**CS6201 DIGITAL PRINCIPLES AND SYSTEM DESIGN**

**L T P C**

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**OBJECTIVES:**

 Learn how to design digital circuits, by simplifying the Boolean functions. Also, gives an idea about designs using PLDs, and writing codes for designing larger digital systems.

**UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 9**

Review of Number Systems – Arithmetic Operations – Binary Codes – Boolean Algebra and Theorems – Boolean Functions – Simplification of Boolean Functions using Karnaugh Map and Tabulation Methods – Logic Gates – NAND and NOR Implementations.

**UNIT II COMBINATIONAL LOGIC 9**

Combinational Circuits – Analysis and Design Procedures – Circuits for Arithmetic Operations, Code Conversion – Decoders and Encoders – Multiplexers and Demultiplexers – Introduction to HDL – HDL Models of Combinational circuits.

**UNIT III SYNCHRONOUS SEQUENTIAL LOGIC 9**

Sequential Circuits – Latches and Flip Flops – Analysis and Design Procedures – State Reduction and State Assignment – Shift Registers – Counters – HDL for Sequential Logic Circuits.

**UNIT IV ASYNCHRONOUS SEQUENTIAL LOGIC 9**

Analysis and Design of Asynchronous Sequential Circuits – Reduction of State and Flow Tables – Race-free State Assignment – Hazards.

**UNIT V MEMORY AND PROGRAMMABLE LOGIC 9**

RAM and ROM – Memory Decoding – Error Detection and Correction – Programmable Logic Array

– Programmable Array Logic – Sequential Programmable Devices – Application Specific Integrated

Circuits.

**TOTAL: 45 PERIODS**

**TEXT BOOK:**

1. Morris Mano M. and Michael D. Ciletti, “Digital Design”, IV Edition, Pearson Education, 2008.

**REFERENCES:**

1. John F. Wakerly, “Digital Design Principles and Practices”, Fourth Edition, Pearson Education, 2007.

2. Charles H. Roth Jr, “Fundamentals of Logic Design”, Fifth Edition – Jaico Publishing House, Mumbai, 2003.

3. Donald D. Givone, “Digital Principles and Design”, Tata Mcgraw Hill, 2003.

4. Kharate G. K., “Digital Electronics”, Oxford University Press, 2010.

**IT6211 DIGITAL LABORATORY**

**L T P C**

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**LIST OF EXPERIMENTS:**

1. Verification of Boolean Theorems using basic gates.

2. Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters.

3. Design and implementation of combinational circuits using MSI devices:

* 4 – bit binary adder / subtractor
* Parity generator / checker
* Magnitude Comparator
* Application using multiplexers

4. Design and implementation of sequential circuits:

 Shift –registers

 Synchronous and asynchronous counters

5. Coding combinational / sequential circuits using HDL.

6. Design and implementation of a simple digital system (Mini Project).

**TOTAL: 45 PERIODS**