BE **IV** Semester **Electronics & Communication Engineering**							
COURSE CONTENTS							
EC-4001	**Electronic Circuits**	**L**	**T**	**P**	**C**	**Max. Marks**	**Min. Marks**
Duration	3 Hours	3	1	2	6	70	22

Unit-I

Amplifier Basics. Transistor as an amplifier, load line, Q-point and its selection criteria, designing of fixed bias and self-bias, stability of biasing circuits, calculation of stability factor. Transistor at low frequency: frequency response, bandwidth, h-parameter analysis of CC, CB and CE Configuration, simplified model, Gain and impedance calculation of single stage amplifier. Transistor at high frequency: high frequency model(hybrid-tt) Parameters and their definition, Miller capacitance and its effect on voltage gain.

Unit-II

Feedback amplifier: positive and negative feedback loop gain, effect of negative feedback on gain stability, distortion, bandwidth, input and output impedance of amplifier, types of feedback (voltage, current, series and shunt) and their analysis.

Oscillators: condition of sustained oscillation. RC phase shift, LC (Hartley and Collpit) Oscillators. Wein Bridge, Negative resistance (Tunnel diode and UJT) oscillators, crystal oscillators.

Unit-III

Power amplifier, classification, operation, analysis and design of class A, class B, Class AB, Class C, transformer coupled, push pull and complementary symmetry amplifiers, power dissipation in transistors (pdmax rating) and efficiency calculations. Tuned amplifier and its applications factor, selectivity and bandwidth, effect of loading double tuning (synchronous and stagger)

Unit-IV

Cascade amplifier Calculation of gain, input and output impendence, Effect of Cascading on bandwidth, Transformer, RC and direct-coupled amplifier and their performance. Darlington connection equivalent circuit and calculation of gain and impedances, cascade amplifier: advantage circuit diagram and analysis feedback pair and application of BIFET, Bootstrapping technique. Differential amplifier configuration, transfer characteristics, DC analysis- parameter analysis, differential and common mode gain, CMRR, Constant current source and current mirror, level shift.

Unit- V

Operational amplifier(IC741) specifications, ideal and practical characteristics, frequency response, unity gain bandwidth, limitations, slew rate and its effect on full power bandwidth, input offset voltage, bias and offset currents, compensation.

Applications of Op-amp: Inverting and non-inverting amplifier Analog computation, summer(inverting and non inverting) average, integrator, differentiator, scalar, sign changer, phase changer, multiplier, buffer, differential amplifier , instrumentation amplifier, comparator, Schmitt trigger, precision rectifier, log and antilog amplifier, voltage-to –current and current-to voltage converter.

Reference:

1. Millman and Hlkias: Integrated electronics,TMH

2. Gayakwad: OPAMP and linear integrated Circuits, Pearson Education
3. Boylestad and Nashelsky: Electronic Devices and circuit theory, PHI
4. Sendra and Smith: Microelectronics, Oxford press
5. Graham Bell: Electronic Devices and Cricuit,Phi
6. Donald A Neamen: Electronic Circuits Analysis and Design,TMH
7. Salivahanan et al: Electronic Devices and Circuit ,TMH

BE **IV** Semester **Electronics & Communication Engineering**							
COURSE CONTENTS							
EC-4002	**Digital Electronics**	**L**	**T**	**P**	**C**	**Max. Marks**	**Min. Marks**
Duration	3 Hours	3	1	2	6	70	22

Unit-I

Review of Numbers systems and Binary codes, Binary arithmetic, addition, subtraction, multiplication and division algorithms, Boolean algebra: theorems and functions, Simplification of Boolean functions, minimization techniques, Karnaugh's map method, Quine and Mc Cluskey's method, realization of various binary function using AND, OR,NOT, XOR logic gates.

Unit-II

Universal gates: NAND, NOR, realization of Boolean function using universal gates. Half and full adder, half and full subtractor, Series and parallel adder, BCD adders, look ahead carry generator, Decoders, Encoders, multiplexers and de-multiplexers. Analysis and design of combination circuits, realization of various Boolean functions using NAND, NOR gates and multiplexers.

Unit-III

Flip- Flops: R-S, Clocked R-S,T,D,J-K race around problem, Master slave J-K State and Excitation Tables Shift registers and counters: synchronous and asynchronous counters, Binary ripple counter, up-down counter, Johnson and ring counter, Analysis and Design of Sequential Circuits.

Unit–IV

Semiconductor memories: Organization and construction of RAM, SRAM, DRAM, RAM BUS ROM, PROM, EPROM, EEPROM, PAL and PLAs etc.

Unit- V Logic families: RTL, DTL, TTL, ECL, IIL, PMOS, NMOS and CMOS logic etc. interfacing between TTL and MOS, Vice–versa.

References

1. M.Mano: Digital Logic and Computer Desgin, Pearson Education
2. W.H. Gothman: Digital Electronics ,Phi
3. Millman and taub: Pulse , Digital and Switching Waveforms , TMH
4. Salivahanan and Ari Vahagan: Digital Circuits and Design, Vikas Publishing House
5. Leach and Malvino: Digital Principles and Applications. TMH
6. Rajkaml: Digital Systems- Principles and Design, Pearson Education

BE **IV** Semester **Electronics & Communication Engineering**							
COURSE CONTENTS							
EC-4003	**Computer System Organization**	**L**	**T**	**P**	**C**	**Max. Marks**	**Min. Marks**
Duration	3 Hours	3	1	0	4	70	22

Unit-I

Computer Basics and CPU: Von Newman model, various subsystems, CPU, memory, I/O, System Bus, CPU and Memory registers, Program Counter, Accumulator, Instruction register, Micro operations, Register Transfer Language, Instruction Fetch, Decode and execution , data movement and manipulation, Instruction formats and addressing modes of basic computer .8085 microprocessor organization.

Unit- II

Control Unit Organization: Hardwired control unit , Micro and Nano programmed control unit, Control Memory, Address Sequencing, Microinstruction formats, Micro program Sequencer, Microprogramming.

Arithmetic and Logic Unit: Arithmetic Processor, Addition, Subtraction, multiplication and division, Floating point and decimal arithmetic and arithmetic units, design of arithmetic unit.

Unit-III

Input output organization: Modes of data transfer- program controlled, interrupt driven and direct memory access, interrupt structures, I/O Interface, Asynchronous data transfer, I/O processor,8085 I/O structure, 8085 instruction set and basic programming. Data transfer - Serial/parallel, synchronous/ asynchronous, simplex/half duplex and full duplex.

Unit- IV

Memory Organization: Memory maps, Memory Hierarchy, Cache Memory – organization and mappings, Associative memory, Virtual memory, Memory Management hardware.

Unit- V

Multiprocessors: Pipeline and vector processing, Instruction and arithmetic pipelines, Vector and array processors, Interconnection structure and inter processor communication.

References:

1. Morris Mano: Computer System Architecture, Phi
2. Gaonakar: Microprocessor Architecture, Programming, Applications with 8085: Penram Int.
3. Williams Stallings: Computer Organization and Architecture ,Phi
4. Carter: Computer Architecture (Schaum):TMH
5. Carl Hamacher: Computer Organization , TMH
6. Tanenbaum: Structured Computer Organization, Pearson Education

BE **IV** Semester **Electronics & Communication Engineering**							
COURSE CONTENTS							
EC-4004	**Analog Communication**	**L**	**T**	**P**	**C**	**Max. Marks**	**Min. Marks**
Duration	3 Hours	3	1	2	6	70	22

Unit-I

Different types of Signals(Continuous, Discrete, Periodic) Time Domain and Frequency Domain Representation, Introduction to basic Transform Techniques applicable to these signals.

Specials Analysis: Fourier Technique, Fourier Transform and their Properties, Transform of Gate, signal, Impulse function and Unit step Function, Fourier Transform Technique for Periodic Signal, Transform of Train of Pulses and impulses, Sine and cosine wave. Signals Energy and Power, Spectal Density of Various types of signals spectra (Parseval's Theorm) Density Spectra of Periodic Gate and impulse train. Linear Time Invariant (LTI) Systems, Impulse Response, convolution ,Convolution with impulse function, Casual and Non Casuals system, distortion less system, Impulse Response of Distortion less System, Ideal Filter and Practical Filler.

Unit_II

Modulation Techniques: Need and types of modulation techniques, Amplitude Modulation, Frequency Splectrum, Power Distribution, Modulation by Complex Signal ,Low level and High Level AM Modulators, Linear integrated Circuit AM Modulators, Suppressed Carrier Generation (Balance/Chopper and Square Law Modulation) SSB Generator (Phase and Frequency Discrimination Method) VSB Transmission and Application, Detection of AM signals: Envelop Detector circuit ,RC time constant, Synchronous detection Technique Error in Synchronous Detection ,SSB signals detection, PLL and its use in demodulation.

Unit-III

Angle Modulation: Frequency and Phase modulation Frequency spectrum, bandwidth requirement, Frequency and phase deviation, Modulation index, NBFM and WBFM, Multiple frequencies FM. FM Modulation: Direct (Parameter Variation method) and indirect (Armstrong) method of frequency modulation. FM Detector: slope detector, Foster seely Discriminator, Ratio Detector and PLL detectors.

Unit -IV

Radio Transmitters: AM transmitter, block diagram and working of Low Level and High Level Transmitters, Trapezoidal Pattern and Carrier Shift ,SSB Transmitters ,FM transmitters _ Frequency Multiplication Applied to FM Signals, FM transmitters.

Radio Receivers: Block Diagram of Radio Receiver, Receiver Characteristics (Selectivity, Fidelity and Sensitivity) AM Receiver, RF Receiver, Super Heterodyne Receiver, RF Amplifier, Frequency Mixer, AVC and AFC Image Signals Intermediate Frequency selection, Diversity Reception. FM Receiver.

Unit-V

Sources and types of noise and their power density, White Noise, Noise from single and multiple noise source for linear systems, Super Position of power spectrum, Equivalent noise bandwidth , noise figure and equivalent noise temperature, their noise performance of communication System, Band Pass noise representation in terms of low pass, In-phase and quadrature phase component and their power spectral density figure of merit, Calculation for

AM-SC and SSB system, Noise in angle modulate system, figure of Merit for FM, Noise density of output of FM detector, Pre emphasis and De-emphasis, Phasor representation of noise ,Capture effect, Comparison of Noise performance of AM and FM.

References:

1. B.P.Lathi: Modern analog and Digital communication system, Wiley eastern limited
2. Taub and schilling: principles of communication systems, TMH 18
3. Singh and Sapre: Communication Systems, TMH
4. S. Haykin: Communication systems, John Wiley and Sons Inc.
5. A Bruce Carlson: Communication System, TMH
6. Steven: Communication Systems_ Analysis and design, Pearson Education
7. Hsu: Analog and digital communication (Schaum);TMH

BE **IV** Semester **Electronics & Communication Engineering**							
COURSE CONTENTS							
EC-4005	**Electro-Magnetic Theory**	**L**	**T**	**P**	**C**	**Max. Marks**	**Min. Marks**
Duration	3 Hours	3	1	0	4	70	22

Unit-I

Review of vector calculus, orthogonal coordinate systems, gradient, divergence and curl. Laplacian operator for scalar and vectors. Vector integral and differential and theorems. Phasor representation of harmonic variation of scalar and vectors Static electric fields, Coulomb's law, electric flux density and electric field intensity, permittivity, dielectric constant, field of distributed charges in free space ,potential function, Laplace's and Poisson's equations, electric dipole, stored electric energy density. Boundary conditions at abrupt discontinuities between two media including conducting boundaries, surface charge distribution capacitance between two isolated conductors.

Unit-II

Solution of Laplace's equations in systems of dielectric and conducting boundaries, uniqueness theorem, two dimensional boundary condition problems, solution by symmetry, conformal transformation of functions, image theory etc. fields in parallel wire, parallel plane and coaxial systems, Static currents and magnetic mobility, explanation of Ohm's law employing mobility, Magnetic effe3cts of current flow, Biot-Savart's law in vector form magnetic field intensity, magnetic flux and permeability, closed loop currents, Ampere's circuital law in integral and differential vector form, magnetic vector potential and related equations. Problems related to straight wire toroidal and cylindrical solenoids, inductance Boundary conditions on magnetic field, equivalent surface currents of abrupt discontinuity of magnetic field.

Unit-III

Time varying fields- Faraday's law in integral and differential forms, displacement current concept, Maxwell's equations in differential and integral forms, wave equations in source free fregion electric and magnetic strode energy density, continuity equation, Poynting vector theorem, time harmonic fields, r.m.s phasor representation of field vectors, Maxwell's equations for TH field, average energy density, complex poynting vector, duality concept Helmholtz wave equations, general solution in free space in various coordinates, plane polarized wave in free space, properties of plane waves, wave front, power flow, stored energy density.

Unit-IV

Circular and elliptic polarization, resolution in terms of linear polarized waves and vice-versa. Plane waves in lossy medium, low loss dielectric, good conducting and ionized media, complex permittivity, loss tangent, skin depth, transmission line analogy, boundary conditions at perfect conductor surface. Surface current density Interference of two plane waves traveling at oblique directions.

Unit-V

Reflection and refraction of plane waves at dielectric media and conducting surfaces, Brewster's angle, total internal reflection, resultant fields and power flow in both media.

Frequency dispersive propagation, phase velocity and group velocity, Magnetic vector potential for sources in free space, retarded potential, radiation principles, boundary condition at infinity.

References:

1. Mathew N.O. Sadiku: Elements of Electromagnetic , Oxford University Press
2. William H.Hayt: Engineering Electromagnetic, TMH
3. John D Kraus: Electromagnetic, MC ,Graw Hill
4. Jordan Balmian : Electromagnetic wave and Radiating System ,PHI
5. David K Cheng: Electromagnetic Fields and Wave, Addison Wesley.
6. Ramo,Whinnerry and Van duzzer " Fields and waves in communication electronics" Wiley 1984
7. Harrington RF " Electromagnetic fields " Mc Graw Hill