COURSE DESCRIPTION FORM

INSTITUTION National University of Computer and Emerging Sciences (NUCES-FAST)

BS(CS)

PROGRAM (S) TO BE EVALUATED

A. **Course Description**

(Fill out the following table for each course in your computer science curriculum. A filled out form should not be more than 2-3 pages.)

Course Code	EE227
Course Title	Digital Logic Design (DLD)
Credit Hours	3+1
Prerequisites by Course(s) and Topics	(EE117) Applied Physics
Assessment Instruments with Weights (homework, quizzes, midterms, final, programming assignments, lab work, etc.)	Mid-I: 15 Mid-II: 15 Assignments/Quizzes: 10 Project: 10 Final: 50
Course Coordinator	Rabia Tabassum
URL (if any)	

Current Catalog Description	The goal of this course is to introduce concepts & tools for the design of digital electronic circuits using sequential and combinational logic to the freshmen computer science students.
Textbook (or **Laboratory Manual** for Laboratory Courses)	Digital Fundamentals , 11th Edition, Floyd and Jain
Reference Material	1. Digital Systems Principles and Applications 8th Ed, Tocci, Widmer and Moss 2. Digital Design by Moris Mano
Course Goals	

A. Course Learning Outcomes (CLOs)

1. Identify and explain fundamental concepts of digital logic design including basic and universal gates, number systems, binary coded system, basic components of combinational and sequence circuits.
2. Demonstrate the acquired knowledge to apply techniques related to the design and analysis of digital electronics circuits , including Boolean Algebra and Multi-variable Karnaugh map methods.
3. Analyze small –scale combinational digital circuits.
4. Design small-scale combinational and synchronous sequential digital circuit using Boolean Algebra and K-map.
5. Familiarize with building blocks of a computer hardware design.

B. Program Learning Outcomes		
For each attribute below, indicate whether this attribute is covered in this course or not. Leave the cell blank if the enablement is little or non-existent.		
1. Academic Education:	To prepare graduates as computing professionals	✔

	2. Knowledge for Solving Computing Problems:	Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements.	✔
	3. Problem Analysis:	Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines.	
	4. Design/ Development of Solutions:	Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.	✔
	5. Modern Tool Usage:	Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.	

	6. Individual and Team Work:	Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings.	✔
	7. Communication:	Communicate effectively with the computing community and with society at large about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.	
	8. Computing Professionalism and Society:	Understand and assess societal, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice.	
	9. Ethics:	Understand and commit to professional ethics, responsibilities, and norms of professional computing practice.	
	10. Life-long Learning:	Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional.	

C. Relation between CLOs and PLOs
(CLO: Course Learning Outcome, PLOs: Program Learning Outcomes)

		PLOs									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
CLOs	1	✔	✔				✔				
	2	✔	✔				✔				
	3	✔	✔				✔				
	4	✔	✔			✔	✔				
	5	✔	✔		✔		✔				
	6	✔	✔		✔		✔				
	7	✔	✔				✔				
	8	✔	✔			✔	✔				

Topics Covered in the Course, with Number of Lectures on Each Topic (assume 15-week instruction and one-hour lectures)

1. Topics to be covered:

List of Topics	No. of Weeks	Contact Hours	CLO

	Chapter-1 : Introduction. Digital Electronics. Digital Principles. Analog Vs. Digital. Basic Logic Chapter-2 : Number Systems. Binary, Decimal,Octal , Hexadecimal inter conversions, Signed number, 1's and 2's Complements , Sign-Magnitude representation, BCD code. The Byte, Nibble and Word.	**2**	**6**	**1**	
	Chapter-3: Logic Gates, AND OR & NOT Gates, NOR NAND XOR Gates. Chapter-4: Boolean Algebra and logic simplification. DeMorgan's Theorems. Boolean analysis of Logic circuits. Truth Tables. The Karnaugh Map.	**2**	**6**	**2**	
	Chapter-5 : Basic Combinational circuits. Implementing Combinational Logic. Using NAND and NOR Gates.	**1**	**3**	**3**	
	========== *MID 1* ==========				
	Chapter -6: Basic Adders. Parallel Binary Adders. Ripple carry adders. Comparators. Decoders. Encoders. Multiplexers. Demultiplexers.	**2**	**6**	**3**	

Chapter-7 : Latches. Edge-Triggered lop Operating Characteristics. Flip-Flop applications.	**2**	**6**	**4**
========== *MID 2* ==========			
Chapter-9: Asynchronous Counters. Synchronous Counters. Cascaded Counters. Counter Decoding.	**2**	**6**	**4**
Chapter -8 : Basic Shift Register Operations. Serial In/Serial Out Shift Registers. Serial In/Parallel Out and Parallel In/Parallel Out Shift Registers. Bidirectional Shift Registers. Chapter -11 Memory Basics, the Random-Access Memory. The Read-only Memory. Programmable ROM. The Flash Memory. Memory Expansion. Special Types of Memories. Magnetic & Optical Storage.	**2**	**6**	**4,5**
Review	**1**	**3**	**2,3,4**
Project Presentations	**1**	**3**	**1,2,3,4,5**
Total	**15**	**45**	

Laboratory Projects/Experiments Done in the Course	

Programming Assignments Done in the Course				
Class Time Spent on (in credit hours)	**Theory**	**Problem Analysis**	**Solution Design**	**Social and Ethical Issues**
	30	10	5	0
Oral and Written Communications	Every student is required to submit at least __1__ written report of typically _2__ pages and to make _1__ oral presentations of typically __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.			

Instructor Name __Rabia Tabassum

Instructor Signature ____________________________

Date __4th February, 2021