SEMESTER - II

ELECC-09

Practical based on papers ELECC-05,06,07& 08

SEMESTER - III

ELECC-10

Control Theory and Instrumentation

1. **Control Systems**Basic elements and types of control systems – Open loop and closed loop control systems, Equations – Models of linear systems – Electrical and mechanical systems – Electrical analogous systems. Transfer function and impulse response, Block diagram representation and manipulation, Signal flow graphs, Mathematical modelling of simple physical systems, Introduction to Feedback control systems
2. **Time domain analysis and Root Locus Techniques** Standard test signals, time domain performance of control systems, transient response of the first, the second order systems, stability, steady state errors, effect of adding zero to the system, Routh stability criterion. Root locus techniques: The root locus concept, construction of root locus and analysis of control system,
3. **Frequency domain analysis** Basic control actions: Correlation between time and frequency response, Polar plots, Bode plots, experimental determination of transfer function, log magnitude versus phase plots, Nyquist stability criterion,Proportional, derivative and integral controllers, combined controllers, Effect of integral and derivative control on system, performance, PID controller.
4. **Measurement of Physical Quantities**Measurement of Displacement, Velocity, Strain, Pressure, Temperature, Light intensity, Signal Conditioner & Display/Recording System: Op-Amp Instrumentation Amplifier, Analog Ammeter, Digital Voltmeter, Strip-chart recorder, X-Y recorder
5. **Transducers**Passive electrical transducers – Resistive, Strain, Pressure, Moisture and optical radiation transducers, capacitive moisture transducers. Active electrical transducers – photoconductive, photovoltaic and photo emissive transducers, Digital transducers- Displacement transducers, tachometers, Transducer Oscillator

Books recommended :

1. Control system Engineering – J.J. Nagrath, M. Gopal, Wiley Eastern Ltd.
2. Modern Control Engineering – K. Ogata, PHI
3. Automatic control systems- B.C. Kuo, PHI
4. Principles of Electronic Instrumentation - Patra Nabis – PHI
5. Electrical & Electronic Measurement -Sawhney, Dhanpat Rai & Sons
6. Biomedical instrumentation and measurements -Cromwell et.al., Pearson
7. Automatic Control System-Samarjeet Ghosh

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SEMESTER - III

ELECC-11

Electronic Communication System

1. **Principles of modulation**Basic principles of AM, FM, PM. Pulse modulation systems-PAM, PWM, PPM.Code modulation systems- PCM, DPCM, DM
2. **Noise**External Noise, Internal Noise. Noise calculations, S/N ratio, Noise factor and Noise figure, Noise temperature
3. **Transmission Lines** Introduction & classification, distributed parameters of lines, Transmission line equations and solutions, characteristic impedance, propagation constant, attenuation constant & phase shift constant, impedance at a point on a line, lossless and distortionless transmission line, voltage reflection coefficient and VSWR, Quarter wave transformers, Smith Chart
4. **Satellite Communication**Kepler's Laws, Types of satellites, Geo-stationary Orbit, Altitude Control, Station Keeping, Antenna look angles, Limits of visibility, Frequency band and polarization, Transponders, Up-link and Down-link, Power Budget, Overall Link Power Budget, Digital Carrier Transmission, Multiple Access Method, Brief Introduction to digital communications by satellite.
5. **Optical Communication**Principles of optical communication system, Optical sources and Detectors, Optical Fibers, Modes of an optical fibers, Multimode fibers, Single mode fibers and their propagation characteristics. Dispersion Management in optical fibers and link design considerations. Integrated Optics – Planar and Channel wave guides, Directional couplers, Optical Switch, Electro-Optic and Acousto-Optic waveguide devices. Display devices, Holography and Optical Information processing.

Books recommended :

1. Radio Wave Propagation – Jordan
2. Optical Fiber Communication – Geerd Keiser, McGraw Hill
3. Hand Book Of Electronics Gupta and Kumar, PragatiPrakashan
4. Electronic Communication Systems -Kennedy & Davis, TMH
5. Electronic Communication-Roddy &Coolen,
6. Principle of Communication Systems -Taub& Schilling, TMH

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SEMESTER - III

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ELECC-12

Electromagnetics and Radiating Systems

1. **Electromagnetic Theory**Maxwell's Equations, EM wave equations and its solution, characteristic impedance of free space, Poynting theorem.
2. **Radio wave propagation**Ground waves, Tropospheric wave propagation, Sky waves, Ionosphere, Virtual height, Chapman's Theory of Layer formation, Refraction and Reflection of Radio waves, Refractive index of ionized medium, Critical frequency, MUF, SKP Distance fading.
3. **Antenna**Alternating current element (Oscillation Electric dipole), Power radiated by current element, Application to short antenna, radiation from quarter wave monopole or half wave dipole, linear antenna arrays, directional properties, folded dipole antenna, Yagi-Uda Antenna, Parabolic reflection antenna, feed mechanism, log, periodic antenna, helical antenna.
4. **Microwave Theory and Techniques**Rectangular wave guide, Solution of wave equation for rectangular wave guide, TE & TM modes, Introduction to circular wave guide , Microwave network representation, Scattering matrix representation, Microwave tubes- Two cavity& Reflex Klystron, Bunching, Travelling wave tube(Helix type), Magnetron
5. **Radar Communication**Principles, arrangement, operating characteristic, maximum range of Radar set, Radar transmitting systems, Radar antennas, Duplexer, Radar receivers

Books recommended:

1. Micro Wave Devices – Liao, PHI
2. Radio Wave Propagation – Jordan
3. Optical Fibre Communication – Geerd Keiser, McGraw Hill
4. Hand Book Of Electronics- Gupta and Kumar,PragatiPrakashan
5. Electronic Communications - Kennedy
6. Antennas -John D Kraus , TMH
7. Electromagnetic waves and Radiating Systems -Jordan & Balmain, PHI

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SEMESTER - III

ELECC-13

Microelectronics

1. **IC Fabrication Technology**Material properties; crystal growth and doping; diffusion; oxidation; epitaxy; ion implantation; deposition of films using CVD, LPCVD and sputtering techniques; wet and dry etching and cleaning; lithographic process; device and circuit fabrication; process modeling and simulation.
2. **VLSI Design** Introduction to NMOS and CMOS circuits; NMOS and CMOS processing technology; CMOS circuits and logic design; circuit characterization and performance estimation; structured design and testing; symbolic layout systems; CMOS subsystem design; system case studies.
3. **Physics and Modelling of Microelectronics** Physics and properties of semiconductor - a review; pn junction diode; bipolar transistor; metal semiconductor contacts; JFET and MESFET; MOSFET and scaling; CCD and photonic devices. MEL G632
4. **Analog IC Design** Basic concepts; BICMOS process and technology; current and voltage sources; differential and operational amplifiers; multipliers and modulators; phase-lock techniques; D-to-A and A- to-D converters; micropower circuits; high voltage circuits; radiation resistant circuits; filter design considerations.
5. **Embedded System Design**Introduction to embedded systems; embedded architectures: Architectures and programming of microcontrollers and DSPs. Embedded applications and technologies; power issues in system design; introduction to software and hardware co-design.

Books recommended:

1. Microelectronics-Millman Jacob and Gsabel Arvin,McGraw Hill International Ed.
2. VLSI Technology – S M Sze, TMH
3. Embedded System Design-Vahid&Givargis
4. Embedded Systems-Rajkamal, TMH
5. An Embedded Software Primer-Simon, Pearson

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SEMESTER - III

ELECC-14

Practical based on ELECC10,11,12&13

SEMESTER - IV

ELEEC-01