PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Computer Science & Engineering

SYLLABUS FOR 3rd Sem BTech PROGRAMME

Digital Electronics (203105201)

Type of Course: BTech

Prerequisite: Basic Electronics

Rationale: This course is design to provide basic ideas of computer architecture. This course also makes help to understand organization and architecture of computer. It will help to develop their logical abilities.

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
				External		Internal			
Lect Hrs/	Tut Hrs/	Lab Hrs/		T	P	T	CE	P	
3	0	0	3	60	-	20	20	-	100

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**UNIT-1**: **Fundamentals of Digital Systems and logicfamilies :** Digital signals, digital circuits, Number Systems**:**binary, signed binary, octal, hexadecimal number, binary arithmetic, one's and two's complements arithmetic, codes, BCD arithmetic ,error detecting and correcting codes, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, examples of IC gates, characteristics of digital lCs, Digital Logic families**:**TTL and CMOS logic, interfacing CMOS and TTL.	15%	7
2	**UNIT-2**: **Minimization Techniques**: Boolean Algebra, Boolean postulates and laws, De-Morgan's Theorem, Principle of Duality, Boolean expression, Minterm, Maxterm, Sum of Products (SOP), Product of Sums (POS), K-map representation, simplification and minimization of logic functions using K-map. Don't care conditions and Quine-McCluskey Method of minimization. Variable Entered Maps, Realizing Logic Function with Gates.	20%	8
3	**UNIT-3**: **Combinational Digital Circuits**: Binary Adders and Subtractors, Parallel binary adder & subtractor, Serial adder, BCD adder, Carry look ahead adder, Multiplexer/De Multiplexer, Encoder/Decoders, Popular MSI chips, Magnitude comparator, parity checker/generator, code converters, priority encoders, decoders/drivers for display devices.	20%	9

4	**UNIT-4**: **SEQUENTIAL CIRCUITS**: A 1-bit memory, the circuit properties of Bi-stable latch, the clocked SR flip flop, J- K-T and Dtypesflip flops, applications of flipflops, shift registers, Applications of shift registers, ring counter, sequence generator, ripple (Asynchronous) counters, synchronous counters,special counter IC's, asynchronous sequential counters, applications ofcounters.	20%	9
5	**UNIT-5**: **A/D and D/A Converters:** Digital to analog converters: weighted resistor/converter, R-2R Ladder, examples of D to A converters IC's, Analog to Digital converters: successive approximation, A/D converter, dual slope A/D Converter, Example of A/DConverterICs.	10%	5
6	**UNIT-6**: **Semiconductor Memories And Programmable Logic Devices:** Classification and characteristics of memories, Content addressable memory (CAM), commonly used memory chips, Introduction of PLD,ROM as a PLD, Programmable logic array, Programmable array logic, Complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA).	15%	7

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Modern Digital Electronics (TextBook)
   R. P. Jain; Tata McGraw-Hill Education
2. Digital Logic and Computer Design
   Morris Mano; PHI
3. Fundamentals of Digital Circuits
   Anand Kumar; Prentice-Hall of India Private Limited, New Delhi (2006)

Course Outcome:

After Learning the course the students shall be able to:

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1. Identify and Explain the digital number system and also able to justify the practical application of number system.
2. Understand and Explain different logic gates and codes and also how to use them in real word application.
3. Realize the minimization techniques of digital Circuits.
4. Design different Adders, Subtracters, Multiplexers, decoders and many more circuits
5. Apply the theoretical knowledge to design flip-flops, counters and many more sequential circuits.
6. Identify and illustrate specifications of different logic families and memories and analyze them in critical way.