Elements of Electronics Engineerig

EC- 101C ELEMENTS OF ELECTRONICS ENGINEERING

No. of Credits: 3

UNIT I Semiconductor Physics: Overview of Semiconductors, PN junction diode and Zener diode –Diode circuits: rectifiers (bridge type only), filters, clippers and clampers - BJT construction, operation, characteristics (CB, CE and CC configurations) and uses – JFET and MOSFET construction, operation, characteristics (CS configuration) and uses.

UNIT II Digital Electronics: Binary, Decimal, Octal and Hexadecimal number systems and conversions, Boolean Algebra, De Morgan's theorem, logic gates (AND, OR, NOT, NAND, NOR, XOR, XNOR),Combinational and sequential circuits, Introduction to flip-flops (S-R & J-K).

UNIT III Electronics Instruments: Role, importance and applications of general-purpose test instruments like Multimeter: Digital & Analog, Cathode Ray Oscilloscope (CRO), Function/Signal Generator.

UNIT IV Optoelectronic Devices and Displays: Photoconductive cell - photovoltaic cell - solar cell – photodiodes – phototransistors, Seven segment display: Common anode and Common cathode connections and applications.
LED DISPLAY: Construction, Working, Advantages, Disadvantages and Applications.
LCD DISPLAY: Types of liquid crystals; Types of LCD display:- Dynamic scattering and field effect type; Construction, Working, Advantages, Disadvantages and Applications.

UNIT V Communication System: Block diagram of a basic communication system – frequency spectrum - need for modulation - methods of modulation - principles of AM, FM, PM , pulse analog and pulse digital modulation – AM / FM transmitters & receivers (block diagram description only)

Text / Reference Books:
1. Sedra A S and Smith K C, "Microelectronic Circuits" 4th Ed., New York, Oxford University Press, New York (1997).
2. Tocci R J and Widmer N S, "Digital Systems – Principles and Applications", 8th Ed., Pearson Education India, New Delhi (2001).
3. Cooper and Helfrick, "Modern Electronic Instrumentation and Measuring Techniques", 4th print Prentice Hall of India, New Delhi (1996)
4. Boylestad and Nashelsky, "Electronic Devices and Circuit Theory", 8th Ed, Pearson Education India, New Delhi (2002).
5. Millman and Grabel, "Microelectronics", 2nd Ed. Tata McGraw-Hill (1999).

FUNDAMENTALS OF COMPUTER AND PROGRAMMING WITH C

UNIT I An Overview of Computer System and Operating Systems: Fundamentals: Hardware organization of a computer, CPU, Input/ Output Devices, Memories, Registers, Ports. Different Number Systems:- Decimal Number System, Binary Number System, Octal Number System, Hexadecimal Number System, and their interconversions. YMCA University of Science & Technology Faridabad Operating System Basics: Introduction to Operating system, Functions of an Operating Systems, Classification of Operating Systems.

UNIT II Basic Introduction to Programming Languages: Machine Language, Assembly Languages, High level Languages, Types of high level languages, Complier, Interpreter, Assembler, Loader, Linker, Relationship between Compiler, Loader and Linker. Flowcharts.

UNIT III Basic Introduction to Computer Networks: LAN, MAN, WAN, OSI Reference model, Introduction to Internet and protocols: TCP/IP ref. model, Network connecting devices. Hypertext documents, HTTP, DNS, Network Security.

UNIT IV An Overview of C: Basic and Derived Data Types: Constants,

Variables and Data types, operators and Expressions, managing I/O operations, Decision Making, branching and looping, Derived Data Types like Arrays, Strings. Structure and Union in C: Defining structure, declaring variables, Accessing structure members, structure initialization, copying and comparing structures variables, operations on individual members, Array of structure, structure with structure, unions.

UNIT V Pointers in C: Introduction, Understanding Pointers, Accessing the address of a variable, Declaring Pointer Variables, Initialization of Pointer Variables, Pointer Expressions, Pointer Increments and Scale Factors, pointers and Arrays, Pointer and Character Strings, Pointers as Function Arguments, Pointers to Functions. UNIT VI File Management in C: Defining and opening file, closing file, I/O operation on files, error handling during I/O operations.

Text Books: 1. Fundamental of Information Technology by A.Leon & M.Leon. 2. Let Us C by Yashwant Kanetkar. 3. Computer Fundamentals and Programming in C by A. K. Sharma, Universities Press. **Reference Books:** 1. Programming in C by Schaum Series. 2. Computer Networks (4th Edition) by Andrew S. Tanenbaum 3. Digital Principles and Application by Donald Peach, Albert Paul Malvino 4. Operating System Concepts, (6th Edition) by Abraham Silberschatz, Peter Baer Galvin, Greg Gagne.

Basic Electrical Engineering

UNIT I DC Circuits: Ohm's Law and Kirchhoff"s Laws; Analysis of series, parallel and
series-parallel circuits excited by independent voltage sources; Power and energy;
Electromagnetism:- Faradays Laws, Lenz's Law, Fleming's Rules, Statically and dynamically
induced EMF; Concepts of self inductance, mutual inductance and coefficient of coupling;
Energy stored in magnetic fields; Hysteresis and Eddy current losses.
UNIT II Network Theorems: Superposition, Thevenin's and Norton's, Reciprocity,
Compensation, Maximum Power transfer, Tellegan's and Millman's theorems, Application
of theorems to dc and ac circuits.

UNIT III AC Circuits: Single Phase A.C. Circuits :-Generation of sinusoidal voltage-
definition of average value, root mean square value, form factor and peak factor of sinusoidal

voltage and current and phasor representation of alternating quantities; Analysis with phasor
diagrams of R, L, C, RL, RC and RLC circuits; Real power, reactive power, apparent power
and power factor, series, parallel and series- parallel circuits, Series and Parallel resonance,
selectivity, bandwidth and Q factor, earthing

Three Phase A.C. Circuits:- Necessity and Advantages of three phase systems, Generation of
three phase power, definition of Phase sequence, balanced supply and balanced load;
Relationship between line and phase values of balanced star and delta connections; Power in
balanced three phase circuits, measurement of power by two wattmeter method.

UNIT IV Electrical Machines:
Transformers: - Principle of operation and construction of single phase transformers (core
and shell types). EMF equation, losses, efficiency and voltage regulation, Principle of
operation of an Auto Transformer. Applications.
Synchronous Generators: - Principle of operation and constructional features, Applications

DC Machines:- Principle of Operation and constructional features, Classification and
Applications.
Three Phase Induction Motor:- Principle of Rotating Magnetic Field, Principle of Operation
of 3-Phase Induction Motor, Starting Methods and Applications of Three Phase Induction
Motors.

Text Books:
1. Edward Hughes, Electrical Technology,10th Edition,ELBS 2010
2. Electrical Engg. Fundamentals. By V. Del Toro Prentice Hall

3. Electrical Technology, By H. Cotton, 7th Edition
4. Basic Electrical Engineering by Kothari & Nagrath TMH

Basics of Mechanical Engineering

UNIT I Basic Concepts of Thermodynamics: Macroscopic and Microscopic Approaches, Thermodynamic Systems, Surrounding and Boundary,Thermodynamic Properties–Intensive and Extensive, Thermodynamic Equilibrium, State, Path, Process and Cycle, Concept of Thermodynamic Work and Heat, Zeroth Law of Thermodynamics, Energy and First law of Thermodynamics, First law applied to non flow processes, Internal Energy and Enthalpy. Numerical Problems.

UNIT II I.C. Engines: Introduction, classification, Constructional details and working of 2 stroke & 4 stroke petrol engine & diesel engine, Otto, diesel and dual cycles, simple problems on Otto & diesel cycles.

UNIT III Simple Lifting Machines: Definition of machine, velocity ratio, Mechanical advantage, Efficiency, Laws of machines, Reversibility of machine, Wheel and axle, Differential pulley block, Single, Double and Triple start worm and worm wheel, Simple and compound screw jacks, Problems.

UNIT IV Basics of Power Transmission: Transmission of mechanical power: introduction belt drives, gear drives, their advantages and disadvantages. Introduction to brakes and clutches.

UNIT V Stresses and Strains: Introduction, Concept & types of Stresses and Strains, Poisons ratio, stresses and Strains in simple and compound bars under axial loading, Stress– Strain diagrams, Hook's law, Elastic constants and Mechanical Properties of metals like mild steel and cast iron.

UNIT VI Basics of Manufacturing Processes and Measurements: Brief introduction to classification of different manufacturing processes: Primary shaping processes, metal cutting processes, joining processes, finishing processes and processes bringing change in properties, Working principle, parts and specification of commonly used machine tools in workshop such as Lathe, Shaper and Milling. Measuring Instruments: introduction to slip gauges, Go and No Go gauges, dial gauges, vernier calliper, micrometer, sine bar, vernier height gauges.

Text Books: 1. Basics of Mechanical Engineering- R.K Rajput Laxmi Pub, Delhi. 2. Elements of Mechanical Engineering- D.S Kumar, S.K Kataria and Sons. 3. Engineering Thermodynamics- P.K Nag TMH, New Delhi. 4. Workshop Technology Vol I & II –Hazra & Chaudhary, Asian Book Comp., New Delhi.

Reference Books: 1. Engineering Thermodynamics- C.P Arora, Pub-TMH, New Delhi. 2. Manufacturing Science- Amitabha Ghosh & Ashok Kumar Malik, - East- West Press. 3 Manufacturing Process & Systems- Oswald, Munoz, John Wiley. 4 Workshop Technology Vol I, II & III- Chapman, WAJ, Edward Arnold. 5. Basics of Mechanical Engineering – Vineet Jain, Dhanpat Rai Publications 6. Automobile Engineering by Dr Kirpal Singh, standard Publishers Distributors