

Lovely Professional University, Punjab

Course Code	Course Title	Course Planner
ECE216	DIGITAL ELECTRONICS LABORATORY	12047::Dr. Cherry Bhargava

Course Outcomes :Through this course students should be able to

CO1 :: Describe the design and functionality of digital circuits.

CO2 :: Analyze the digital circuits and compare its theoretical performace to actual performance.

CO3 :: Analyze functionality of the digital trainer kit to verify basic logic truth table.

	TextBooks (T)		
Sr No	Title	Author	Publisher Name
T-1	DIGITAL DESIGN PRINCIPLES AND PRACTICES	JOHN F. WAKERLY	PEARSON
	Reference Books (R)		
Sr No	Title	Author	Publisher Name
R-1	DIGITAL FUNDAMENTALS	THOMAS L. FLOYD , R. P JAIN	PEARSON
R-2	DIGITAL ELECTRONICS PRINCIPLES AND INTEGRATED CIRCUITS	ANIL K MAINI	PEARSON
R-3	DIGITAL INTEGRATED ELECTRONICS	H. TAUB AND D. SCHILLING	MCGRAW HILL EDUCATION
R-4	DIGITAL ELECTRONICS- A COMPREHENSIVE LAB MANUAL	CHERRY BHARGAVA	BS PUBLICATIONS

Detailed Plan For Practicals

Practical No	Broad topic	Subtopic	Other Readings	Learning Outcomes
Practical 1	Analysis and Synthesis of Boolean Expressions using Basic Logic Gates	Understanding the combinational logic by implementing the boolean function using basic logic gates		Student will learn about the basic gates design and implementing functions using them.

An instruction plan is only a tentative plan. The teacher may make some changes in his/her teaching plan. The students are advised to use syllabus for preparation of all examinations. The students are expected to keep themselves updated on the contemporary issues related to the course. Upto 20% of the questions in any examination/Academic tasks can be asked from such issues even if not explicitly mentioned in the instruction plan.

Practical 2	Analysis and Synthesis of Arithmetic Expressions using Adders/Subtractors	To design and analyze the circuit for Full adder and Full subtractor using Logic Gates.		Practical 2: Student will learn to design arithmetic circuits using basic gates. Practical 3: Practical work evaluation based on Practical 1(Analysis and Synthesis of Boolean Expressions using Basic Logic Gates) and Practical 2 (Analysis and Synthesis of Arithmetic Expressions using Adders/Subtractors).
Practical 3	Analysis and Synthesis of Arithmetic Expressions using Adders/Subtractors	To design and analyze the circuit for Full adder and Full subtractor using Logic Gates.		Practical 2: Student will learn to design arithmetic circuits using basic gates. Practical 3: Practical work evaluation based on Practical 1(Analysis and Synthesis of Boolean Expressions using Basic Logic Gates) and Practical 2 (Analysis and Synthesis of Arithmetic Expressions using Adders/Subtractors).
Practical 4	Analysis and Synthesis of Logic Functions using Multiplexers and decoders	Understanding the combinational logic by implementing the boolean function using multiplexer		Student will learn to implement different logical expressions using multiplexer.
Practical 5	Analysis and Synthesis of Logic Functions using Multiplexers and decoders	Understanding the combinational logic by implementing the boolean function using Decoder		Practical 5: Student will learn to implement different logical expressions using decoder. Practical 6: Practical work evaluation based on Practical 4 and Practical 5 (Analysis and Synthesis of Logic Functions using Multiplexers and decoders).
Practical 6	Analysis and Synthesis of Logic Functions using Multiplexers and decoders	Understanding the combinational logic by implementing the boolean function using Decoder		Practical 5: Student will learn to implement different logical expressions using decoder. Practical 6: Practical work evaluation based on Practical 4 and Practical 5 (Analysis and Synthesis of Logic Functions using Multiplexers and decoders).
Practical 7	Design and Implementation of application based projects, any two to be implemented	To design a circuit for smart home automation.		Student will design new circuit and architecture for an application based projects.
	Design and Implementation of application based projects, any two to be implemented	To design a system for solar tracking.		Student will design new circuit and architecture for an application based projects.
	Design and Implementation of application based projects, any two to be implemented	Design a digital calculator which can implement subtraction and division functions, and display output in 7-segment display unit		Student will design new circuit and architecture for an application based projects.
Practical 8	Analysis and Synthesis of Sequential Circuits using Flip-Flops	Understanding the sequential logic by implementing the flip flop with the help of logic gates		Students will learn the working of flip flop and designing them using basic gates.

Practical 9	Analysis and Synthesis of Sequential Circuits using Flip-Flops	Understanding the sequential logic by implementing the counter with flip flop.		Practical 9: Student will learn the working as well as designing of counter using flip flops. Practical 10: Practical work evaluation based on Practical 8 and Practical 9 (Analysis and Synthesis of Sequential Circuits using Flip-Flops).
Practical 10	Analysis and Synthesis of Sequential Circuits using Flip-Flops	Understanding the sequential logic by implementing the counter with flip flop.		Practical 9: Student will learn the working as well as designing of counter using flip flops. Practical 10: Practical work evaluation based on Practical 8 and Practical 9 (Analysis and Synthesis of Sequential Circuits using Flip-Flops).
Practical 11	Analysis of Functions of BCD-TO-7-segment Decoder / Driver and Operation of 7-segment LED Display	To visualize the output of decade counter on seven segment display		Student will learn about the mod-10 counter design using flip flops.
Practical 12	Design and implementation of combinational and sequential circuit using Software	To implement and simulate combinational and sequential circuit using DSCH/Proteus.		Practical 12: Student will learn to use the software for designing digital circuits and to generate a simulation result. Practical 13: Practical work evaluation based on Practical 11(Analysis of Functions of BCD-TO-7-segment Decoder / Driver and Operation of 7-segment LED Display) and Practical 12 (Design and implementation of combinational and sequential circuit using Software).
Practical 13	Design and implementation of combinational and sequential circuit using Software	To implement and simulate combinational and sequential circuit using DSCH/Proteus.		Practical 12: Student will learn to use the software for designing digital circuits and to generate a simulation result. Practical 13: Practical work evaluation based on Practical 11(Analysis of Functions of BCD-TO-7-segment Decoder / Driver and Operation of 7-segment LED Display) and Practical 12 (Design and implementation of combinational and sequential circuit using Software).
Practical 14	Design and Implementation of application based projects, any two to be implemented	To design 4 bit digital calculator which can perform addition and multiplication and display using 7 segment.		Student will design new circuit and architecture for an application based projects.
	Design and Implementation of application based projects, any two to be implemented	To design a circuit which can generate random number and display using 7 segment.		Student will design new circuit and architecture for an application based projects.
	Design and Implementation of application based projects, any two to be implemented	To design a up and down fading lights (different colored LEDs) with specified delays using flipflops/counters		Student will design new circuit and architecture for an application based projects.
	Design and Implementation of application based projects, any two to be implemented	Design a universal counter which can perform different shift operations using multiplexer.		Student will design new circuit and architecture for an application based projects.
	Design and Implementation of application based projects, any two to be implemented	To design a circuit for global positioning system synchronize clock.		Student will design new circuit and architecture for an application based projects.

Practical 14	Design and Implementation of application based projects, any two to be implemented	To design a circuit for secure locking mechanism.		Student will design new circuit and architecture for an application based projects.
	SPILL OVER			
Practical 15	Spill Over			