operations	CO1	Sec 1.3	• Able to do Sec 1.1, 1.2
4	Gray code, Alphanumeric code	CO1	Sec 1.5, 1.6	• Understand gray code and alphanumeric code.
5	Digital circuits, truth table,	CO1	Sec 2.1	Understand digital circuits, truth table,

	boolean function, binary logic and gates, boolean algebra, logic diagram.			Boolean function, binary logic and gates, Boolean algebra, logic diagram.
6	Boolean Algebra and its identities, Duality of Boolean algebra.	CO1	Sec 2.2	Able to use Boolean identities to simplify Boolean expression.
7	Boolean function, complement of a function.	CO1	Sec 2.2	• Able to write a Boolean function from truth table. • Able to complement a function.
8	Minterms, maxterms	CO1	Sec 2.3	• Understand minterms and maxterms. • Able to prove that they are complement of each other.
9	K-Maps, Cost criteria	CO1	Sec 2.4	• Able to use k-maps to simplify Boolean function. • Able to find circuit input cost.
10	Map manipulation, Don't care conditions	CO1	Sec 2.5	Able to simplify function using map manipulation and don't care conditions.
11	SOP, POS	CO1	Sec 2.5	Able to convert SOP to POS and vice versa.
12	Design Problem Solution	CO1	Sec 2.6	Learn the complete design of a problem
	MIDTERM EXAM			
13	Sequential circuits, sequence recognizer	CO4	Sec 6.1, 6.6	• Understand sequential circuits • Able to Design a sequence recognizer.
14	Storage elements: buffer, latches (SR (NOR, NAND), Clocked latch, D latch	CO4	Sec 6.2	Understand buffer, latches.
15	Flip flops: Master slave – S-R, D, J-K, Sequential circuit design	CO4	Sec 6.4, 6.5, 6.6	• Understand different types of FFs. • Able to Design sequential circuit
16	Registers	CO4	Sec 7.1, 7.6	Understand multiple bit registers – parallel load, shift registers.
17	Counters	CO4	Sec 7.6	Able to Design upward, downward ripple, synchronous counters.
18	Review Lecture 13 to 17.	CO4		
19	Combinational logic design procedure	CO3	Sec 3.3	Able to Design combinational circuit.
20	Decoder	CO3	Sec 4.3	Able to use decoder in different applications.
21	Encoder	CO3	Sec 4.4	Able to use encoder in different applications.

	22	Multiplexer	CO3	Sec 4.5, 4.6	Able to use Multiplexer in different applications.	
	23	Adder	CO3	Sec 5.2	• Understand different types of adders. • Able to Design multiple bit adders.	
	24	Review lecture 13 to 23	CO3, CO4			

Appendix 1: Assessment Methods

Assessment Types	Marks
Attendance	5%
Assignments	5%
Class Tests	20%
Mid Term	30%
Final Exam	40%

Appendix 2: Grading Policy

Letter Grade	Marks %	Grade Point	Letter Grade	Marks%	Grade Point
A (Plain)	90-100	4.00	C+ (Plus)	70-73	2.33
A- (Minus)	86-89	3.67	C (Plain)	66-69	2.00
B+ (Plus)	82-85	3.33	C- (Minus)	62-65	1.67
B (Plain)	78-81	3.00	D+ (Plus)	58-61	1.33
B- (Minus)	74-77	2.67	D (Plain)	55-57	1.00
			F (Fail)	<55	0.00

Appendix-3: Program outcomes

POs	Program Outcomes
PO1	An ability to apply knowledge of mathematics, science, and engineering
PO2	An ability to identify, formulate, and solve engineering problems
PO3	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
PO4	An ability to design and conduct experiments, as well as to analyze and interpret data
PO5	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
PO6	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
PO7	A knowledge of contemporary issues
PO8	An understanding of professional and ethical responsibility
PO9	An ability to function on multidisciplinary teams
PO10	An ability to communicate effectively
PO11	Project Management and Finance
PO12	A recognition of the need for, and an ability to engage in life-long learning