Computer Engineering Department, NIT Surat, INDIA

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B.Tech. II (CO) Semester - 3	L	T	P	C
EC207 : DIGITAL CIRCUITS (IS-I)	3	1	2	5

COURSE OUTCOMES

After successful completion of this course, student will be able to
• Understand the fundamentals of various basic semi-conductor devices.
• Apply the knowledge of basic semi-conductor devices to realize the working of basic electronics circuits.
• Design basic electronic circuits.

COURSE CONTENT

• **COMBINATIONAL LOGIC CIRCUIT USING MSI INTEGRATED CIRCUITS**	**(08 Hours)**

Binary Parallel Adder; BCD Adder; Encoder, Priority Encoder, Decoder; Multiplexer And Demultiplexer Circuits; Implementation Of Boolean Functions Using Decoder And Multiplexer; Arithmetic And Logic Unit; BCD To 7-Segment Decoder; Common Anode And Common Cathode 7-Segment Displays; Random Access Memory, Read Only Memory And Erasable Programmable ROMS; Programmable Logic Array (PLA) And Programmable Array Logic (PAL).

• **INTRODUCTION TO SEQUENTIAL LOGIC CIRCUITS**	**(08 Hours)**

Basic Concepts Of Sequential Circuits; Cross Coupled SR Flip-Flop Using NAND Or NOR Gates; JK Flip-Flop Rise Condition; Clocked Flip-Flop; D-Type And Toggle Flip-Flops; Truth Tables And Excitation Tables For Flip-Flops; Master Slave Configuration; Edge Triggered And Level Triggered Flip-Flops; Elimination Of Switch Bounce Using Flip-Flops; Flip-Flops With Preset And Clear.

• **SEQUENTIAL LOGIC CIRCUIT DESIGN**	**(08 Hours)**

Basic Concepts Of Counters And Registers; Binary Counters; BCD Counters; Up Down Counter; Johnson Counter, Module-N Counter; Design Of Counter Using State Diagrams And Table; Sequence Generators; Shift Left And Right Register; Registers With Parallel Load; Serial-In-Parallel-Out(SIPO) And Parallel-In-Serial-Out(PISO); Register Using Different Type Of Flip-Flop.

• **REGISTER TRANSFER LOGIC**	**(06 Hours)**

Arithmetic, Logic And Shift Micro-Operation; Conditional Control Statements; Fixed-Point And Floating-Point Data; Arithmetic Shifts; Instruction Code And Design Of Simple Computer

• **PROCESSOR LOGIC DESIGN**	**(04 Hours)**

Processor Organization; Design Of Arithmetic Logic Unit; Design Of Accumulator

• **CONTROL LOGIC DESIGN**	**(08 Hours)**

Control Organization; Hard-Wired Control; Micro program Control; Control Of Processor Unit; PLA Control.

• Tutorials will be based on the coverage of the above topics separately	**(14 Hours)**

(Total Contact Time: 42 Hours + 14 Hours = 56 Hours)

PRACTICALS

1). Half Adder/Full Adder and Full Adder/Full Subtract or
2). Parity generator/checker circuit , Binary to Gray /Gray to Binary code converter
3). 4-bit binary parallel adder circuit and BCD adder
4). Implementation of basic flip-flops, Counter(ripple & synchronous) and Up/Down Counter

BOOKS RECOMMENDED

1). Mano Morris, Digital Logic and Computer Design, Pearson Education, 2005.
2). Jain and Anand, Digital Electronics Practice Using Integrated Circuits, TMH, 2004
3). Kime Charles, Logic and Computer Design Fundamentals, Pearson Education, 2004
4). Lee Samual, Digital Circuits and Logic Design, PHI, 1998.
5). Floyd and Jain, Digital Fundamentals, Pearson Education, 2006