

बिलासपुर विश्वविद्यालय
बिलासपुर (छत्तीसगढ़)



पाठ्यक्रम

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परीक्षा : 2014

:: प्रकाशक ::

कुलसचिव बिलासपुर विश्वविद्यालय
बिलासपुर (छत्तीसगढ़)

Only D82 B8

स्मरण (QV) स्लेट निश्चय
2004-05

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PAPER - I

ELECTRODYNAMICS AND ELECTRONICS MATERIALS

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~~AK=3667~~
~~AK=6677~~

UNIT-I

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Gauss's law, Scalar potential, Poisson's and Laplace equation and their solution in Cartesian coordinates, Electrostatic potential energy. Dielectrics and its polarization. Polarization of non-polar molecules (Classicus - Mossatti relation), Bio - Savart Law, Vector Potential, Ampere's Circutial law, Energy Density in Magnetic field.

Maxwell's equation in terms of Scalar and Vector potential, Gauge transformations, Lorentz and Coulomb gauge. Retarded potentials. Radiation from an oscillating electric and magnetic dipole with simple application.

UNIT-II

Polarization by reflection. Total internal reflection. Electromagnetic waves in conducting medium, Normal and anomalous dispersions.

The dielectric tensor of an anisotropic medium, the structure of monochromatic plane wave in an anisotropic medium, the phase velocity and ray velocity. Fresnel's formula for the propagation of E.M. waves in crystals.

Wave guides and resonant cavities, cylindrical cavities and wave guides, modes in rectangular wave guides, energy flow and attenuation in wave guides, modes in rectangular. Resonant cavities, power losses in cavities.

UNIT-III

Fundamentals of material science : Phase rule, Phase Diagram, Relative stability of Phases. Phase Transformations : Elementary idea of Nucleation and Growth, Methods of crystal growth. Defects in Crystals : Elementary idea of point, line and planar defects. Materials in thin film form : Concept of thin films, preparation of thin films, deposition of thin film using sputtering methods (rt and glow discharge)

UNIT-IV

Special Materials in Electronics:

Composite materials : Composites of glasses, polymers metals and ceramics, properties and applications. Polymers : Mechanism of polymerization, conducting polymers, application of polymers in electronics. Metallic Materials : Functional gradient materials, shape memory alloys, amorphous materials, IC package materials. Liquid crystal polymers, Optical properties of cholesteric and chiral nematics liquid crystal displays, optical fibre materials.

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UNIT-V

Dielectric and Ferroelectric Materials : Dielectric materials as capacitive elements, polar dielectrics, properties and applications in electronics. Ferroelectrics : physical properties and classification, properties modifications, nonlinearities, application in electronic devices.

Magnetic Materials : Ferromagnetic materials and their application transition metals and alloys as ferromagnets, hard and soft magnetic materials. Ferritites : Elementary idea of spinels. Garnets and hexagonal ferritites, application of ferritites in electronics, magnetic bubbles.

Books Recommended

1. Classical Electrodynamics : Jackson, J.D.
2. Introduction to electrodynamics : Griffith, D.J.
3. Optics : Mathur, B.K.
4. Electromagnetics : Laud, B.B.
5. Electrodynamics : Satya Prakash.
6. Material science in engineering : V. Raghavan
7. Element of material science and engineering : L.H. Van Vleet
8. The structure and properties of materials : R.M. Rose and J. Wulf.
9. Liquid Crystal : S. Chandrasekhar.
10. Material Science : C.M. Gupta.
11. Solid State Physics : C. Kittel.

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PAPER - II ~~AI-3766~~

INTEGRATED CIRCUIT AND SEMICONDUCTOR DEVICES

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UNIT-I ~~AT-1669~~

The feedback concept, Generalized voltage and ~~even~~ ^{Current} feed back (series and shunt) General characteristics of negative feedback amplifiers, ^{Current} ~~even~~ and voltage feedback circuits, Emitter follower, Amplifier distortion, amplifier classification and characteristics, Power and efficiency of amplifiers, Direct and Transformer coupled amplifiers, Theory and application of class A push pull amplifier, Working principle of class B push pull amplifier.

Basic operational amplifier, Differential amplifier, transfer characteristics of a differential amplifier, IC operational amplifier, OP-AMP parameters and their frequency response, Application of OP-AMP as adder, subtractor, active filter, Noise in OP-AMP.

UNIT-II

Differentiating and integrating circuit, clipping and clamping circuits, comparators, Multivibrators, Waveform generators (Series square, triangular) frequency to voltage and voltage to frequency conversion.

JFET, MESFET, MOS-Diode, Microwave devices, Tunnel diode, IMPATT, Light Emitting diode, Photovoltaic solar cell, Characteristics efficiencies, Fill factor, voltage factor, effect of series and shunt resistance, Material selection.

UNIT-III

Active filters, Butterworth and chebyshev salen and key filters, Low and Band-Pass/ Reject filters.

Fundamental definitions related to Opto Electronic devices, Photo conductive sensors, application of photo diode and photo transistors, Photo Multiplier tube, Light emitting diode, Photo coupler.

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UNIT-IV

Classification of IC's, Electronic grade silicon, Silicon shaping, lapping, polishing and wafer preparation, Vapour phase epitaxy, Molecular beam epitaxy, Optical lithiography, Photomask, Photoresist and process, Limitation of optical lithiography, Idea of electron and x-ray lithiography, ^{Wet} ~~dry~~ chemical etching, Reactive plasma etching.

UNIT-V

Fabrication of monolithic diodes, Fabrication of integrated transistors, Idea of buried layer fabrication, Monolithic circuit layout and design rule, Isolation methods monolithic FET, MOSFET, Processing idea of HET (High electron mobility transistor) CCD, MOS integrated circuits, Large, Medium scale, Hybrid integrated circuit.

P-n homojunctions, Thermal equilibrium, Depletion region, I-V Characteristic, Heterojunction model, current transport, Heterojunction parameter and criterion, material selection, Application of Heterojunctions, Ohmic contacts, Semiconductor contacts.

Books Recommended: (To be included)

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PAPER - III

DIGITAL ELECTRONIC AND COMMUNICATION

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UNIT-I

Logic gates, Boolean Algebra, Simplification of logic circuit using karnaugh map, Number system and codes, Signed binary numbers, Representation of fractions, Arithmetic circuits, Adder subtractor, Code convertor-decoder, Multiplexer and Demultiplexer seven segment and Dot matrix display.

UNIT-II-

Logic families, TTL circuits, Totem pole output, TTL parameters, TTL NAND gate, Open collector gates, Tri-state TTL devices, External drive for TTL load, MOS logic enhancement type MOSFET, CMOS characteristics TTL and C-MOS interfacing.

UNIT-III

Flip flops R-S, D, T, J-K and master slave J-K flip flops registers, Buffer and shifts registers, Binary ripple counter of Mod N synchronous counters, Ring counters, Semiconductor memories, Memory addressing logic, ROM, EPROM and RAM memories.

D-A conversion, Weighted registers and Ladder method, Sample and hold circuit, A-D convertor Simulation methods, continuous method, counter method, successive approximation, A-D accuracy, Resolution, Digital clock, Digital voltmeter, Digital frequency meter.

UNIT-IV

Modulation technique : Amplitude modulation, square wave modulation, suppressed carrier balance modulator, study of amplitude modulated transmission, Square law detector, distortion in linear diode detector.

Frequency modulation and detection : Reactance tube modulators, frequency modulation varactor diode, Armstrong method of frequency modulation, frequency stabilization FM receives, limiters, FM detectors.

Digital communication : Sampling and quantization, Time division multiplexing, Pulse code modulation, PCM encoding, delta modulation, Differential PCM, Adaptive delta modulation.

UNIT-V

Radar communication : Continuous and pulse radar system, General study of pulse radar using A type indicator, Radar performance factors, Radar transmitting systems, Rotatory spark gap modulators, Hard value puer, Radar waveform range determination, Radar antenna duplexer, Radar receiver, Automatic tracking radar, Doplar effect in radar.

Books:

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PAPER - IV
SIGNAL SYSTEM AND COMPUTER APPLICATION IN
ELECTRONICS

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UNIT-I

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Signal and System Modeling Concepts : Introduction of signal and system analysis, few examples of system, signals models, classification of signals, energy and power signals, energy and power special densities.

System modeling and Analysis in Time Domain: Introduction to system modeling concepts, The superposition integral for fixed linear system, convolution integral, Evaluation of convolution integral, Impulse response of a fixed linear system, superposition integral in terms of steps response, stability linear system modeling and simulation.

UNIT-II

State variable Techniques : Introduction, State variable concepts from the state equation, Time domain solution of state equation, frequency domain solution of state solutions, finding the ^{state} transition matrix, equations for discrete system.

Discrete time signal and system., D-A conversion and Filter circuit analysis.

UNIT-III

Architecture of 8085: Organization of microprocessor (8085), General purpose registers and register pairs, Concept of flag and their uses, General processing unit of microprocessors, Timing and control unit, Fetch and execute cycle, General discussions about input/output of microprocessors, I/O section, Useful I/O facilities and their control concept of interfacing, types of interfacing devices, Interrupt facility advantage and disadvantages of interrupts, Simple interrupts system, Direct Memory Access (DMA).

UNIT-IV

Assembly Language Programming : Concept of assembly language and assembler. The instruction 8085, Op-codes. Machine language and instruction cycle, Addressing techniques, Direct immediate, Relative indirect and indexed addressing, single address computer, Organization, The memory reference instructions, Loop jump, Instructions Addressing, Modes stack, Call, Return instruction and their routineness.

UNIT-V

Introduction of Computer System & "C" Programming : Basic idea of computers, I/O devices, Programming concepts "C" Programming structure, Data types, Constant, Variable, Assignment declarations and expressions, Statement,



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Symptotic constant, Different types of operators, Integers, Floating point in "C".
Data input and output controls, Printf and Scant function, Putchar, Getchar, Arrays.
Control statements and Decision making in "C", If-else statement, Gesting of
If in statement, While loop, Do-while loop, For loop, Nesting: if for loop, Newton-
Raphson iteration method as example of "C" program, User defined function,
Function and structured programming, Local and global variables, Declaration
function, arrays, Declaration, Initialization and processing of Arrays.

Books Recommended :

- (1) Digital Computer Electronic and Microprocessor : A.P. Malvino.

More books are to be included

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