Barkatullah University Institute of Technology, B.U., Bhopal

SEMESTER I

ENGINEERING PHYSICS

EL-101

Unit I

WAVE OPTICS

Theory of Bi-prism and Newton's Rings experiments, Michelson's Interferometer. Diffraction at single slit, Double slit and diffraction grating, resolving Power, Rayleigh criterion, Resolving power of telescope, microscope, grating and prism, concept of polarized light, Nicol prism. Idea about circularly & elliptically polarized light.

Unit-II

QUANTUM PHYSICS

Matter waves, group and particle velocity, uncertainty principle, Schrödinger wave equation and its application. Characteristic and back ground X-rays, Duan Hunt Limit, Moseley's law .Bragg's diffraction and bragg's spectrometer, comption effect. Stimulated and spontaneous emission, principles of laser action. Properties of solid state(Ruby & Nd YAG) and gas (He-Ne & Co_2) type lasers and their engineering applications. Fundamental ideas about fibre optics

Unit-III

NUCLEAR PHYSICS

Static properties of Nuclear shell model an liquid drop mode, particle accelerator. Cyclotron, Synchrocyclotron 7 Betatron, Nuclear reaction and Q values. Nuclear cross section Nuclear fission, Fission energy. Theory of fission process. Chain reaction. Critical size. Principles of Nuclear reactor and Nuclear fusion. Control fusion and fusion reactor.

Unit IV

SEMICONDUCTOR PHYSICS

Idea of energy bands in solids, distinction between metal insulator & semiconductor. Intrinsic and extrinsic semiconductor electron and hole motilities. Electrical conductivity and Hall effect P-n Junction. Junction Transistors. Transistor parameters. Working principles of thermostat, photo voltaic effect and solar cells. Fundamental ideas superconductivity Meissner effect, Isotope effect, Josephson effect.

Unit-V

DIELECTRIC MATERALS

Dielectric polarization, Gauss's Law. EP and D vectors .Different type of polarization. Conecpt of internal fields. Claudius Mosotti relationship. Langevin's theory of dipolar orientation Idea of polar and non-polar dielectrics, Ideal of lossy dielectric. Loss tangent and idea of complex permittivity.

Suggested text books:-

1. Concepts of modern physics by Arthur Beiser.
2. A text book of Engineering Physics by P.G. kshirsagar.
3. Engineering Physics theory & Experments by Shrivastava & Yadav.
4. Physics for Engineers by M.R. Srinivasan.
5. Optics by Ajoy Ghatak.

Barkatullah University Institute of Technology, B.U., Bhopal

ENGINEERING MATHEMATICS-1
EL-102

Unit I.

Maclaurin's and Taylor theorem, roll's theorem, applications to rates, small increments, approximations and errors.

Unit II

Tangents and sub tangents, normals and subnormal differential coefficients of length in Cartesian,
Polar and parametric coordinates, Curvature definition formula in intrinsic, Cartesian and polar coordinates, radius of curvature and center of curvature.

Unit III

Asymptotes Envelopes, evolutes, indeterminate forma, partial differentiation, Euler's theorem, application of partial differentiation on approximation and errors of Taylor's series of two variables maxima and minima of function of one two variables.

Unit IV

Definite integrals and their properties, integral as the limit of a sum application to summation of series area, length, of curves, volume and surface of solids of revolutions.

Unit V

Beta and gamma function multiple integral, double integral and triple integral application to problem in area., volume center of gravity, moment on inertia and enter of pressure.

Suggested text books:-

1. Differential & integral calculus by Gorakh Orasad.
2. Integral calculus By M. Ray, H.S. Sharma & S.S.Seth.

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FUNDAMENTALS OF COMPUTER AND PROGRAMMING
EL-103

Unit-I
General organizations of typical computer, classification of computers , generation of computer. Input-output devices. Storage devices. System software like assemblers. Compliers

Unit-II
Operating systems, Introduction to UNIX. Simple UNIX commands like date. Who. Cal. Tty, Is ete. File commands like mv, cp,cat.etc. Directory commands like pwd, Mkdir, Rmdir, cd etc. other commands like echo. Man etc. Modifying files using vi editor. Compare UNIX and DOS. Generation of programming language.

Unit-III
Problem specification. Flow chart and algorithm development, structured programming object oriented programming and its advantages. Data types. Assignments unary binary and tertiary operator Input-output statements Developing simple C Programmes. If statements, loops (for, while, do … while).break & continue. Switch statements. Development of C Programmes using above statements.

Unit-IV
Arry, functions . Parameter passing Recursion. Programming in C Using these statements. Preprocessors directives and macros. Storage classes of variables.

Unit-V
Structures, Pointers, Files handling using intel86() function, union enumerated data type command line argument, working with user defined header file.

Suggested text books:-

1. Unix by Summitabha Das
2. “C” Programming by E Balaguruswamy
3. Complete reference of “C”
4. Fundamental of computer by V Rajaraman.

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BASIC ELECTRONICS
EL-104

Unit-

Semiconductor Theory & Diodes

Energy band theory of crystals, Insulators, Semiconductors 7 Metals. Intrinsic & Extrinsic semiconductors Theory of P-N Junction, Ideal & Practical diode, Transistor Characteristics & Operation, Temperature and breakdown characteristics, Junction Capacitances, piece wise liner DC model of diode, Zener diode, Desgn of Zener regulator, Varactor diode, Point-Contact diode tunnel diode, schottky- Barrier diode Light emitting diode 7 Power rating of diodes

Unit-II

APPLICATIONS OF DIODE & WAVE SHAPING CKTS

Half wave & Full wave Rectifiers with& without Filter, Clippers & Clampers, Voltage Multipliers RC Integrators & Differentiator

Unit-III

BJT-FET

Input & output Characteristics od all configuration, biasing & Thermal Stabilization, AC & DC Load line, Compensation techniques, Thermal runway, Eber's Molls equation & Early effect, FET Characteristics & Applications of JFET & MOSFET.

Unit-IV

Amplifier

Parameters, Caluation of gain & impedances, FET equivalent CKT, Hybrid π model, Millers effect, Transister as an Amplifier. Frequency Response of Amplifiers, Classifications of Amplifiers-Voltage & Current Amplifiers, Coupled Amplifiers, Multistage Amplifiers.

Unit-V

CRO & Multilayer Devices.

CRT Construction, Block diagram of CRO & deflection systems and its Sensitivity, Trigging 7 Synchronization, lissajous patterns of CRO
Construction & Characteristics of DIACS, Triacs UJT,
SCR- Latching 7 Holding Current, V-I Characteristics, Triggrting CKT,
Communication circuits Series & Parallel Connections of SCR.

Suggested text books:-

1. Integrated Electronics by Millman & Halkias
2. Electronics Devices and circuit Theory by Boyelasted an Nashlsky.
3. Electronics Instrumentation by copper & Halfrick.

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COMMUNICATION SKILLS
EL-105

Unit-I
Languages as a sklii of communication linguistic techniques modern usage & atyle comprehension skills, English phonetic symbols, oral presentation audition.

Unit-II
Application of linguistic ability writing of definitions of engineering terms, objects, processes and principles.

Unit-III
Letter writing Application, Enquiry, calling quotations, Tenders order& complaint, company atucture and systems.

Unit-IV
Precise writing noting & drafting technical descriptions of simple engineering objects & processes, slogan writing, advertising, book review.

Unit-V
Writing technical reports of the type of observation report, survey report, report of trouble, laboratory report and project report on the subjects of engineering, debates, speech discussion.

Suggested text books:-

1. Business correspondence and report writing by R.C. Sharma and Krishna – Tata Mc Graw Hill.
2. Communication in English fir Technical Students by Ray Williams, Rabindrnath Ray and John Swales- Orient Longman.
3. Living English Structure W standard – Allen –Longmans.
4. Essentials of communication Techniques by Dr. Ravi S. Verma, H.S. Satsangi- Career Publication

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SEMESTER – II

BASIC ELECTRICAL ENGINEERING
EL-201

Unit-I

Introduction to electrical Engg. Generation, transmission, distribution and utilization . DC circuits: Maxwell's loop & node equations. Source conversion, Network theorems Superposition theorem, Maximum power transfer theorem, Millman theorem, Reciprocity theorem, Star/Delta transformation.

Unit-II

Magnetic ckts & electrostatics: fundamental definitions, Ampere's law lenz's law, calculation of mmf, electric field, electrostatic potential energy stored in electric and magnetic field, statically & dynamically induced emfs, self & mutual induction, coefficient of coupling, rise & decay of current in inductive ckt.

Unit-III

Single phase AC. Circuits: Average value, RMS value, Form factor, Alternating waves, power & Power factor, single phase series-parallel ckts, resonance, phase diagram.

Poly phase AC circuits: Phase sequence, Concept of line & phase quantities, star/Delta Connections, Three phase power & Power management.

Unit-IV

Transformer: Construction, classification, principle of operation, phasor diagram on no-load and on load condition, equivalent ckt, efficiency, regulation, all day efficiency, OC & SC test, auto transformer.

Unit-V

DC machine – Generator – types, principle of operation, emf equation, magnetic characteristics, motor- back emf, torque equation, mechanical characteristics, commutation armature reaction, interpoles, starting & speed control, applications.

Suggested Text Books & References:-

1. Electrical Engg. Fundamentals - V.Deltoro
2. Electrical Machines - Nagrath Kothari
3. Electrical Machines - P.S. Bimbhra.
4. Basic Electrical Engg - V.N. Mittle.
5. DC machines & Transformers - K. Murugesh Kumar.

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ENGINEERING CHEMISTRAY
EL-202

Unit-I

Source & impurities, Alkalinity & P^H hardness of water. Degree of hardness. BOD,COD and their determination. Standard of Water for drinking purposes. Purification of water for domestic uses. Methods of sterilization, methods of water softening, lime soda process. Zeolite and ion exchange resin processes. Scale formation Causes. Effects and prevention. Caustic embrittlement, priming foaming, boiler corrosion and de-aeration simple numerical problems on water softening and analysis.

Unit-II

Fuels.

Classification of fuels and their comparison, calorific values, fuel resources in India, analysis of coal clinker formation. Pulverized coal as fuel, methods of manufacture of coke and uses, petroleum distillation. Cracking cracked gasoline. Varieties of fuel oils, their properties and uses, knocking, anti knocking compounds. Problems based on combustion.

Unit-III

Materials

Composition engineering properties and uses of alloys of Al. Fe. Ni Cu and Zn. Refractories: definition. Classification, properties and uses: Types of Cements .manufacture. properties and uses of Portland Cement, Chemistry of setting hardening of Cement.

Polymers: Polymerization, different types of polymers. Plastics. Their preparation engineering properties and uses. Silicones . natural and synthetic rubbers, their properties and uses, adhesives.

Unit-IV

Lubricants

Types and classification of lubricants, mechanism of lubrication, physical and Chemical properties testing of lubricants types of greases, application of lubricants. Corrosion and corrosion reaction, types and theories of corrosion, factors affecting the rate of corrosion, protection of metal from corrosion by various measures, important inorganic metallic and non metallic coatings and organic coating.

Unit-V

Basic environmental chemistry and Instrumental techniques in chemical analysis.

A. Pollution, cause of pollution, air pollution and its types, green house effect, importance of ozone layer, control of air pollution, water pollution, sources, methods of prevention, sewage and its treatment, soil and land pollution and its control, radio active pollution and its control.
B. Introduction, infrared, UV,NMR, spectrophotometry, chromatograph, gaschromatography, colorimetry, Lamberts and beer's law.

Suggested Text Books:-

1.Engineering Chemistry by Jain & Jain – Dhanpat Rai & Sons, New Delhi
2.A Test book of Engineering Chenistry by S.S. Dara S. Chand & Co. Lted. New Delhi

3. Krishna's engineering Chemistry by B.K. Sharma – Krishna Prakashan, Meerut.
4. A book of Practical Engineering Chemistry by Mittal by Kapoor & Mittal- Kedar Nath Ram Nath, Meerut.

BASIC MECHANICAL ENGG.
EL-203

Unit-I

Boilers- Names and function of principal parts, Cochran, Locomotive, Babcock and Wilcox boilers, boiler mountings and accessories. Steam Sensible heat, Latent hear, super heat, internal energy, dryness fraction and its determination processes constant pressure, constant volume, hyperbolic and throttling.

Unit-II

IC Engines:

Classification of I.C. Engines, description and working of four stroke cycle petrol and diesel engines, two stroke cycle petrol engine and their working cycles, indicated power, brake power and efficiencies.

Thermodynamics – system properties and processes, Zero, first second and third law of thermodynamics.

Unit-III

Modes and application of heat transfer unidirectional steady state heat conduction, heat transfer through composite slab, Air conditioning- need and application, description of summer and winter air conditioning.

Workshop Technology.

Unit-IV

Introduction to materials machine tool and metrology:

Engineering materials: Classification, composition, mechanical properties and uses of cast iron, mild steel, high carbon steel and high speed steel.

Machine tool: introduction, specification construction and uses of lathe, drilling, shapes milling and grinding machines.

Measurement: construction and uses of measuring tools and gauges, surface plate, dial gauge, sine bar, caliper, micrometer, comparators.

Unit-V

Foundry and Fabrication:

Foundry: Basic steps involved in foundry. Introduction to patterns, types material allowances, mould making, composition of molding sand i.e. green sand, dry and loam sand,

Fabrication: Welding and types of weld ability of material. Introduction to gas and are welding- TIG,MIG and submerged, resistance welding, soldering and brazing & related process.

Suggested Text Books:-

1. Manufacturing technology vol. I& II Raghuwanshi.
2. Workshop Technology Vol.I & II Hazara Choudhary.
3. Workshop Technology Vol.I & II P.N. Rao.

ENGG.MECHANICS
EL-204

Unit- I

Co-plainer Forces, free body diagrams, Varignon's Theorem, Condition of Equilibrium, force polygon and funicular polygon of forces and equivalent force system, Analysis of forces in the members of a truss, method of joins, Method of section.

Unit-II

Centroid and mount of Inertia of plane areas, perpendicular Axis and theorems, product of Inertia, Radius of gyration, Principal Axes and principal Mount of Inertia, Mass Mount of Inertia.

Unit-III

Friction on inclined plane, screw & nut friction, ladder wedge friction, Transmission of power through belt, and rope, gear Trains, simple, compound and Epicyclic.

Unit-IV

Kinematics and kinetics of particle, motion under constant force, Super elevation of rails, Momentum and Impulse, D' Alembert's Principal, Work energy principle, Collision of elastics bodies, rigid body dynamics, Kinematics and Kinetics of rigid body, Flywheel,

Unit-V

Shear force & bending moment diagram in cantilever & simply supported beam with concentrated, distributed load, and couple, overhanging beams , pint of contra-flexure, relationship between load, bending moment & shear force.

Suggested Text Books:-

1. Applied Mechanics by S.B. Jummarkar.
2. Engg. Mechanics by R.K. Rajput.
3. Applied mechanics by I.B. Prasad.

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DATA STRUCTURE AND ALGORITHMS
EL-205

Unit-I
Introduction to Algorithms, concept of time and space complexity of algorithms to recursion, running time calculation of algorithms. Introduction to data structure, arrays, representation and manipulation of multidimensional arrays.

Unit-II
Introduction to linked lists, doubly linked lists, stacks queues implementation and manipulation of these data structures.

Unit-III
Trees- Basic terminology and representation, Binary trees, Binary tree traversal, Binary search tree, applications of trees.

Unit-IV
Graphs- Basic terminology and representation, graph traversal connected compound and spanning trees, shortest path-
Dijkstra's algorithm.

Unit-V
Study and analysis of various internal sorting techniques- Insertion sort, quick sort, merge sort, heap sort. Introduction to external sorting- need and techniques.

Suggested Text Books:-

1. Fundamental of Data Structures by Horowitz & Sahani.
2. Data structure in C and C^{++} by A.S. Tanenbaum.

SEMESTER-III

ENGG.MATHEMATICS-II
EL-301

Unit-I

Differential equation of first order and first degree liner and exact differential equation. First order and higher degree differential equations and soluble for P,X, and Y including clarauts form.

Unit-II

Second and higher order differential equation. Simultaneous differential equations of both types second order differential equation with variable coefficients.

Unit-III

Solution by series mentod with emphasis to legender's and bessel's equation and properties of legender's and bessel's function.

Unit-IV

Laplace transformation of elementary functions unit step function, dirac-delta function, properties, inverse transformation. Solution of order diff. equations using laplace transformation.

Unit-V

Fourier series including half range series. Harmonic analysis, P.D.E. of first order. Liner and non liner, liner p.d.e of second and higher orders boundary value problems separation of variables, methods, application to heat transfer and vibration in one and two dimensions.

Suggested text books:-

1. Higher Engineering Mathematics by B.S. Grawal.
2. A text book of Engg. Mathematics by Srivastava and Dhawan.
3. Engg. Mathematics by Chandrika Prasad.

ELECTROMECHANICAL ENERGY CONVERSION
EL-302

Unit-I

Electrical Energy conversion principle-energy balance, energy in sngly excited and multiply excited magnetic systems, basic definitions of rotating machines. Rotating magnetic field.

Unit-II

3Φ Induction motors- construction, principle, types, equivalent ckt, torque equation, slip-torque characteristics, starting & speed control.

Unit-III

Special machines- 1 Φ Induction motors, principle, construction, starting, torque characteristics, applications, construction, principle & analysis of stepper motor, liner induction motor, hysterisis motor, universal motor, servo motor.

Unit-IV

Synchronous machines- Generator, construction, emf equation, OC and SC Characteristics, synchronous impedance, method of calculating regulation, motor –characteristics, V & inverted V curve salient & non salient pole machines, vector diagram, power angle characteristics.

Unit-V

Transmission & distribution- Transmission of power by different systems, influence of voltage on cost & efficiency, short & medium line- parameter, representation vector diagram, introduction of portative devices.

Suggested text books:-

1. Electrical Machines by P.S. Bhimbra.
2. Measurement and Instrumentation by A.K. Sawhney.
3. A course in Electronics and electrical Measurement & Instrumentation by J.B. Gupta.

NETWORK ANALUSIS & SYNTHESIS
EL-303

Unit- I

Circuit elements energy sewers, loop & node analysis kinehoff's current & voltage laws, Analysis of magnetically coupled ckts. Dot convention, cramer's rule, dual network, voltage & current source, controlled sources. Networks theorems. Thevenin's & norton's theorem, superposition, reciprocity, compensation, max power transfer & Millman's theorm.

Unit-II

Transient & steady state analysis transients in ROL, RC, RLC circuits, Initial conditions, time constants, circuit driver by constant, sinusoidal & other driving sources & their solutions. Network topology: graph, trees, branches & links, impedance matrix, cut set, & tie set matrices.

Unit-III

Frequency domain analysis differential equation description of first & second order, systems, Laplace transform, & its application in circuit analysis, initial & final value theorem, response of periodic & non periodic excitations. Concept of signal spectrum, Fourier series, exponential from Fourier integral, and Fourier transform, frequency & phase spectrum.

Unit-IV

Network unction concept of complex frequency, impedance 7 admitance function for two port network, Two port-Network parameter's & relationship between parameters, interconnection of two port networks, poles & zeros in the S-plane for a driving point finite & transform functions, RLC circuits series & parallel resonance, band width Q factor & pole zero considerations.

Unit-V

Positive real function IC, RL,RC,7 RLC network synthesis, foster & cauer network, minimum positive real functions, broune's method. Bott- Duffin method. Insertion loss synthesis- coefficient matching techniques.

Suggested text books:-

1. Network analysis by Van Valkeinburg.
2. Network Synthesis by Van Valkeinburg.
3. Linear networks & Systems by D. Roy Chowdary.
4. Network analysis and Synthesis by F.F. Kuo.

DIGITAL ELECTRONICS
EL-304

Unit-I

Number system & Boolean algebra, number systems: Binary, Arithmetic, octal, hexadecimal 7 radix conversion.

Binary codes: BCD, excess three code, gray code display code ASCII, EBCDCIC, parity check codes code conversion, Boolean algebra; theorems, Introduction to logic gates, NANPNOR realization, Boolean laws & theorems.

Unit-II

Simplification of Boolean expression, sum of product & product of sum forms, concept of min terms & max terms, minimization techniques, Karnaugh's map method, Tabulation method. (Qunie-MC- clusky mehod)

Unit-III

Combinational circuits & filp flops half adder, substructure, BCD adder- excess-3adder multiplexer & demultiplexer, encoder & decoder ckts. FLIP-FLOPS: RS, clocked RS, T, D, JK, master slave JKFF and latches.

Unit-IV

Sequential ckts, elements of sequential switching ckts, synchronous 7 asynchronous systems, binary ripple, counter, BCD counter, UP-Down counter, Shift requesters, serial and parallel shift registers shift left & shift right operation, Johnson & Ring counter.

Unit-V

Design of sequential ckts. State table, state assignment, characterizing equation & definition of synchronous sequential machines. Mealy & more model machines, state table & transition diagram, Introduction to logic families, RTL, DTL, all types of TIL, ECL, NMOS, CMOS logic.

Suggested text books:-

1. Digital logic and Computer Design by Moris Mano.
2. Digital Principles and applications by Malvino & Leach.
3. Digital Fundamental by Floyd.

ELECTRONICS CIRCUITS
EL-305

Unit-I

Power Amplifiers & Regulators:

Power Amplifiers:- Class A, Class- B and AB Amplifiers, Push pull Amplifier Driver stage Design, Compound states, complementary symmetry circuits stability and thermal consideration, Class C Amplifier large signal power & Audio amplifier, tuned amplifiers.

Regulators:-Regulated Power Supply, Shunt & Series regulators, Current 7 Voltage regulator, Current limiting Protections Ckts.

Unit-II

Feedback Amplifiers, Negative & Positive feedback.

Feedback general theory, Effect of Feedback on gain, sensitivity, input & output impedances bandwidth & Noise types of feedback, Current & Voltage feedback Multistage feedback.

Unit-III

Waveform Generator

Conditions for Oscillators, types of Oscillators, phase shift Oscillators, Wein Bridge Oscillators , L-C Oscillators Colpitts & Hartley Oscillators, Crystal Oscillators, Negative resistance Oscillators, switching characteristics of transistor multivibrator designing & application of bistable monostable and astable multivibrator, 555 timr and its applications.

Unit-IV

Differential Amplifier

Direct Coupled amplifiers using BJT & FET, drift Problems, Darlington configuration, bootstrap, NPN-PNP Combination, Differential Amplifier ,Common mode rejection ration, cascaded Amplifier, series & shunt Choppers, inverted mode Choppers, balanced Choppers.

Unit-V

Operational Amplifiers (op-Amps)

Specifications, Compensation, Inverting & Non inverting modes, applications of Op-AMPs, Comparator , Zero crossing detector CKT, Schmitt trigger, instrumentation Amplifiers, Voltage to frequency & frequency to Voltage Converter Log & Antilog Amplifiers, Bridge Amplifiers, Voltage to current Amplifiers Rectifier CKT using OP-AMPs, precision rectifiers, 555 timer and its application.

Suggested text books:-

1. Integrated Electronics by Milliman & Hailias.
2. Micro Electronics by Sedra Smith.
3. Opamp by Gaikwad.
4. Micro electronics by P. Rashid.

ELECTROMECHANICAL ENERGY CONVERSION LAB
EL-306

List of Experiments;

A. Study of various parts & working of a synchronous machines.
B. Study of various starting methods of an induction motor.
C. Study of special machine like, liner IM, stepper motor, hysteresis motor.

1. To verfy the voltage & current relations star & delta connected 3 phase system.
2. Measurement of power in a three phase balanced circuit by two wattmeter method.
3. No load & block rotor test on 3Φ induction motor.
4. Load test on 3Φ-slip ring induction motor.
5. N load & block rotor test on 1Φ IM.
6. Speed control of 3Φ induction motor by cascadig.
7. To find voltage regulation of on alternator using synchronous impedance method.
8. To find voltage regulation by alternator using direct loading method.
9. To obtain V & inverted V- curves of synchronous motor.

10. To find voltage regulation of an alternator using zero power factor method.

NETWORK ANALYSIS & SYNTHESIS LAB
EL-307

Study of verification of Kirchoff's laws.

Study and verification of various theorema- Thevenin's, Norton, Superposition, Max. Power Transfer, Reciprocity, Millman's theorems.

Measurement of two port parameters & network function of a giver circuit.

Computer based simulation of different networks.

DIGITAL ELECTRONICS LAB
EL-308

Verification of truth table of various logic gates.

Design and implementation of half and full adder, Substractor.

Design and implementation of code converters, realization of multiplexers and demultiplexers, flipflops, counters and shift registers.

ELECTRONICS CIRCUITS LAB
EL-309

Frequency response of an amplifier with and without feedback.
Designing of differential amplifier and determining the different parameters of differential amplifier.
Operational amplifier – Inverting and non inverting configurations application of Op- Amp as summer, comparator, integrator differentiator etc.
555 timer ad its applications astable, monostable & bistable multivirbrator.

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SEMESTER-IV

NUMERICAL ANALYSIS
EL-401

Unit-I

Algorithm and its basic properties like effectiveness and efficiency. Examples of polynomial evaluation, searching largest number in a set etc. interactive and recursive loops in flow chat errors and approximations. Types of errors, sources of errors, problem in computational safeguards against errors.

Unit-II

Solution of equation Newton deflected Newton rap son methods. Bairstow's method of complex roots. Efficiency of these methods.

Unit-III

Interpolation forward backward, central and divided difference formula legrangian interpolation, inverse inter potation. Numerical interpolation: Newton cote's formula Weddle's $3/8^{th}$ rule Simpson's as a special case of Newton cote's gauss legendre open quadrature.

Unit-IV

Ordinary differential equation modification euler,picard and taylor series method, runga kutta 3^{th} and 4^{th} order, predictor and corrector method.

Unit-V

Linear simultaneous equation: partial and complete pivoting triangularization. Gauss reduction, jacobi, Gauss siedel itenation methods. Relaxation methods.

Suggested text books:-

1. Numerical methods in Engg. And Sciences by B.S. Grewal.
2. numerical Algorithm by E.V. Krishnamurthy & S.K. Sen.
3. Higher Engg. Maths by B.S. Grewal.

ENVIRONMENTAL ENGG.
EL-402

Unit-I

Environmental problem and issues Ecosystem, global warming, Green House effect, Depletion of ozone layer, Human activity and meteorology. Genetic and plant biodiversity, EL-Nino phenomemenon and its effects. Explosion of environmental issues, land and soil pollution.

Unit-II

Air pollution

Introduction, structure of the atmosphere, chemical and photochemical reactions in the atmosphere, effects of air, pollution sources & classification of air pollutions harmful effects of Co_1 Co_2 CH_4 So_x No_x H_2 S Ozone & particulate, Basic concept for air sampling techniques, photochemical Smog, Acid Raim.

Unit IV

A. Noise pollution and radioactive pollution Noise pollution- general introduction of noise pollution and its effects, sound unwanted from of noise changers, traffic noise prediction and control, radioactive wasti sources characteristics and disposal.
B. Solid and Hazardous waste management sources types and composition of solid waste physical, chemical Biological characteristics, disposal of solid waste.

Unit-V

Collection of base line Data, Introduction and concepts of initial environmental examination (IEE), Environmental Impact Assessment (EIA), Environmental Impact statement (EIS), environmental Audit EA Risk Assessment (RA) etc.

Regulatory Responses:-

Review of national and international developments related environmental issues, laws and legislation.

Reference books:-

1. Chemistry in Engineering & technology vol-II Tate MC Graw.
2. Chemistry of environmental Engineering S. Awyer and Parkin – Mc Graw Hill international.
3. “Environmental by A.K.De, Wiley eastern limited, New Delhi.
4. “Environmental pollution monition and conform khopkar S.M. New age international pub.
5. S.R. Khirsagar Sewage and Sewage treatment
6. D.N. May_ Nandbook of Noise assessment Van Nostrand.

7. Inroduction to Environmental Engineering & Science- gillberd M. Masters, PHI, Standard Methods for the examination of water and waste water. American public health association, Washington, DC.

ANALOG COMMUNICATION
EL-403

Unit-I

Signal Analysis: Review of fourier Transform, convolution signal transmission and its properties, through linear systems, signal distortion in transmission, paley-wiener criteria, bandwidth and rise time, energy and power density and parseval's theorem for energy and power signals, convolution & correlation.

Unit-II

Linear Modulation: necessity of modulation principle of amplitude modulation, generation and detection of AM-SC, SSB-SC and VSB, comparison of various Am systems, FDM.

Unit-III

Exponential modulation: Definitions and relationship between PM and FM frequency deviation, bessel's function, spectrum and transmission BW of FM, WBFM, phaser diagram of FM signal, multitone FM. Generation and detection of FM Non linear effects in FM systems, comparison of AM and FM systems.

Unit-IV

Radio Transmitter and Receivers: different types of AM and FM transmitters and receivers, AM and FM standard broadcast transmitter and receivers, image rejection, mixers, noise sources, calculation of noise for single and cascaded stages.

Unit-V

Noise performance of Analog communication systems SNR Noise figure, noise temperature, noise calculation for cascaded stages, noise figure of merit, of SSB, DSB, AM, FM systems, noise threshold effect, threshold improvement in FM systems: FMFB PLL, preemphasis and De-emphasis and other threshold improvement circuits.

Suggested text books and References:

1. Modern Digital and Analog Communication systems by B.P. Lathi. Third edition 1998 Oxford Univ. pres.
2. Communication systems: Analog & Digital: Singh & Sapre TMH 1995.
3. Communication systems: Simon Haykins 4th edition 2001 John Wiley & sons. Inc.

MICROPROCESSOR AND MICROCONTROLLER
EL-404

Unit-I

Microprocessor (8085):- internal architecture, instruction set and classification, Interrupts and data transfer schemes, memory- mapping and its interfacing, assembly level programming.

Unit-II

Microprocessor (8086):- organization, Architecture, addressing modes, instruction set, assembly language programming, memory management, real & protected mode.

Unit-III

Salient features of advanced Microprocessor, RISC and CISC processors, Review of evolution of advanced Microprocessor: 8086,8088,80-186/286/386/486/ Pentium, super scalar architecture of Pentium, Alpha AXP and Ultras arc processors.

Unit-IV

Introduction of various Interfacing chips like 8212, 8155,8255,8755, and its interfacing keyboards, printers, LRDS, motors, ADC,DAC, and stepper motor and introduction to programmable keyboard/ display interface, general-purpose programmable peripheral devices (8253)8254 programmable interval timer, 8259A programmable interrupt controller & 8257 DMA controllers. Serial I/O & data communication: use RS 232C, modern etc and various bus standards, 8251.

Unit-V

Introduction to microcontroller (8051):- its architecture, pin description, I/O configuration, interrupts, addressing modes, an overview of 8051 instruction sets.

Suggested text books:-

1. B.B. Brey Person The Intel Microprocessors, Architecture, Programming and Interfacing.

2. D.Hall (Mc-Graw Hill) " advanced Microprocessors, Programming and Interfacing.
3. A. P. Mathur (TMA) 'Introduction to Microprocessor " Intel Microprocessors Data Manuals.
4. Microprocessor Arch. Programming & Application with 8085 by R>S. Gaonkar.
5. Introduction to Microprocessors by P.K. Ghosh & P.R. Sridhar, PHI, 2/e.
6. The 8051 Micro controller by K.J. Ayala.
7. 8051 Microcontroller & Embedded system by Rajiv kapada.

COMMUNICATION NETWORK & TRANSMISSION LINES
EL-405

Unit-I

Lattice and bridged – T networks, image impedance, iterative impedance characteristic impedance, attenuators and their design.

Law pass, high pass, band pass and band elimination filters, m-derived filters, composite filters, frequency transformation.

Unit-II

Low pass, high pass band pass and elimination filters, prototype and m-derived filters composite filters, frequency transformation.

Unit-III

Filter specifications, Introduction to Butter worth, chebysher inverse chebyshev, and elliptical filters and their comparison, first and second order low pass, band pass and band stop filter design.

Unit-IV

Construction and design of two wire line and coaxial cable. Voltage and current on a transmission line, infinite, line characteristic impedance and propagation constant, wave from distortion, attenuation and phase equalizers. Distortion less line, loading, linear reflection on a line, reflection coefficient, input and transfer impedances, open circuit and short circuit line, reflection factors, reflection factors, reflection loss, T and II equivalents of a line, location of line fault.

Unit-V

Line at radio frequencies, parameters of line and coaxial cable at radio frequencies, dissipation less line, voltage and current on a dissipation less line, standing waves, standing wave radio, input impedance of open circuit and short circuit, power and impedance measurement on line, eightwave quarter wave and half wave line, circle diagram smith chart, solution of problems using Smith chart, single and double stub matching.

Suggested text books:-

1. Network and Transmission Lines By J.D. Ryder
2. Network and Transmission Lines By G.K. Mithal
3. Network and Transmission Lines By Umesh Sinha.
4. Transmission Lines By Evritt & Anner.

ANALOG COMMUNICATION LAB
EL-406

Amplitude modulation and demodulation

Generation and Detection of DSB-SC,SSB,VSB

Frequency modulation and demodulation

Radio transmitter and Receiver

Noise performance pf AM & FM systems

MICROPROCESSOR AND MICRONTROLLER LAB
EL-407

Introduction to 8085 & 8086 kit

Assembly language programming in 8085 and 8086.

Verification of different inter cards- 8155,8255,ADC,DAC,8212 etc.

Programming in 8051 microcontroller.

COMMUNICATION NETWORKS TRANSMISSION LINES
EL-408

Design and Testing of low pass, high pass, m-derived filters.

Design and Testing pf low pass, high pass, band pass, band eliminated transmission line.

Single stub matching on transmission line.

ELECTRINICS WORKSHOP
EL-409

Study of Following Components:-

Resistors:-
Carbon, Wire wound and Metal Film Resistors, Potentiometers, Ratings, Codes etc.
Capacitors:-
Electrolytic, Ceramic Mica, Silver, Polystyrene Metallized polystyrene & Tantalum,
Inductors:-
Types of Inductors & Transformers
Active devices:-
Transistors Diodes & ICs
Special Components:-
Thermistors Varistors ferretes & Piezoelectric Components.

Electronic Circuit Layout:-
Conventions, preparing the layout for the printed Circuit boards. Mini project based on Discrete Components and ICs.

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SEMESTER – V

INDUSTRIAL ECONOMICS & BUSINESS ORGANIZATIONS - EL-501

Unit-I

INTRODUCTION TO ECONOMICS

Introduction to economics, its importance, approaches and uses of study, engineering and economics. Economic problems. Economic good and Wealth, Demand and supply. Competition, Monopoly, Theory of firm, Money and its function, theory of money and choice, bank and its functions, employment and income, gross national product, net national product- consumption, savings and investment.

Unit-II

FEATURES OF INDIAN ECONOMY

Broad features of Indian economy, Natural resources and economic development, infrastructure in the Indian economy, Agriculture development, Green revolution, Population, Population theories, Unemployment, Poverty, and balance regional development. Economic growth and economic development, Indian Industries, Industrial policy, Industrialization in India, Role, Plan and pattern of industrialization, Public Vs private Sectors, Economic reforms in India, India's five year plans.

Unit-III

INDIAN ECONOMY & GLOBAL TRANSACTIONS

The indigenous and modern banking system in India, Reserve Bank of India, Monetary and Fiscal policies, Financial Institutions and SEBI, Free Trade and protection, Inid's Foreign Trade and WTO, balance of payments. India currency systems and foreign exchange, Foreign Capital Investment, Foreign aid and FEMA>

Unit-IV

INTRODUCTION TO BUSINESS ORGANIZATION

Concept nature and scope of business, business and its environment, economic, legal social and political environment of business, business ethics.

Forms of business organization- Types and their functions, roles and responsibilities, HUF, Partnership, Joint Stock Companies, Private and Public Limited companies, Cooperatives, Joint stock and public sector, Entrepreneurship, promoters and financial institutions, concept of business growth, profit maximization Vs social responsibility, role and problems of small business, Joint Ventures, multinationals.

Unit-V

INTRODUCTION TO MANAGEMENT

Evoltion, development and modern philosophy, management in India, Scientific management, Rationalization and quality circles. Principles of management- Nature and function of management, Management By Objectives (MBO) and management by Exception (MBE)- Importance, characteristics, applications, Management theory Jungle, Schools of Management thought, Management Information Systems(MIS).

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DIGITAL COMMUNICATION
EL-502

Unit-I

Type of signals, sampling theorem, pulse modulation techniques, PAM, Natural and flat-top sampling, equalizer, detection of PAM signals, bandwidth of PAM, S/N ratio in PAM, cross-Talk, PWM and PPM, methods of generation and detection synchronous and asynchronous time division multiplexing, synchronization techniques.

Marginal joint and conditional probability, random signal, random variable, random process, probability density function and probability distribution function, Binomial, Poisson and Normal distribution.

Unit-II

Quantization of signals, PCM, Quantization error, compounding, intersymobol interference, eye patterns, multiplexin of PCM signals, bandwidth of PCM, output S/N ratio in PCM, delta modulation, adaptive delta modulation, bandwidth of DM, output S/N ratio in DM differential PCM, M'ary System.

Unit-III

ASK, OOK, BFSK, M'ary FSK, BPSK, DPSK, QPSK, M'ary PSK, QAM, MSK, baseband signal receiver, probability of error, optimum filter, matched filter, correlator, coherent and nonpcoherent detection.

Introduction to spread spectrum, D-S and F-H spread spectrum, principle of CDMA, Applications of spread spectrum.

Unit-IV

Unit of information, entropy, entropy maximization, information rate, Joint and conditional entropy, mutual information, channel capacity of various channels, Shannon's theorem, Shannon-Hartley theorem, BW-S/N ratio trade-off, Shannon limit.

Unit-V

Source coding prefix property, coding efficiency, data compression codes, Shannon-Fano code, Huffman code.

Channel coding, Hamming distance, Minimum Distance, error detection and correction, ARQ and FEC, party check code liner block code, Hamming's single error correction code, convolutional code, cyclic code.

Suggested Text books and references:-

1. Principles of communication systems- H. Taub and D.L. Schilling, Tata Mc Graw Hill, 2nd ed 1996.
2. Modern digital and analog communication systems- B.P. Lathi, Oxford university press, 3rd ed, 1998.
3. Communication systems: Analog and Digital- R.P. Singh & S.D Sapre, Tata Mc Garw Hill, 1st edition, 1995.

INTEGRATED ELECTRONICS
EL-503

Unit-I

Introduction to micro-electronics, advantages and limitation of integrated ckts. Monolithic Ics-Planner process, basic setps required in the fabrication of monolithic IC.

Monolithic integrated devices: NPN transistor, punch- through transistors, lateral and substrate PNP transistor, monolithic diodes, schottkey diodes, schottkey transistor, super beta transistor, high frequency transistor, JEFTs,MOSFETs, diffused resistors epitaxial resistors, junction capacitor.

Unit-II

DTL and TTL logic: Basic DTL inverter, modified DTL,DTL Nand gate fanout power dissipation, spice simulation.

Basic TTL inverter, stored change removed from DTL and TTL, basic TTL Basic TTL inverter, stored change removed from DTL and TTL, Basic TTL NAND gate and multiple, emitter, BJT, voltage transfer characteristics, TTL fanout, power dissipation LTTL (low power) HTTL (high speed), spice simulation. STTL, ECL, ECL fanout, III, ECL gate versatility.

Unit-III

MOS and CMOS logic: introduction to MOS in digital circuit, MOS inverter, VTC, power dissipation, MOS logic gats (NOR,NAND,OR,X-OR,) NMOS Schmitt triggers and transmission gate. CMOS technology, CMOS device molding, CMOS inverter, CMOS gates, COMS tristate gates. CMOS Schmitt trigger gates, CMOS driver, dynamic CMOS, comparison and interfacing of logic families, BICMOS. CMOS amplifiers, Analog integrated circuit design.

Unit-IV

Semiconductor memories: Diode Rom, BJT, ROM, Bioplar Rom Line amplifier NMOS,ROM,NMOS, NAND ROM, CMOS pre-charging and discharging of a load capacitance, CMOS ROM, semiconductor static RAM-static Ram cell with transmission gates, MOSFET static Ram cell technologies, BJT RAM Cell, gate arrays PLA, Digital to analog and analog to digital converters.

Unit-V

Basic regulator circuits: Monolithic voltage regulator, regulator circuits using type 78xx series, 79xx series and 723 series etc. principle of phase locked loops, PLL building blocks, study of PLL, application of PLL, Fm and Am modulation frequency synthesis, translation and multiplication.

Suggested Text books:-

1. Analysis and design of digital Intergrated circuits- David A hodGES. Horgeg Jeckson.
2. Digital intergrated circuits – Thomesa De Massa Zack Eiecone, John Willey and Sons.

3. Intergrated Electronics, Millman & Halkias.

CONTROL SYSTEMS
EL-504

Unit-I

Control system Components & transfer function : system concept, open loop and closed loop systems, introduction to feedback concepts, mathematical modeling of physical systems, transfer function of linear system, block diagram and its reduction procedure, signal flow graph, mason gain formula. System components, potentiometer, a.c. synchronous tachometers, a.c. and d.c. servo motors, servo amplifiers, selsyns, amplifying.

Unit-II

Time Response: Time Response of first, second and higher order systems to various test input signals. Types of systems, steady state error and constants, basic control action and automatic controllers, effects of proportional, integral, derivative and PID controllers on system performance.

Unit-III

Stability: concept of stability, necessary conditions for stability, absolute and relative stability rough Hurwitz criterion, Nyquist criterion, construction of root loci ad application.

Unit-IV

Frequency Domain analysis & compensation techniques Co-relation between time and frequency response, frequency, domain analysis, bode plots, gain phase margin, effect of feed back on frequency domain analysis, design consideration for control system, phase lead, phase lag lead compensation, choice of compensating network using bode plots.

Unit-V

Sate space analysis and sampled data system: state space representation of systems, state models and transfer functions, state transition matrix, controllability and operability, introduction to discrete time system, analysis of sampling process, the Z-transform and inverse Z-transformation.

Suggested Text books:-

1. Control system Engineering- Nagrath & Gopal, New age international 3rd edition.
2. Linear control system- B.S. Manke, Khana Pub. 5th edition.
3. Modern control system- R.C. Dorf & R.N. Bishop, AWL Low price edition.

COMPUTER ENGINEERING
EL-505

Unit-I

Introduction to computer organizations and architecture, compute system components, bus organized computer, memory address register, data program counter, accumulator, instruction register. Instructions fetch. Decoding and execution. Instruction formats and addressing modes, instruction set design issues, micro operation. Register transfer language.

Unit-II

Control unit organization. Instruction sequencing, interpretation. Hardwired control and micro programmed control organization, control memory, address sequencing, microinstruction formats, micro program sequencer, microprogramming, microinstruction encoding, horizontal and vertical micro instructing.

Unit-III

Introduction to Operating Systems, Operating system services, multiprogramming, time-sharing system, storage structures, system call, multiprocessor system. Basic concepts of CPU scheduling, Scheduling criteria, Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling I/0 devices organization, I/0 devices organization, I/0 devices organization, I/0 buffering.

Unit-IV

Process concept, process scheduling, operations on processes, threads, interprocess communication, precedence graphs, critical section problem, semaphores, classical problems of synchronization. Deadlock problem, deadlock characterization, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Methods for deadlock handling.

Unit-V

Concept of memory management, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation. Concept of virtual memory, demand paging page replacement algorithms, allocation of frames, thrashing demand segmentation, Cache memory.

Suggested Text books:-

1. Computer Organization and Architecture Design and Performance by Willam Stakking.
2. Computer Architecture Organization by M. Morris Mano.
3. Operating Systems Concepts by Silberschatz, Galvin, Gagne.
4. Modern operating system by Tanenbaum.

DIGITAL COMMUNICATION LAB
EL-506

Sampling Theorem and data reconstruction

Generation and detection of PAM, PWM,PCM.PTM.

Delta modulation, ADM,

Generation and detection of ASK,PSK,DPSK,FSK,QAM.

INTEGRATED ELECTRONICS LAB
EL-507

Fanout calculation close loop system

Transfer of characteristic curve of RTL,DTL,TTL & CMOS.

Design of voltage and current regulator using IC7805,7812.

CMOS, TTL interface.

CONTROL SYSTEMS LAB
EL-508

Open loop and close loop system.

Time response of I^{st} order and II^{nd} order system.

Error coefficient and steady state error calculation for type-0,1.2 system.

Bode plot

Compensation network.

PI,PD and PID controller.

COMPUTER ENGG.LAB
EL-509

- PC hardware study.
- Programming in assembly language.
- Study of RAM/ROM operations.

- Study of various operating system like DOS, WINDOWS, UNIX and LINUX with following.
    - Memory management.
    - File management.
    - Scheduling methods.
    - Protection security.

- Implementation of Bankers algorithms for deadlock avoidance.
- Implementation of Semaphores.I

SEMESTER – VI

ELECTROMAGNETIC FIELDS AND WAVES EL-601

Unit-I

Cartesian, cylindrical and spherical co-ordinate systems, scalar and vector fields gradient, divergence and curl of a vector fields. Divergence theorem and stokes theorem.

Unit-II

Electric field, coulomb's law electric field due to several charges viz: line charge, sheet charge, field due to continuous volume.

Gauss's law- electric field due to simple charge bodies, equipotential surfaces, Poisson's equation and laplace's equation, capacitance, energy, stored and electric field, conservative and non-conservative field, solution of two dimensional laplace's equation, finite difference method, method of moments.

Unit-III

Magnetic field, magnetic flux density, magnetic intensity, magneto motive force, energy stored in magnetic field. Apere's law vector magnetic potential, amperes circuital law, lorentx force equation.

Unit-IV

Derivation of Maxwell's equations in differential and intergral form for static and time varying field, boundary conditions for conductor and dielectric.

Unit-V

Wave equations for free space, uniform plane wave, liner elliptical and circular polarization, wave equations for conducting medium, wave propagation on conductors and dietaries depth of pentration, reflection and refraction of plane wave by conductor and dielectrics, poyenting vector and flow of power, wave between parallel planes, concept of TE, TM & TEM waves.

Suggested text Books:-

1. Elements of Electromagnetic- Mathew N.O. Sadiku.
2. Engineering Electromagnetic- W.Hay
3. Introduction to Electrodynamics- David J Griffithe.

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ADVANCED COMMUNICATION
EL-602

Unit-I

Optical Fiber communication, Types of Fiber Spectrum, SI & GI Fiber, FO Transmission NA, Models in of refractive index profiles, Signal Degradation in optical Fiber, attenuation absorption, Scattering losses, banding losses dispersion, group delay.

Unit-II

Optical sources LED & lasers structure, Principle, material, Modulation Response & Transmit Response, efficiency Optical detector basic Concept, photo diode, PIN & APD, noise performance, link design power & noise tune budget.

Unit-III

Satellite Communication: Introduction to satellite Communication ctive/passive synchronous/ None Synchronous, bit, Satellite altitude, transmission path, pathless noise consideration, link analysis Satellite systems, effective, isotopic radiated power, multiple access methods, earth stations, tracking and servo systems, up-down converters, example of satellite systems.

Unit-IV

Digital switching systems, Introductive to Electronics & digital exchanges, Hierarchy of switching offices, common control push button Dialing systems, switching matrix multiple stape switching TDM, Time slot Interchange, Comparison of digital signal, Combined space & Time switching.

Unit-V

Introduction to spread spectrum modulation, Direct sequence (DS) spread spectrum spread spectrum with spread spectrum, PN sequence generation, acquisition and tracking of FH signal and DS signal.

Mobile communication- Introduction to cellular mobile communication, elements of cellular system, cell design, hand off techniques, frequency management.

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Suggested text Books:-

1. Digital switching systems by Thygrajan Vishwanathan.
2. Cellular and mobile communication by Lee.
3. Optical fiber communication by G. Keiser.
4. Satellite communication by

DIGITAL SIGNAL PROCESSING
EL-603

Unit-I
Signals and Systems:-
Representation and analysis of discrete signal and systems. Analysis of discrete time linear time- invariant systems and test for causal, static, Time-invariant and stable system, properties of convolution and interconnection of LTI system.
Unit-II
Z transform:-
Z transform and inverse, Z transform. Properties of Z- transform, Rational Z transform, stability, poles and zeros of Z transform.
Unit-III
Recursive and non- recursive systems:-
Representation and block- diagram representation of recursive and None-recursive systems. LTI systems characterized by constant coefficient difference equations. Realization of LTI systems. Structures of finite- Impulse and Infinite impulse response systems.
Unit-IV
Discrete Fourier transform:-
Discrete Fourier transform and inverse DFT to other transforms properties of DFT, linear and circular convolution. Fast Fourier transform direct computation of DFT and FFT algorithm. Radix-2 and Radix-4 FFT algorithm. Intro. To wavelet transform, relation between wavelet transform and DFT.
Unit-V
Design of Digital Filters:-
Design of FIR filters, using windows and linear phase frequency sampling method. Design of IIR filters using impulse- invariant and bilinear transformation method.

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Multirate signal processing, Application of MATLAB for filter design.

Suggested text Books:-

1. Discrete Time Signal Processing A.V. Oppenheim and R.W. Schaffer.
2. Introduction to digital Signal Processing Prockis.
3. Digital Signal Processing S.K. Nitra.

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VLSI Design
EL-604

Unit-I

Review of Logic design fundamentals: combinational logic, k-maps, designing with NOR and NAND gates, hazards in combinational networks. Mealy sequential network design, Moore sequential network design, synchronous design, machine design.

Introduction to VHDL:VHDL description and combinational network, modeling flip-flops multiplexes using VHDL processes, complications and simulations of VHDL code, modeling a sequential machine, variable, signal, and constants, arrays, VHDL operators functions and procedures, packages and libraries.

Unit-II

Attributes, multi-valued logic and signal resolutions. IEEE 1164 standard logic, generics, generate statement, synthesis of VHDL code, synthesis examples, files and TEXTIO.

Unit-III

Designing with programmable logic devices ROM, PLA'S PAL'S PLD'S designing with programmable gate arrays, FPGA'S, CPLD'S (complex programmable logic device).

Floating point arithmetic multiplication and other operations.

Unit-IV

Hardware testing and design: Combinational logic testing sequential logic testing, scan testing boundary scan, built-in self test.

Unit-V

Design examples and case studies: USART design, micro controller design, design of microcomputer CPU, filter design etc.

Suggested text Books:-

1. VHDL primer' by Bhaskar.
2. Digital system design using VHDL' by Charles Roth.
3. Modern VLSI design(system of silicon)' by Wayne Walf.

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COMPUTER NETWORKS
EL-605

Unit-I

Study of the function of OSI and TCP/IP reference in computer networks, circuit, message, packet and hybrid switching broadband ISDN and ATM, poling techniques, multiplexing an concentration, transmission media used in physical layer, X.25 networks.

Unit-II

Queuing theory, introduction LAN, MAN and WAN, various types f ALOHA's LAN protocols, IEEE standards for LAN and MAN.

Data link layer protocols, error detection and correction codes in data link layer, protocol performance evaluation, protocol specification and verification, data link layer switching.

Unit-III

Network layer design issue, introduction to routing and congestion in network layer, routing and congestion control algorithms, inter networking, network layer in internet.

Unit-IV

The transport service, Elements of transport protocols, protocols of transport layer, internet transport protocol (TCP&UDP).

Unit-V

Data security and cryptography techniques, access management in application layer, world wide web(www), electronic mail(E-mail), concept of virtual terminals.

Study of common types of network like ARPANET, USENET etc.

Suggested text Books:-

1. Computer Networks- Tanenbaum, PHI 2001.
2. Data communication and Network- W. Stallings.
3. Data Netwqorks- Dimitris Bertsekas and Robert Galliger, EEE 2nd Edition.

ADVANCED COMMUNICATION LAB
EL-606

Setting up fiber optic analog and digital links.

Propagation and bending losses, numerical aperture measurements

PEM,PPM modulation and demodulation, PC to PC communication using optical digital link.

Satellite communication-Transmission and Reception.

DIGITAL SIGNAL PROCESSING LAB
EL-607

Implementation of FIR/IIR Filters.

MATLAB-

Butterworth digital and analog filter design

Digital signal processing Tool Box.

Signal generation and convolution

VLSI Design Lab
EL-608

Programming using VHDL- Logic gates, combinational circuits, memory, FIFO,ALU etc.

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SEMESTER – VII

ELECTRONICS MEASUREMENT AND INSTRUMENTATION- EL-701

Unit-I
Measurement and error, accuracy and precision, significant figures, sensitivity, resolution type of error.
Cathode Ray Oscilloscope (CRO): free running and triggered CROs, dual trace and dual beam CROS, delayed mode facility, CRO probes, multichannel CRO, Storage sampling and digital read-out CRO, Z-modulation.
Unit-II
Measurement of voltage, current, impedance and power.
Electronics voltmeter: D.C. Voltmeter with direct coupled and chopper amplifiers, a.c. voltmeter using rectifiers and amplifiers combinations, true rms responding voltmeters, electronics millimeter, differential voltmeter,(Q-meter, RLC-Q data bridge, AC bridges), Wagner earthling, vector impedance meter, vector voltmeter, measurement of power by bolometer and calorimeter.
Unit-III
Waveform analyzers: Harmonic distortion analyzers, wave analyzer, spectrum analyzer heterodyne frequency meter, frequency, phase and pulse measurement by CRO, Signal function generator, function generator, sweep frequency generator, arbitrary wave from generator.
Amplifier Measurement: Input and output impedance measurement, signal to noise ratio and noise figure measurements, square wave testing of an amplifier, swept frequency measurements.
Unit-IV
Measurement of None-electrical quantities: classification of transducers strain gauges, displacement transducers, LVDT, Photo electric transducers, temperature measurements, thermistor, photosensitive devices, nuclear radiation detection instruments (speed measurement)
Unit-V
Digital measurement: Advantages of digital instruments, A-D & D-A, conversion, principles of digital voltmeters, ramp type DVM, integrating DVM, successive approximation DVM, frequency counters, display (LED, LCD, Seven Segment, Fourteen Segment etc.)

Suggested Text books and references:-

1. Electronics Instrumentation & Measurement system by A.K. Shawney.
2. Electronics Measurement and Instrumentation by W.D. Cooper, PHI.
3. Electronics Measurement and Instrumentation by Kalsi, PHI.

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ANTENNA & WAVE PROPAGATION
EL-702

Unit-I

Radiation retarded potential, radiation field from current element antenna, radiation power and radiation resistance of short dipole and half dipole antenna, field and phase patterns of point sources, directivity and gain, directivity and gain calculation of short dipole and half wave antenna.

Unit-II

Introduction to antenna, the antenna as an aperture, effective length, resonant and traveling wave antenna for different wave lengths. Antenna arrays of point sources, two elements arrays, end fire and broad side arrays, uniform linear arrays of N elements, linear arrays with non-uniform amplitude distribution binomial distribution and Dolph chebychev optimum distribution.

Unit-III

Effect of earth on vertical pattern, image antenna, network theorems applied to antennas, salf and mutual impedance of antenna, future of antenna impedance, patterns and principal of pattern multiplication, polarization broadest antenna, long wave medium wave and short wave antenna loop and helical antennas.

Arrays of two driven half wave length elements,(broad side and end fire case) arrays with parasitic elements Yogi-Uda antenna, folded dipole, turnstile, batwing and long wore antenna rhombic antenna.

Unit-IV

Far field approximate radiation from aperture, Huyggen's principle, Bavinet's principles & complimentary antennas, horn antennas, plane sheet reflector, corner reflector, parabolic reflector antennas, log periodic antenna (introduction only), slot antenna.

Pattern measurement, phase measurement, measurement of radiation resistance by reflector method. Polarization measurements field strength measurement. Feeders for exciting resonant antennas, center fed and end fed, matching network.

Unit-V

Ground wave propagation, surface wave propagation, space wave propagation, reflection of wave by earth's surface, reflection coefficient of vertically and horizontally polarized wave, space wave propagation, range of propagation, propagation beyond the line of sight, diffraction, normal reflection, radio horizon radius of curvature of bending wave modification in earth's curvature, abnormal reflection, standard atmosphere, modified atmosphere, modified atmosphere, dust propagation. Troposphere, scatter, field strength of tropopheric wave Ionosphere, virtual heights, critical frequencies, refractive index of ionized region. Reflection and refraction of radio waves in ionosphere, influence of earth's magnetic field, loss of energy in ionosphere, skip distance and maximum usable frequency (MUF), single hop and multiple hop transmission, optimum frequency, abnormal atmospheric behavior, ionospheric storms, radio fade out, Dellinger's effect of solar eclipse, scattering of radio waves, Luxemburg effect.

Suggested Text books:-

1. Antennas By Krauss.
2. Antennas and Radio wave propagation by R.E. Collin.
3. Antennas & wave propagation by K.D. Prasad.

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MICROWAVE ENGINEERING
EL-703

Unit-I

Characteristic, features and application of microwaves, microwaves, Rectangular and circular waveguide resonators, plain and choke flanges bends. T-junction, magic tee, waveguide irises, posts, matched loads, attenuators, directional couplers.

Scattering matrix representation of microwave network, properties of scattering matrices, S-matrices, for typical networks such as section of uniform transmission line, 3-port networks (reciprocal and nonreciprocal), directional coupler, magic tee, ferrite devices, permeability, isolator, circulators, YIG resonators.

Unit-II

Generation of microwave by tubes, limitations of conventional tubes, klystron amplifiers reflex klystron oscillator, magnetrons, traveling wave tube (TWT), Backward wave oscillator (BWO).

Unit-III

High frequency limitations of transistors, microwave transistors, varactors, manely rowe relations, parametric amplifier and frequency multipliers, tunnel diodes. Gun effect, gun diode oscillators. A valanche effect, IMPATT & TRAPATT diodes, PIN diodes and their applications. Schttky barrier and backward diodes.

Unit-IV

Planer transmission lines such as stripling Micro strip line, slot line etc.technology of hybrid MICs, advantages of MICs. Stmulated emission of devices such as MASERS and LASERs, holography. VSWR measurement, cicrowave power measurement, impedance measurement, network analyzer, frequency measurement swept frequency measurement.

Unit-V

Microwave link, line of sight, troposcatter and diffraction links, frequency allocation, block diagram of microwave links, microwave modulation and demodulation, microwave repeater station, design consideration of microwave links, principles of microwave digital communication.

Suggested Text books and references:-

1. Microwave Engineering and Applications- Om.P. Gandhi.
2. Microwaves- K.C. Gupta.
3. Microwave devices and circuit- Liao.

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DIGITAL IMAGE PROCESSING
EL-704
Elective-I

Unit-I
Introduction to processing system: Image process, digitizer, Display and recording devices, Digital Image fundamentals: image model, relationship between pixels imaging geometry.

Unit-II
Manipulation on images
Images transformation: Introduction to fast Fourier transformation, Walsh transformation, hadmard transformation, Hotelling transformation, Hough transformation method, Histogram, modification
Image smoothing: Neighborhod averaging, Median filtering, low pass filters. Average of multiple images, image sharpening by differentiation technique. High pass filtering.

Unit-III
Image Restoration
Degradation model for continuous function effect of digitalization on degradation models, algebrare approach to resteration, east mean square filter interactive restoration, grey level interpolation.

Unit-IV
Image Encoding & Segmentation:
Encoding: Mapping Quantizer, Coder.
Segmentation: detection of discontinuation by point detection, line detection. Edge detection. Edge linking & Boundary detection: Local analysis, Global by Hough transform & Global by graph theoretic techniques. Thresholding: Definition, Global Thresholding,
Filtering: Median, Grandient.

Unit-V
Simple methods of Representation
Signatures, Boundary segments, skeleton of region Polynomial approximation, Application of Image processing toop box of MATLAB.

Suggested Text books and references:-

1. Digital Image Processing by R.C. Gonzalez, Richard E. Woods.
2. Digital Image Processing by W.K.Part.
3. Digital Image Processing & analysis by Chanda and Majumdar.

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ADVANCED COMPUTER ARCHITECTURE
EL-704
Elective-I

Unit-I
Evolution of computer architecture, introduction to multi-process and multi computers , taxonomy and models of computer/ super computers. Condition of parallelism, partitioning and scheduling of program.

Unit-II
Advance processor technology Design space of processors, instruction set architecture, CISC, RISC Processors, Superscalar, VLIW architecture, case studies, Virtual memory technology, TLB paging an segmentation.

Unit-III
Cache memory organization, cache performance, shared memory organization, interleaved memory, bandwidth and fault tolerance, memory allocation schemes.

Unit-IV
Pipeline and super scalar techniques: Linear pipeline processor, nonlinear pipeline processor, instruction pipeline design, arithmetic pipeline design, superscalar and super pipeline design.

Unit-V
Multiprocessors and multicomputers Multiprocessor system interconnect, cache coherence and synchronization, massage passing mechanisms.

Suggested Text books and references:-

1. Advanced compute Architecture – Kai Hwang.
2. M.J. Flynn.
3. Compute Architecture & Organization.

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ADVANCED CONTROL SYSTEM
EL-704
Elective-I

Unit-I
Design and Compensation:-
Design consideration of control system, lead lag lead-lag compensation, design of compensating network using bode plots and root locus, MTLAB simulation.
Unit-II
State space analysis:-
State space representation of systems, phase variable representation, canonical variable representation, diagonalisation, canonical variable representation, controllability and absorbability, pole placement design using state variable feed back.
Unit-III
Non Linear systems:-
Non Linear systems, common, physical non linearities, phase plane method-basic concepts, construction of phase trajectories, singular points, describing function method-basic concepts, deviation of describing function, stability analysis by describing function method
Unit-IV
Stability of Non Linear Systems:-
Concepts of stability, limit cycles, Liapunov stability criterion, method of constructing .
Liapunov function for non-linear systems, Krasovsqi's method, variable gradient method, Popov's stability criterion.
Unit-V
Digital Control System:-
Introduction to discrete time system, z-transform, inverse z-transform. Pulse transfer function, time reponse of sampled data system, stability on z-plane, stability criterion, methods of stability analysis, bilinear transformation, stability analysis using Nyquist criterion and root locus, state space representation of

discrete system, state transition matrix controllability and absorbability of discrete time system, MATLAB simulation.

References books:-

1. Discrete control Engineering - Ogata.
2. Automatic Control System - B.C.Kuo.
3. Moder control system - Nagarth Gopal.
4. Linear Control System - Prof.B.S. Manke
5. Elements of control system - Gupta.

PROJECT MANAGEMENT
EL-704 Elective-I

Unit-I

Management Fundamental of Organizational Planning:-Strategic Policies and Planning premises; managerial Decision Making; Strategic Organizational Design; Effective Organizing and Organizational Culture; Staffing Leadership Controlling.

Finance:-

Indian financial system and financial institution; Valuation of securities; Financial statement analysis; Financial forecasting; Sources of log term finance; Cost of capital and capital structure theorems; Estimating working capital needs; Capital expenditure decision.

Unit-II

Project file cycle: an overview, Project planning; project execution; Project closure; Project initiation and resource allocation; Market and demand analysis; Technical analysis; Financial projections; Appraisal criteria.

Risk analysis in capital investment decisions; Social cost benefit analysis; Multiple project and constraint.

Unit-III

Human resource management and project management; Interfacing with major stake holder; Issues in project organizational design; Designing a project organizational structure; Matrix structure and Making it work;

Communication: A key to project success

Motivation in a project environment; Understanding conflicts; Managing and resolving ina project environment; Negotiations; Managing stress; leadership in project management; Power influence and politics in project management.

Unit-IV

Procurement planning; Solicitation planning; Solicitation; Source selection Contract administration, Contract closeout, Quality planning, Quality assurance.

Quality control, Risk management planning, Risk identification, Qualitative risk analysis.

Quantitative risk analysis, Risk response planning, Risk monitoring control.

MIS for project management.

Unit-V

Project Management through Network Analysis: Work Break Down structure, Gantt chart etc. PERT; Activity Average Time variance and project completion time by Normal Distribution CPM: Critical path, floats and their Interpretation Event Occurrence time, Net slacks Q storable and Non-storable Resource allocation, Crashing of Network, Time cost trade-off, Monitoring and Control: Features of

control, Project control, performance analysis and cost control curves, Line of balance, GERT, Computer Applications.
Regulatory framework for Project & Industrial Licensing, Income Tax benefits, Incentives offered.
Project/Case Studies.
Books Recommended;

1. Project preparation, Appraisal and Implementation Prasanna Chandra, TMH.
2. Project Planning and Appraisal Jain D.K. Uppal Publishing House.
3. Project Management, Dennis Lock, Galgotia Publishers.
4. Project Engineering and Management, Sinha & Sinha, Vikas Publishing House.
5. Project Planning and Control, Mohsin M. Vikas Publishing.

SATELLITE COMMUNICATION
EL-705
Elective-II

Unit-I
Evaluation of satellite technology communication satellite, system elements, orbit configurations, coverage frequency bands, different types.
Unit-II
Microwave Link, power balanced 7 pathloss, altennuation factors, downlink & uplink budget, overall link, sources of noise and interference.
Unit-III
FDMA,TDMA,CDMA,Systems, DS-CDMA and frequency hopped CDMA.
Unit-IV
Digital processing spatial compression, temporal compression, motion, compensation, hybrid coding, digital video broadcasting standard, requirements and organization, convolution code convolution interleaving.
Unit-V Direct to home TV, down frequency, channel spacing, scrambling, conditional access system, medium and high power DTH systems, VSAT network design, mobile satellite services.

Suggested Text books:-

1. The satellite communication hand book-Bruce R. Elbert
2. Introduction to satellite communication- Bruce R. Elbert.
3. Satellite communication Yimothy Prati & Charles.
4. Electronic Communication System- Wayne Tomasi Regents.
5. Satellite communication- Robert M. Gajliardi.
6. Digital Satellite communication – Tri T. Ha.
7. Satellite Communication- Dennis Reddy.

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NEURAL NETWORKS
Elective-II

Unit-I

Introduction: Artificial neuron, Single layer artificial neural network, Multilayer, Training of artificial neural network, biological model for artificial neural network.

Unit-II

Perception & back propagation; Perception representation, linear seprability, Perception learning & training algorithm, back propagation training algorithm.

Unit-III

Counter propagation network & statistical method; Introduction network structure, Training of the Kohonen layer & application Boltzmann training Cauchy training, Artificial specific heat method statistical Hopfield network, Hopfield nets & Boltmann method.

Unit-IV

Adaptive resonance theory: ART architecture, ART classification operation, ART implementation, ART training.

Unit-V

Optical neural network, Electro optical matrix multiplier, Holographic correlators, Optical neurons, Introduction to cognitron & neo cognitron.

Suggested Text books:-

1. Neural Network Design by Hagan, Dernuth & beale
2. Neural computing by Philip D. Wasserman.

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BIOMEDICAL INSTRUMENTATIONAL

EL-705

Elective-II

Unit-I

General aspect of biomedical instrumentation, system approach to bio-medicine connect of modeling and block diagram simulation components of the man instrument system, interaction of radiation with matter, various types of electrodes, biopotential amplifier.

Unit-II

Transducer for biomedical application, principles, types, biomedical amplifier, electronics instruments for attecting the human body, phonon and paramagnetic resonance phenomenon, molecular beam, masers, gas lasers, spectroscopy of solid state meter material, solid state lasers.

Unit-III

Analysis of biomedical signal, EGG, EMG, EEG, Biotelemetry, physiological parameters adaptable for telemetry, block diagram & application electrical safety of patient, shock hazards.

Unit-IV

Cardio- vascular measurements- the heart blood pressure blood- flow measurement, blood ph measurement, blood-gas-analyzer, respirator, ventilators phono-cardiograph, einthoven triangle heart sound, the pacemaker, its types & properties.

Unit-V

Non- invasive diagnostic instrumentation techniques for dignosis, introduction to medical imaging, X-ray, CAT scanners, ultra-sonography nuclear magnetic resonance imaging (MRI) thermographs, electro surgical units & laser surgery techniques.

Suggested Text books and references:-

1. Biomedical insemination-Khandpur

2. Biomedical instrumentation- Cromwell.
3. Principle of medical electrons a7 biomedical instruments- C Raju Rao & S.K.Guhu.
4. Principles of biomedical instrumentation & measurement –Richard Aston.

INTELLECTURAL PROPERTY RIGHTS FOR ENGINEERS
EL-705 Elective-II

Unit-I-Intellectual Property Rights- Concepts and Evolution.

Introduction to intellectual Property Rights, Evolution of Intellectual Property Laws Standards and Concepts in Intellectual Property, Conventions and Treaties Relating to Global Administration of Intellectual Property Rights, Protection and Classification Regional Conventions and Treaties, Organization for Administration of IPRs, Jurisdiction enforcement and Administration of IPRs, IPRs and information technology IPRs and Bio-technology IPRS and Traditional knowledge, Management of Intellectual Property Rights, Law of Intellectual Property and Ethical Issues, Knowledge Driven Economy and IPR, Intellectual Rights in Developed, Developing and Underdeveloped counties including India.

Unit-II-Law of Patents

Introduction to Parents, Evolution of patent Law-Scope and purpose Classification of Parents, patents- other forms of Intellectual Property, Patent Law in India: Act of 1970, The Patents(Amendments)Act, 2002, Patent Office and Authorities, Grant of Patent, Right and Obligation of a Patentee, Infringement of Patents Offences and penalties, Patents and other commercial Law, patents- International Law Patents Law-Emerging Trends, Social Implication of Patents.

Unit-III-Law of Copyrights and Trademarks

Introduction to copyrights, Copyrights-forms of Intellectual Property, Copyrights Law in India (Copyrights Act of 1957)- meaning, Form of Copyright and Ownership Assignment/License, Registration and terms of Copyright, Copyright infringement Offences, Remedies and Enforcement, broad casting Organization and performers Copyright- International Law, Introduction to trademarks,

Trademarks-forms of Intellectual property, Law of trade Marks in India(trademarks act of 1999)-meaning, registration and Authorities, Rights conferred by registration and use of Trademarks, Infringement of Trademarks and passing off, Offences, remedies and enforcement Trademarks- International Law.
Unit-IV-Law of Designs, geographical Indications and other Intellectual Property.
Introduction to designs- Industrial Designs, Design Laws in India: Designs Act of 2000 Registration of Design, Owners Rights, piracy of Designs, Offence, Remedies and Enforcement, designs- International law, introduction to Geographical Indication I India :Geographical Induction of goods (Registration and protection) Act, 1999, Register of Geographical Induction, Infringement of Registered Geographical Indication Offence, Remedies and Enforcement, The Semiconductor Integrated Circuit Lay Out design Act, 2000, The protraction of plant varieties and Farmers rights Act, 2001, Law Relating Diversity
Unit-V-Electronic Business and Legal Issues.
Evolution and Developments in e-commerce, paper vs. paperless Contracts, E-Commerce models B2B and B2C, Infrastructure for E-Commerce S/W, H/W etc, Overview of E-business, Internet and Banking Electronics Payment System, intranets, Extranet and virtual private networks, Concept of EDI, its advantages and Limitations, Concept of SCM/ CRM/ERP, Emerging Trends, E-markets, Models of E-Market, E-security, Taxation Issues, Online transaction Processing(OLTP)

Suggested Text books and references:-

Law and practice of Intellectual property in India by Vikas Vashishth.
Intellectual property by A.A.Kalan.
Intellectual property- patents, copyrights, trade marks and allied rights. By Cornish w,r.
Patents, copyrights, trade markd and design by B.I Wadhera.
Intellectual property law by P.Narayana.
Patents, copyrights, trade marks and design by Rajeev Jain.

ELECTRONICS MEASUREMENT AND INSTRUMENTATION LAB
EL-706

Measurements using A.C. bridges, LVDT,RTD, Strain Gauge
Z modulation using CRO, V-F,F-V converters

ANTENNA LAB
EL-707

Radiation of various Antennas like dipole, yagiuda helix, horn etc.
VSWR vs Frequency analysis.
Measurements of sidelob level, angular position and polar plots of arrays.

MICROWAVE ENGINEERING LAB
EL-708

Characteristics of klystron and gun diode

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Measurements of VSWR
Directivity and coupling factor of directional coupler.
Components of a microwave link.

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SEMESTER - VIII

E-BUSINESS
EL-801

1. Introduction to Electronics Commerce.
   Defining electronics commerce, forces fueling E- Commerce Industry frame work, types of E-Commerce.
2. World Wide Web and its applications.
   Brief history and introductions of WWW, the web and the Electronics commerce, key concepts behind Web, Web and Database Integration, Web software developments tools (HTML,XMIL) UML, Java script, VB Script, ASP JSP, Multimedia Web extensions (VRML, Real Audio, Internet and Web based Technology) Directories and search engines.
3. Firewalls and Transaction Security.
   Introduction to farewells and network security(types, policies and management)
   Transaction security, Encryption and transaction security, The comparison of encryption methods, security in WWW (Netscape's Secure socket layer, security and online web based banking)
4. Electronics Payment Systems.
   Overview of the Electronics payment technology, Electronics cash, Electronics checks, online credit cards based system, other emerging financial instruments.
5. Electronics Commerce and Banking.
   Home banking, Banking via the PC using internet/ Internet, banking via online services, banking via Web.
6. Electronics Commerce and Retailing
   Changing retail industry dynamics and technology improvements in Electronics retailing, Mercantile models from consumers perpective.
7. Supply chain management
   Fundamental and management of supply chains, supply chain application software and its future.
8. Roadmap to E-business
   Challenges and strategy creation, Roadmap to e-business.
9. Translating E-business strategy into action
   Beginning of a virtual factor, E-business blueprint creation, E-Business project planning checklist, an execution blueprint, failures of E-business Initiatives.

Reference:

1. E-Business-Roadmap for success by Dr Ravi Kalkota pub.By Addison Wesley(Pearson Edu.Asia)
2. Electronics commerce by David Kosiur Pub. By Microsoft Press.
3. Electronics commerce by Dr Ravi Kalkota and Andew B. Whinston pub. By Addison Wesley.

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TELEVISION AND RADAR
EL-802

Unit-I

Elements of system of television, scanning sequence, interlacing determination of bandwidth synchronizing pulses, equalizing pulse, composite video signal, television camera tubes, monochrome picture tube.

Unit-II

Television transmitter, block diagram of T.V receiver, video detector design and operation of sound signal, transmitting and receiving antennas.

Unit-III

Basic principle of colour T.V, three colour theory, colour mixing, chromaticity chart, colour picture tube, delta gun, PIL and Trinitron picture tube, PAL, SECAM and NTSE ystems, brief introduction of VCP and VCR, introduction of HDTV.

Unit-IV

Introduction to radar, radar frequencies, radar block diagram, radar equation and its performance factors such as cross section and its fluctuation, transmitter power, pulse repetition frequency. Antenna parameters, system losses and propagation effect.

Unit-V

Doppler effect, CW radar, frequency modulated and multiple Doppler frequency radar, oving target indication radar, delay line canceller blind speed, duplexer, scanning and racking radar, lobe switching, monopoles, conical scan,Adcock antenna, instrument ending system (ILS) ground controlled approach(CGA) kit port surveillance radar (PSR), precision approach radar(PAR).

Suggested Text Books:-

1. Television Monochrome & Colour –Gulati
2. Television Engineering -Grobs.
3. Introduction to radar Engineering- Skolynik.

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TELECOM SWITCHING SYSEMS
EL-803
Elective III

Unit-I
Electronic Space division switching:
stored program control, switching matrics, multistage switching, enhance services photonic switching.
Unit-II
Time division switching:
Time division space& time switching, multiplexed switching, N-stage combination switching, PBX switching, PBX networking, digital PBX.
Unit-III
Traffic Engineering:
Traffic load, grade of service, Erlang's formulas, blocking modeling switching systems, blocking model. Subscriber loop, dialing systems. Local access techniques: digital subscriber lines, DSL,ADSL etc. WLL, FIL, wireless for local telephone services.
Unit-IV
Mobile communication:
Cellular communication fundamental. Cellular systems, geometry of a hexagonal cell, design aspects of cellular system, cell splitting frequency and spectrum management and handoffs access techniques.
Unit-V
Mobile satellite communication:
GEO,LEO,MEO, terrestrial mobile system GSM architecture and interfaces. Radio link design, receiver sensitivity and link budget data services in GSM, GSM GPRS, privacy and Security in GSM.

Suggested Text Books:-

1. Telecom. Switching system and network Tharigrajan.
2. Telecom.& The Computers- James Martin.
3. Mobile Cellular system-Lee.

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ARTIFICAL INTELLIGRNCE & FUZZY LOGIC
EL-803
Elective-III

Unit-I
Meaning and definition of artificial intelligence various types of production systems, characteristics of production systems, study and comparison of breadth first search and depth first search techniques, other search techniques like hill climbing, best first search, A^* algorithm, AO^* algorithm etc. and various types of control strategies.

Unit-II
Knowledge representation, problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic, resolution, refutation, deduction, theorem proving, inferencing, monotonic and non-monotonic reasoning.

Unit-III
Probabilistic reasoning, Bayer's theorem, semantic networks, scripts, schemas, frames, conceptual dependency, fuzzy logic, forward and backward reasoning. Game playing techniques like minimax procedure, alpha-data cut-off etc.

Unit-IV
Planning study of block word problem in robotics, understanding and nnatural language processing.
Introduction to learning, various techniques used in learning and natural networks, applications of neural networks, common sense, reasoning and expert systems.

Unit-V
Introduction to fuzzy logic, neuro fuzzy, and soft computing, from conventional AI to computational intelligence, Neural Network, Evolutionary computation, Neuro fuzzy and soft computing characteristics, Fuzzy set theory: Basic definition & terminology, set theoretic operations, MF formulation & parameterization, Fuzzy union, intersection & compliment. Fuzzy Rules & fuzzy Reasoning Extension Principles and Fuzzy Relations, Fuzzy if-then rules, linguistic Variables, Fuzzy reasoning, compositional rules of inference, Fuzzy systems as function estimators, Fuzziness as milt valence.

Suggested Text Books and References:-

Charniak and Mcdermott. *Introduction to Artificial Intelligence.* Addison-Weasley, 1985.
Ginsburg *Essentials of Artificial Intelligence*, Morgan Kaufmann, 1993.
Winston *Artificial Intelligence*, 3rd Edition, Addison Wesely, 1992.
E.Charniak and D. McDermott. *Introduction to Artificial Intelligence,* Addison-Wesley, 1985
E. Rich. *Artificial Intelligence*, McGraw-Hill, 1983.

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J.Sowa. Conceptual Structures, Addison-Wesely, 1984.
S.R. Jang, Sun& Mizutani, Neuro-Fuzzy abd sift computing, PHI.
Bart Kosko, neural Network & Fuzzy Systems, PHI.
Haykin, Fuzzy logic & Artificial neural Network: A Comprehensive Foundation, Asea Pearson.

POWER ELECTRONICS
EL-803
Elective-III

Unit-I
Rectifiers:
Review of uncontrolled rectification an its limitations, controlled rectifiers, half wave, full wave, configurations, power supplies, spice thruster model.
Unit-II
AC to DC converter
Analysis of fully controlled converter for continues & discontinuous conduction mode, harmonic factor, problems & solution of input current harmonics & poor p,f. dual converter.
Unit-III
AC to AC converter
Analysis 1Φcontroller, 3Φ half wave & full wave controllers & effect of sources & load inductance. 3Φ to 1Φ phase cycle converters. 3Φ to 3Φ cycles converters.
Unit-IV
Inverters
Current source investor, 1Φ, principle of operation of PWN inverter. Voltage controlled & Harmonic reduction in inverter, 1Φ bridge inverter, 3Φ inverter, 180^0, 120^0 conduction.
Unit-V
Industrial applications.
Thyristorized AC,DC drive UPS, Inverters, SMPS, Electronics timer, battery, Charger, electronic regulator, application in industrial process control.

Suggested Text Books and References:-

1. Power controller by Debey, Deradia, Joshi & Sinha.
2. Power controller by P>S. Hhimbra
3. Power Electronics by Rashid
4. Power Electronics by C.Y Lander
5. Power Electronics converter & applications & Design-Need Mohan Et al.
6. Power Electronics – P.C. Sen

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NEW VENTURE CREATIONS
EL-803
Elective-III

Unit-I
The Entrepreneurial Perspective

1. The nature and Importance of Entrepreneurs
2. The Entrepreneurial and Entrepreneurial Mind
3. The Individual Entrepreneurship Opportunities

Unit-II
Creating and Starting the Venture

1. Creativity and the Business Idea
2. Legal Issues for the Entrepreneur
3. The Business Plan: Creating and Starting
4. The Marketing Plan
5. The Financing Plan]
6. The Organizational Plan
7. The Production plan- Plant location/ layout, Inventory, production systems, Techniques & Planning.
8. Business Practices.

Unit-III

1. Sources of Capital- Indian/ Global, Short/ Long term.
2. Informal Risk Capital and Venture Capital.

Unit-IV
Managing, Growing, and Ending The new venture

1. Preparing for the New venture launch: Early management Decisions.
2. Managing Early Growth of the venture
3. New Venture Expansion Strategies and Issues
4. Going Public
5. Ending the venture

Unit-V

1. Project Report preparation : Product Identification, Market Surver, Detailed,
2. Project report preparation feasibility report.

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EMBEDDED SYSTEMS
EL-804
Elective-IV

Unit-I
Hardware fundamentals:-
Gates, timing, diagram, memory, microprocessor, buses, DMA.
Interrupts:- Microprocessor architecture, interrupt basics, interrupt latency, shared data problem.
System partitioning, building the architectural modal, Input and output processing Hardware and software partitioning. Timing requirements.
Unit-II
Microprocessor selection. Microprocessor versus Micro-Controller analysis CISC versus RISC study of major embedded processor architecture memory system design. System optimization. Architecture for embedded software:- round robin, found robin with interrupts. Function-queue-scheduling and real time operating system.
Unit-III
Real time operating system:- Tasks and task states, task and data, semaphores and shared data. Operating system services:- inter task communication, timer services, memory management, events and interaction between interrupt routines and real time operating system. Software selection issues. Selecting an RTOS,RTOS performance metrics, RTOS scalability and tool support. Compiler Selection.
Unit-IV
Embedded system design using real time operating system: encapsulating semaphores and queues, hard real time scheduling
Consideration saving memory space.
Unit-V
Development tools and debugging:-Host and target machines. Linker/ location, taraget system testing, instruction set, asset macro. Establishing a software development environment C runtime environments Embedded debuggers Cross-development methods Embedded file formats, readers. Creating object files-the build process loading software In to remote targets.
Books:-

1. An Embedded Software Primer by David E. Simon ISBN.
2. Embedded System Design by Arnold S. Berger.

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WEB TECHNOLOGY
EL-804
Elective-IV

Unit-I

Internet Concept, Architecture and Protocols. IP addressing scheme-sub netting supernetting and classless addressing, Routing of IP packets, Binding protocol address(ARP and RARP), IP Datagrams and Datagram forwarding, IP encapsulation, Fragmentation and reassemble, IPv6- motivation, frame format and addressing.

Unit-II

Startup procedure- BOOTP and DHCP

Internet Control Message Protocol: Introduction and usage for testing reachability, rout tracking, MTU determination, message format, error reporting, query, and checksum.

Unit-III

User Datagram protocol(UDP): Format of UDP message, headers, UDP encapsulation and protocol layering, checksum computation, multiplexing and demultiplexing in UDP, port number and socket address, Use of UDP.

Transmission Control Protocol: Properties of reliable delivery sliding window concept architecture of TCP frame, header checksum, Connection establish and release, TCP timers, Congestion control, TCP operation, Interior and exterior routing- RIP, OSPF and BGP.

Unit-IV

Domain name system: Introduction, DNS client server Model, Server hierarchy, server architectures, optimization of DNS performance, DNS entry types, message format.

World Wide Web: Introduction, HTML format, Client server interaction, Browser architecture, CGI, JAVA techniques for Dynamic Web Documents, Socket Interfaces.

Unit-V

Web applications: Remote login, tenet, FTP,NFS,TFTP, electronics mail (SMTP,MIME) Internet Management (SNMP) and NMS.

Suggested Text Books and References

1. "Computer Networks and Internet" by D.E.Comer
2. TCP/IP- Protocol Suite by B.A. Forouzan.
3. "Internetworking with TCP/IP"- Vol-I –Duglus E. Comer.
4. "Internet by Coleman & Dyson.

ROBOTICS
EL-804
Elective-IV

Unit-I
Introduction: Basic components of robotic system, classification of a robot, characteristic of robot, performance, advantages and disadvantages of robot, applications of a robot.

Unit-II
Kinematics for manipulators, homogeneous transformations, solution of kinematics equation, Lagrangion equation, and manipulator dynamics, iterative Newton- Euler dynamics formations.

Unit-III
Position planning, position velocity and force control, controller design, digital simulation.

Unit-IV
Sensing system: types of sensors, Robot sensing technology and sensing system design, machine vision, artificial intelligence, control technique.

Unit-V
Programming language for robots, applications of computer controlled robots in manufacturing and programmable automation.

Reference:
Introduction to Robotics: John J Craig.

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ENERGY CONSERVATION & MANAGEMENT
EL-804
Elective-IV

Unit-I
General energy problem: Global & national energy scenario, Energy conservation techniques in domestic, Transport & in industrial section.
Unit-II
Maintenance engineering, friction, lubrication, predictive & preventive maintenance, Energy audits.
Unit-III

a. Heating, lighting & air conditioning of building & measures of conservation of electrical energy.
b. Industrial heating & energy conservation in electric & oil fired furnace.
c. Measures for reduction of losses in transmission & distribution syatem.

Unit-IV
Energy efficient drives, energy efficient motors, VSD, P.F. improvement in power system, energy conservation in transportation system especially electric vehicles.
Unit-V
Energy conversation by using renewable technologies, Solar, wind, small hydro, Biomass, tidal, geothermal, animal & human energy, Appropriate energy technology for rural development.

Books:

1. Electrical Energy utilization and conservation by S.C. Tripathi.

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TV & RADAR LAB
EL-806

Monochrome and Color television- fault generation and troubleshooting
Different sections of Television receiver system.