INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPT./CENTRE: **Electronics and Computer Engineering**

1. Subject Code**: EC - 203** Course Title**: Digital Electronics**

2. Contact Hours: **L: 3 T: 1 P: 0**

3. Examination Duration (Hrs.): **Theory** 0 | 3 **Practical** 0 | 0

4. Relative Weight**:** **CWS** 25 **PRS** 00 **MTE** 25 **ETE** 50 **PRE** 00

5. Credits**:** 0 | 4 6. Semester √ **Autumn** ☐ **Spring** ☐ **Both**

7. Pre-requisite**: EC – 102**

8. Subject Area**: DCC**

9. Objective: To acquaint the students with the fundamental principles of two-valued logic and various devices used to implement logical operations on variables.

10. Details of the Course:

Sl. No.	Contents	Contact Hours
1.	Introduction to Boolean algebra, Boolean identities; Basic logic functions, combinational logic, standard forms of logic expressions.	4
2.	K-map representation, simplification of logic expressions, realization of logic expressions using AOI, NOR, NAND and other combinations of logic functions.	4
3.	Transistor as a switch, Schottky transistor; Logic gate characteristics: Propagation delay, speed, noise margin, fan-out and power dissipation.	3
4.	Analysis and characteristics of standard TTL, Schottky TTL, advanced TTL and ECL logic; MOS inverter and gate, CMOS logic, operation and characteristics of MOS and CMOS logic.	6
5.	Comparison of logic families, interfacing of various logic families; Tri-state logic.	3
6.	Multiplexers, demultiplexers and decoders, and their use in logic synthesis; Arithmetic circuits; Seven-segment and alphanumeric display design.	5
7.	Operation and excitation tables of RS, JK, Master Slave, D, and T flip flops; Latch, shift register; Counters: Ripple, synchronous, ring and up-down; Design of counters, design of other sequential circuits.	10
8.	ROM and RAM; PLA, PAL and FPGA; Logic synthesis.	3
9.	Astable and monostable multivibrator circuits using basic logic gates, internal structure of 555 and its applications, clock circuits.	4
	Total	**42**

11. Suggested Books:

Sl. No.	Name of Books/ Authors	Year of Publication
1.	Mano, M.M. and Ciletti, M.D., "Digital Design", 4th Ed., Prentice-Hall.	2006
2.	Balabanian, N. and Carlson, B., "Digital Logic Design Principles", John Wiley & Sons.	2001
3.	Jain, R.P., "Modern Digital Electronics", 3rd Ed., Tata McGraw-Hill.	2003
4.	Kumar, A.A., "Pulse and Digital Circuits", 2nd Ed., Prentice-Hall of India.	2008
5.	Malvino, A.P. and Leach, D.P., "Digital Principles and Applications", 6th Ed., Tata McGraw-Hill.	2008
6.	Floyd, T.L., " Digital Fundamentals ", 8th Ed., Pearson Education.	2005