CP203: Digital Logic and Design

Teaching Scheme			Credits	Marks Distribution				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	CE	ESE	CE	
3	0	2	5	70	30	30	20	150

Course Content:

Sr. No.	Topics	Teaching Hrs.
1	**Introduction:** Digital Systems; Data representation and coding; Logic circuits; integrated circuits; Analysis; design and implementation of digital systems. Truth table; Basic logic operation and logic gates.	03
2	**Number Systems and Codes:** Positional number system; Binary; octal and hexadecimal number systems; Methods of base conversions; Binary; octal and hexadecimal arithmetic; Representation of signed numbers; Fixed and floating point numbers; Binary coded decimal codes; Gray codes; Error detection and correction codes - parity check codes and Hamming codes.	04
3	**Boolean Algebra & Simplification of Boolean Algebra:** Basic postulates and fundamental theorems of Boolean algebra; Standard representation of logic functions; The Map Method; SOP and POS forms; Simplification of switching functions K-map and Quine-McCluskey tabular methods; Synthesis of combinational logic circuits.	07
4	**Combinational Logic Modules and their applications:** Decoders; encoders; multiplexers; demultiplexers and their applications; Parity circuits and comparators; Arithmetic modules- adders; sub tractors and ALU; Design examples.	06

5	**Sequential Logic systems:** Definition of state machines; state machine as a sequential controller; Basic sequential circuits- latches and flip-flops: SR-latch; D-latch; D flip-flop; JK flip-flop; T flip-flop; Timing hazards and races; Analysis of state machines using D flip-flops and JK flip-flops; Design of state machines - state table; state assignment; transition/excitation table; excitation maps and equations; logic realization; Design examples.	08
6	**Finite State machine design and applications:** Designing state machine using ASM charts; Designing state machine using state diagram; Design approaches for Synchronous and asynchronous machines; Registers and Counters; Application examples.	08
7	**Logic Families:** Transistor-Transistor Logic (TTL); MOSFET; CMOS.	05
8	**Programmable Logic Devices:** PLAs; PALs and their applications; Sequential PLDs and their applications; State-machine design with sequential PLDs; Introduction to field programmable gate arrays (FPGAs).	04
	Total Hrs.	**45**

Reference Books:

1. M Morris Mano, "*Digital Logic and Computer Design Fourth Edition*", Prentice Hall Publication.
2. A. Anand Kumar, "*Fundamentals of Digital Circuits*" third Edition: PHI Learning Pvt. Ltd.
3. Malvino and Leach, "*Principle of digital Electronics*" Seventh Edition; McGraw-Hill Education.
4. R.P. Jain, "*Modern Digital Electronics*" Fourth Edition; McGraw-Hill.