DETAILED SYLLABUS

UNIT I. AC FUNDAMENTALS ,BATTERIES AND UPS 12Hrs

1.1 AC Fundamentals: Difference between AC and DC - Advantages of AC over DC – Waveform of sinusoidal A.C. Cycle – Generation of single phase A.C. by elementary alternator - Definition of cycle, frequency, time period, amplitude, peak value, average value and rms value – Define peak factor and form factor - Concept of phase , phase difference and phase angle – Single phase and 3 phase (Definition) - Meaning of lagging and leading sine wave - Advantages of three phase over single phase

1.2 Batteries: Classification of cells - Construction of Lead acid cell – Methods of charging – Care and Maintenance of Lead acid battery – Indications of a fully charge battery – Maintenance free batteries.

1.3 UPS : Need for UPS - Online and Offline UPS – Definition – Block Diagram – Explanation of each block – Merits and demerits of on line and off line UPS – Need of heat sink- Specification and ratings –Maintenance of UPS including batteries

UNIT II.TRANSFORMER AND SPECIAL MOTORS 12 Hrs

2.1 Single Phase transformer: Working Principle and Construction of transformer – Brief description of each part – Function and materials used - emf equation of transformer (No derivation) – Voltage and current ratio of a transformer – Efficiency - Losses in a transformer - Auto transformer - Comparison with two winding transformer – Applications – Step up and Step down transformer (Definition only)

2.2 Special Motors: Stepper Motor: Definition - Working principle - Types and applications – Servo motors: Definition - Working principle - Types and applications – Factors to be considered for selecting a motor for a particular application.

2.3 Electrical Safety: Electric shock-need for earthing-types of earthing, fuses-need-types of fuses

UNIT III - SEMICONDUCTOR DEVICES 14 Hrs

3.1 Diodes: PN Junction diode – Barrier Voltage, Depletion Region – Forward biased and Reverse biased Junction – Working principle - forward /Reverse characteristics of P-N Junction diode - Applications of diode – Zener Diode: Construction -Characteristics (Forward and Reverse) – Avalanche and Zener break down - Applications of Zener diode. Light Emitting Diodes-operation, construction and characteristics. LDR – Principle of operation and Characteristics .Photo Diode – Principle of operation(concept only)

3.2 Rectifiers: Definition – Need of Rectification – Circuit diagram, Operation, i/p and o/p Waveforms of Half wave - Full wave- Bridge rectifiers (without filters) - Uses of filters in rectifier circuit – Ripple factor, Efficiency and PIV (No derivation) – Comparison

3.3 Bipolar Junction Transistor: Definition - Principle of NPN and PNP transistor - Symbol - Transistor terminals - Operating principle (NPN transistor only) - Configurations of transistor – Comparison between CB, CE and CC - Input and Output characteristics of CE configuration – Transistor application as switch.

UNIT IV.BOOLEAN ALGEBRA ,LOGIC GATES COMBINATIONAL SYSTEM 14 Hrs

4.1 Number representation: Decimal, Binary, Octal and Hexa decimal number systems- Conversion of number from one number system to another (without decimal point) - BCD CODE – ASCII Codes - Parity bit – Use of a parity bit – Odd parity and Even parity

4.2 Logic gates: Positive and Negative logic System - Definition, Truth table, Symbol and Logical equations of AND – OR - NOT – EXOR - EXNOR (Only 2-inputs) gates – Universal gates - NAND - NOR – Symbol and truth table .

4.3 Boolean Algebra : Basic laws of Boolean algebra – Demorgan's Theorem and proofs – Duality theorem - Simplification of logical equations using Boolean laws - De-Morgan's theorem – Two, three and four variable Karnaugh map

4.4 Arithmetic Circuits: Half Adder and full adder- Truth table, Circuit diagram – Half subtractor and Full subtractor - Truth table, Circuit diagram.
4.5 Combinational logic circuits: Parity generator and checker - Multiplexer - De multiplexer – Encoder - Decoder (Definition and Basic Circuits only) – Comparator Circuit for two bit words.

UNIT V .SEQUENTIAL LOGIC SYSTEM 13 Hrs
5.1 Flip flops: Basic principle of operation - S-R, D flip-flop – Operation and truth table - Race Condition – JK flip flop – T flip flop – Toggling - Edge Triggered Flip-flop – Level Triggered flip flop - Need for a Master-slave flip flop - J-K Master Slave flip flop.
5.2 Counters: Need- Types of counters- 4 bit Asynchronous counter-Mod N counter-Decade Counter- 4 bit Synchronous counter-Distinguish between Synchronous and Asynchronous counter-Application of counters
5.3 Registers: Shift register - Block diagram representation and waveform of serial –in Serial out, Serial – in Parallel – out, Parallel in -parallel out Applications of Shift Registers.

REFERENCES

S.No	Title	Author	Publisher	Year of Publishing/ Edition
1.	Digital Electronics and Logic Design	Jaydeep Chakravarthy	University Press, Hyderabad	First Edition2012
2.	Basic Electricall Engineering	V.N.Mittle	Tata Mc-Graw Hill, NewDelhi	First Edition
3.	Basic Electrical and Electronics Engineering	R,Muthusubramanian R.Salivajanan	Tata Mc-Graw Hill, NewDelhi	Seventh Reprint 2011
4..	Principles of Electronics	V.K.Mehta	S.Chand & Co, NewDelhi	Second Edition
5.	Digital Electronics	G.K.Kharate	Oxford University Press	2010