**NBKR INSTITUTE OF SCIENCE & TECHNOLOGY::VIDYANAGAR**

AUTONOMOUS (Affiliated To JNTU, Anantapur)

 **II YEAR OF FOUR YEAR B.TECH DEGREE COURSE- I SEMESTER**

ELECTRONICS & COMMUNICATION ENGINEERING

SCHEME OF INSTRUCTIONS AND EVALUATION

 (w.e.f the batch admitted in 2013-2014) & (With effect from the academic year 2014-15)

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| CourseCode | Course Title | InstructionHours/Week |  Credits  | Evaluation | Max.  |
| SessionalTest-I | Sessional Test-II  | Total Sessional Marks (Max. 40) | End Semester Examination  | Total Marks  |
| L  | T  | D/P  | DurationIn Hours |  MaxMarks | Durationin Hours |  MaxMarks | 0.8(best test) +0.2(other test)Day to day Evaluation and test | Durationin Hours |  MaxMarks | 100 |
| **THEORY** |
| 13SH2101 | Engineering Mathematics-III \*\* | 3 | 1 | -  | 4  | 2  | 40 | 2  | 40 | 3  | 60  | 100 |
| 13EC2101 | Signals & Systems \*\* | 4  | -  | -  | 4  | 2  | 40 | 2  | 40 | 3  | 60  | 100 |
| 13EC2102 | Electronic Devices & Circuits\*\* | 3 | 1 | -  | 4 | 2  | 40 | 2  | 40 | 3  | 60  | 100 |
| 13EC2103 | Electromagnetic Fields and Waves | 3 | 1 | -  | 4  | 2  | 40 | 2  | 40 | 3  | 60  | 100 |
| 13EE2103 | Circuits & Networks \*\* | 4  | -  | -  | 4 | 2  | 40 | 2  | 40 | 3  | 60  | 100 |
| 13EE2120 | Electrical Technology | 3 | 1 | - | 4  | 2  | 40 | 2  | 40 | 3  | 60  | 100 |
|  | **PRACTICALS** |  |  |  |  |  |  |  |  | Day to day Evaluation (30) + A test (10)  |  |  |  |
| 13EC21P1 | Electronic Devices Lab | - | -  | 3  | 2  | --  | - | -  | - | 3  | 60  | 100 |
| 13EE21P8 | Electrical Technology Lab | - | -  | 3  | 2  | --  | - | -  | - | 3  | 60  | 100 |
|  | TOTAL  | 20  | 4 | 06 | 28 | - | - | - | - | - | - | - | 800 |

\*\* Common to ECE & EEE

**13SH2101 ENGINEERING MATHEMATICS-III** (Common to EEE and ECE)

 Credits: 4

Lectures / Week: 4 Hrs Sessional Marks: 40

Univ. Exam: 3Hrs Univ. Exam. Marks: 60

 **UNIT-I**

**Applications of Partial Differential Equations:** Methods of Separation of Variables – One dimensional Wave equation – One dimensional Heat flow equation – Two dimensional Laplace equations.

 **UNIT-II**

**Special functions:** Bessel functions – Properties– Recurrence formulae for Bessel function – Generating function for Jn(x) – Orthogonally of Bessel Functions. Legendre functions – Rodrique’s formula – Recurrence relation for Pn(x) – Generating function for Pn(x) – Orthogonality of Legender polynomials.

 **UNIT-III**

**Complex Analysis-I:** Analytical functions, Cauchy - Riemann equations, Construction of Analytic function, Applications to flow problems. Conformal mapping–Bilinear transformations.

 **UNIT-IV**

**Complex Analysis-II:** Complex integration – Line integral – Cauchy’s theorem – Cauchy’s integral formula – Taylor’s theorem and Laurent’s theorem (without proof) – Singularities – Poles – Residues – Residue theorem – Evaluation of real definite integrals.

 **UNIT-V**

**Z-Transforms and Difference equations:** Z – Transform of some standard functions- Properties of Z-Transforms – Shifting properties – Initial value theorem and final value theorem – Inverse Z- Transform – Convolution theorem – Inversion by partial fractions – Region of Convergence – Applications to difference equations.

**TEXT BOOKS:**

1. Higher Engineering Mathematics-B.S.Grewal, Khanna Publishers.
2. Engineering Mathematics – B.V.Ramana-TMH
3. Advanced Engineering Mathematics-Erwin kreyszing

**REFERENCE:**

1. Higher Engineering Mathematics- H K Das et al

1. Engineering Mathematics-III –TKV Iyengar, S.Chand.
2. Engineering Mathematics-III - M K.Venkataraman

**13EC2101**-**SIGNALS AND SYSTEMS**

(Common to EEE& ECE)

 Credits: 4

 Lectures/Week: 4Hrs. Sessional Marks: 40

 Univ.Exam.Duration: 3Hrs Univ.Exam.Marks: 60

**UNIT – I**

**Continuous Time Signals:** Signal classification – Dirac delta-types of signals unit step, ramp, sign and exponential functions – Operations on signals- Analogy between vectors and signals – Orthogonality – Mean square error – Periodicity - power and energy spectral densities – Auto and cross correlation signals.

**UNIT – II**

**Fourier series**: Definition-Dirichlet’s conditions –classification of Fourier Series-properties of Fourier Series.

**Fourier transform:** Existence of Fourier Transform- Properties of Fourier Transform-Inverse Fourier transforms. Parseval’s Theorem of Energy and Power signals.

**UNIT – III**

**Continuous Time Systems:** Classification of systems – Linearity and time invariance – Transmission of signals through LTI systems – Convolution – Impulse response – Frequency response – Ideal filters – Distortion less transmission – Band Width – Rise time – Hilbert transform – Pre and complex envelopes – Band pass signals through band pass systems.

**UNIT – IV**

**Discrete Time Signals and Systems:** Unit impulse, step, ramp, and exponential signals – Periodicity of signals – Operations of signals – Linear Shift Invariant(LSI) system – Stability – Causality – Convolution and Correlation –Linear constant coefficient difference equation – Impulse response – Discrete time Fourier transform – Properties – Transfer function – System analysis using DTFT.

**UNIT-V**

**MATLAB**: Introduction –Basic operations on Matlab –generation of signals –correlation- Convolution-Computation of Fourier Transform-Solving difference equations. Computation of Z-Transform.

**Text Books:**

1. Oppenheim. A.V, Wilekey, A.S.and S. Hamid Nawab, “Signals and Systems, PHI
2. Simon Haykin. “Communication Systems”, Wiley Eastern Ltd., New Delhi.
3. Sanjith k.Mithra Digital Signal Processing with MATLAB, TMH Publications.

**References:**

 1. Ashok Ambardar, “Analog and Digital Signal Processing”, Thomson Learning Inc.

 2. B.P. Lathi, “Signals, Systems and Communications”, B.S. Publications.

**13EC2102**-**ELECTRONIC DEVICES AND CIRCUITS**

(Common to EEE and ECE)

 Credits: 4

Lectures/Week: 4Hrs. Sessional Marks: 40 Univ. Exam.Duration: 3Hrs Univ.Exam.Marks: 60

**UNIT-I**

**Special semiconductor devices:** operation of SCR, DIAC, TRIAC and UJT.

**Rectifiers:** Diode equivalent circuit, Half-wave, Full-wave and Bridge rectifiers, Analysis of filters with full wave rectifier.

**UNIT-II**

**BJT Amplifiers :** BJT biasing schemes, Stability(Ico,VBE and β), Hybrid model, Small signal analysis of single stage BJT amplifiers, Comparison of CE, CB and CC amplifiers, Approximate model analysis, Effects of coupling and bypass capacitors on low frequency response,

**UNIT-III**

**BJT High frequency analysis:** Hybrid-π model at high frequencies, Parameters fβ and fT.

**Multistage Amplifiers:** Types of coupling, Analysis of multistage amplifiers, overall voltage gain and Bandwidth of n-stage amplifier, Darlington and Bootstrap circuits.

**UNIT-IV**

**FET Amplifiers:** FET biasing scheme, Small signal model, Analysis of CS &CD amplifiers, High frequency response.

**UNIT-V**

**Feedback amplifiers:** Feedback concept, Classification, Effect of negative feedback on gain, Stability, Noise, Distortion, Bandwidth, Input and Output resistance. Different types of feedback circuits without analysis.

**Sinusoidal Oscillators:** Barkhausen criterion, RC phase shift, Wien Bridge, Hartley, Colpitts and Crystal oscillator.

**TEXT BOOKS:**

1. Mottershed, “Electronic devices and circuits”, PHI.

2. Millman and Halkias, “Integrated Electronics”, McGraw- Hill Co.

**REFERENCES:**

1. Boylestad, Louis Nashelsky “Electronic devices and circuits” 9ed.., 2008 PE.

2. David.A.Bell. “Electronic Devices and circuits”, Oxford university press

3. Adel S.Sedra, Kenneth C.Smith, “Micro Electronic Circuits”, Oxford university press

**13EC2103-ELECTROMAGNETIC FIELDS AND WAVES**(Common to EEE and ECE)

 Credits: 4 Lectures/Week: 4Hrs. Sessional Marks: 40
Univ. Exam. Duration: 3Hrs Univ.Exam.Marks: 60

**UNIT I**

**ELECTROSTATICS:** Coulomb’s Law – Electric Field Intensity – Electric Flux Density –Gauss’s Law- Electric Potential-Potential Gradient-Energy Stored in Electric Field.

**UNIT II**

 **CONDUCTORS AND DIELECTRICS:** Current and Current Density- Continuity Equation-Conductors-Ohms Law-Dielectrics: Dipole Moment-Polarization-bound Charge Densities-Boundary Conditions- Poisson’s and Laplace’s equations-Capacitance-Energy density

**UNIT III**

 **MAGNETO STATICS:** Biot-Savart’s Law - Ampere’s circuital law – Lorentz Force Law – Magnetic field intensity H-Magnetic Vector Potential-Poisson’s and Laplace’s Equations-Dipole Moment-Bound Current Densities-Boundary Conditions-Energy Stored in Magnetic Field.

**UNIT IV**

 **ELECTROMAGNETIC WAVES:** Faraday’s Law – Displacement Current – Modified form of Ampere’s circuital law – Maxwell’s Equations -Poynting theorem. Wave Equation – Uniform Plane Waves in Lossless Media and in Lossy Media.

**UNIT V**

 **POLARIZATION, REFLECTION AND REFRACTION:** Linear, Elliptical and circular polarization – Reflection of Plane Wave from a conductor – normal incidence – Reflection of Plane Waves by a perfect dielectric – Normal and Oblique Incidence –VSWR- Brewster angle.

**TEXTBOOKS**

1. Matthew N.O.Sadiku: “Elements of Engineering Electromagnetics” Oxford University Press, 4th edition, 2007 (Unit I, II, III).

2. E.C. Jordan & K.G. Balmain “Electromagnetic Waves and Radiating Systems.” Pearson Education/PHI 4th edition 2006. (Unit IV, V)

**REFERENCES**

1. W H.Hayt & J A Buck: “Engineering Electromagnetics” TATA McGraw-Hill, 7th Edition 2007

2. Narayana Rao, N: “Elements of Engineering Electromagnetics” 6th edition, Pearson Education, New Delhi, 2006.

3. Ramo, Whinnery and Van Duzer: “Fields and Waves in Communications Electronics” John Wiley & Sons, 3rd edition 2003.

4. David K.Cheng: “Field and Wave Electromagnetics - Second Edition-Pearson

Edition, 2004.

5. G.S.N. Raju, Electromagnetic Field Theory & Transmission Lines, Pearson Education, 2006

**13EE2103 - CIRCUITS & NETWORKS**

(Common for EEE & ECE)
 Credits: 4

Lectures/Week: 4Hrs. Sessional Marks: 40

End Exam. Duration: 3Hrs End Exam.Marks:60

**UNIT –I**

Series and parallel Resonance, Half power frequencies, Bandwidth and Q factor, Relation between half power frequencies- Bandwidth – Quality factor.

Locus diagrams of RL & RC series circuits, Locus diagrams of two branch parallel circuits.

**UNIT-II**

Three phase circuits: Advantages of three phase systems - Phase sequence - Star - Delta transformation - Balanced & unbalanced three phase systems - Magnitude & phasor relationships between phase and line voltages & current in balanced star and delta circuits - Analysis of balanced and unbalanced three phase circuits- measurement of three phase power.

**UNIT-III**

Two port Network Parameters - Open circuit parameters – Short circuit parameters – Transmission parameters - inverse transmission parameters - Hybrid parameters – Inverse hybrid parameters - Inter-relationships of different parameters –Condition for reciprocity and symmetry of networks with different two port parameters - Terminated two port networks – Image parameters.

**UNIT-IV**

Network functions : Single port & multiport networks – Impedance functions of two port networks – Necessary conditions for driving point functions & transfer function – Complex frequencies – Poles and zeros – Time domain response from pole zero plots – Restrictions on pole-zero locations.

**UNIT-V**

Transient response of RL, RC & RLC circuits for DC & AC excitations using time domain & Laplace transform techniques - Determination of initial conditions - Concept of time constant – Transformed circuits -Transient response of RL, RC & RLC circuits for other types of signals using Laplace transform methods.

**TEXT BOOKS:**

1. Circuits & Networks: A. Sudhakar and Shyam Mohan - TMH

2. Circuit Theory: A. Chakarabarti - Dhanpat Rai

3. Circuits & Systems: K.M.Soni – Kataria Publishers

**REFERENCES:**

1. Network Analysis: Vanvalkenberg 3ed, PHI

2. Engineering Circuit Analysis: Hayt & Kemmerly, TMH

**13EE2120**-**ELECTRICAL TECHNOLOGY**

 Credits: 4

Lectures/Week: 4Hrs. Sessional Marks: 40

End Exam. Duration: 3Hrs End Exam. Marks: 60

**UNIT-I**

**DC Machines:** Principle of operation of the generator, EMF equation, types of generators, magnetization and load characteristics, Principle of operation of DC Motors, Torque equation, Speed control methods, Efficiency calculations by Swinburne’s test and direct load test.

**UNIT-II**

**Transformers:** Single phase transformer, principle of operation & types, constructional Details, EMF equation, Phasor diagram on no load and load equivalent circuit, regulation from OC and SC tests.

**UNIT-III**

**Three Phase Induction Motors**: Constructional features, principle of torque production, torque equation, slip, torque characteristics, efficiency calculation, starting methods.

**UNIT-IV**

**Alternator:** Constructional features, EMF equation, coil span factor, estimation of regulation by synchronous impedance method.

**UNIT-V**

**Single phase induction motors:** Principle of operation, starting methods, types of single phase induction motors. Stepper motors.

**TEXT BOOKS:**

1. B.R. Guptha “Electrical Machines” Kataria & Sons.
2. 2. P.S. Bimra,“Electrical Machines” Khanna Publications.

**REFERENCES:**

1. “Electrical Machines” Nagrath and Kothari
2. “Electrical Technology” B.L. Thereja.

**13EC21P1EL ECTRONICS DEVICES LAB**

(Common to EEE& ECE)

 Credits: 2

 Lectures/Week: 4Hrs. Sessional Marks: 40

 Univ.Exam.Duration: 3Hrs Univ.Exam.Marks: 60

**LIST OF EXPERIMENTS**

1. **P-N JUNCTION DIODE CHARACTERISTICS ( Ge & Si )**
2. **ZENER DIODE CHARACTERISTICS**
3. **BIPOLAR JUNCTION TRANSISTOR CHARACTERISTICS**

 **(CE CONFIGURATION)**

1. **JUNCTION FIELD EFFECT TRANSISTOR CHARACTERISTICS**
2. **UNI JUNCTION TRANSISTOR CHARACTERISTICS**
3. **LIGHT EMITTING DIODE CHARACTERISTICS**
4. **LIGHT DEPENDENT RESISTOR CHARACTERISTICS**
5. **PHOTO TRANSISTOR CHARACTERISTICS**
6. **THERMISTOR CHARACTERISTICS**
7. **DIAC CHARACTERISTICS**

**13EE21P8 ELECTRICAL TECHNOLOGY LAB**

 Credits: 2

 Lectures/Week: 3Hrs. Sessional Marks: 40

 Univ.Exam.Duration: 3Hrs Univ.Exam.Marks: 60

**LIST OF EXPERIMENTS**

1. Excitation Characteristics of a) Separately Excited DC Generator

 b) Self Excited DC Shunt Generator

1. External Characteristics of DC Shunt Generator
2. Brake Test on DC Shunt Motor
3. Swinburne’s Test
4. Speed Control of DC Shunt Motor
5. O.C & S.C Test on 1ɸ Transformer
6. Load Test on 1ɸ Transformer
7. Load Test on 3ɸ Induction Motor
8. Voltage Regulation of an Alternator By EMF Method
9. Equivalent Circuit of 1ɸ Induction Motor

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AUTONOMOUS (Affiliated To JNTU, Anantapur)

 **II YEAR OF FOUR YEAR B.TECH DEGREE COURSE- II SEMESTER**

ELECTRONICS & COMMUNICATION ENGINEERING

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| CourseCode | Course Title | InstructionHours/Week |  Credits  | Evaluation | Max.  |
| SessionalTest-I | Sessional Test-II  | Total Sessional Marks (Max. 40) | End Semester Examination  | Total Marks  |
| L  | T  | D/P  | DurationIn Hours | MaxMarks | Durationin Hours |  MaxMarks | 0.8(best test) +0.2(other test)Day to day Evaluation and test | Durationin Hours |  MaxMarks | 100 |
| **THEORY** |
| 13SH2201 | Engineering Mathematics-IV \*\* | 3 | 1 | -  | 4  | 2  | 40 | 2  | 40 | 3  | 60  | 100 |
| 13EC2201 | Switching Theory & Logic Design \*\* | 4  | -  | -  | 4  | 2  | 40 | 2  | 40 | 3  | 60  | 100 |
| 13EC2202 | Random Signals & Stochastic Processes  | 4 | - | -  | 4 | 2  | 40 | 2  | 40 | 3  | 60  | 100 |
| 13EC2203 | Analog Communications | 4 | - | -  | 4  | 2  | 40 | 2  | 40 | 3  | 60  | 100 |
| 13EC2203 | Pulse and Analog Circuits \*\* | 4  | -  | -  | 4 | 2  | 40 | 2  | 40 | 3  | 60  | 100 |
| 13SH2202 | Economics & Accountancy \*\* | 4 | - | - | 4  | 2  | 40 | 2  | 40 | 3  | 60  | 100 |
|  | **PRACTICALS** |  |  |  |  |  |  |  |  | Day to day Evaluation (30) + A test (10)  |  |  |  |
| 13EC22P2 | Electronic Circuits Lab | - | -  | 3  | 2  | --  | - | -  | - | 3  | 60  | 100 |
| 13EE22P9 | Circuits & Networks Lab | - | -  | 3  | 2  | --  | - | -  | - | 3  | 60  | 100 |
|  | TOTAL  | 23  | 1 | 06 | 28 | - | - | - | - | - | - | - | 800 |

SCHEME OF INSTRUCTIONS AND EVALUATION

 (w.e.f the batch admitted in 2013-2014) & (With effect from the academic year 2014-15)

\*\* Common to ECE & EE

**13SH2201 ENGINEERING MATHEMATICS-IV** (Common to EEE&ECE)

 Credits: 4

Lectures / Week: 4 Hrs Sessional Marks: 40

Univ. Exam.Duration: 3Hrs Univ. Exam. Marks: 60

 **UNIT-I**

**Determination of Roots of Non-linear Equations:** Bisection Method - Iterative methods - Falsi position method – Newton Raphson method.

**Curve fitting**: Fitting a straight line – Second degree curve by the method of least Squares – Power Curve by the method of least Squares. Correlation: Coefficient of correlation – Rank correlation – Regression of lines.

 **UNIT-II**

**Solution of Linear and Non-linear Algebraic Equations:** Iterative methods – Gaus Jordan– Gauss Elimination with Pivotal condensation –Triangular factorization methods – Gauss- Seidel and Newton – Raphson iterative methods.

 **UNIT-III**

**Solution of Ordinary Differential Equations:** Taylor’s Series method ­– Euler’s method –Euler’s modified method — Runge-Kutta Second and Fourth order methods - Runge-Kutta Grill method – Milne’s Predictor and Corrector methods for first order equations.

 **UNIT-IV**

**Numerical Interpolation, Differentiation and Integration:** Newton’s forward and backward interpolation formula – Lagrange’s interpolation formula - Numerical Differentiation by Richardson’s extrapolation—Numerical integration by Romberg method.

 **UNIT-V**

**Probability and Statistics:** Introduction – Random variables – Discrete and Continuous distributions – Binomial, Poisson’s and Normal distributions.

**TEXT BOOKS:**

1. Higher Engineering Mathematics by Dr. B.S.Grewal.
2. Higher Engineering Mathematics by H.K Das et al
3. Numerical Methods by Balagurusamy, Tata McGraw- Hill

**REFERENCE BOOKS:**

1. Numerical methods by S.Armugam etal, Scitech
2. Engineering Mathematical Methods by B.V.Ramana ,TMH

**13EC2201**-**SWITCHING THEORY & LOGIC DESIGN**

(Common to EEE and ECE)

 Credits: 4

Lectures/Week: 4Hrs. Sessional Marks: 40

Univ. Exam.Duration:3Hrs Univ.Exam.Marks: 60

**UNIT – I**

**Number Systems and codes:** Number systems, conversions, complements, arithmetic operations, signed binary numbers, BCD, Grey, ASCII, Parity bit and hamming code.

**Boolean algebra and Logic Gates**: NOT, OR, AND operations, Boolean theorems, De-Morgan’s theorem, logic gates, Universal gates and IEEE standard logic symbols.

 **UNIT – II**

**Combinational logic circuits:** Standard forms of logical functions, Min-term and max-term specifications, Simplification by K-maps, Incompletely specified functions, prime implicants, essential prime implicants, Realization of logical functions using gates.

 **UNIT -III**

**Design of combinational circuits:** Design procedure, Binary adders and subtractor, Serial and parallel adders, IC parallel adder, Decoders, encoders, Multiplexers, De-multiplexers and Digital magnitude comparator.

 **UNIT – IV,**

**Sequential circuits:** Latch, flip-flops (SR, JK, D & T), Timing problems, master-slave flip-flop and Shift registers.

**Design of sequential circuits:** Asynchronous, synchronous counters, Ring and Johnson counters.

 **UNIT-V**

**Memory Devices:** Terminology, ROM, PROM, EPROM, EEPROM, Semiconductor RAM (SRAM & DRAM) and its architecture, Memory expansion.

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**TEXT BOOKS:**

1. Digital design by Morris Mano, Pearson Education Asia

2. Fundamentals of logic design by Roth & Charles, 2nd Edition, West Publishing Company, 1979

3. Ronald J.Tocci, Neal S.Widmer, “Digital systems — Principles and applications”.8th edition, Pearson Education Asia, 2001.

**REFERENCES:**

1. Fundamentals of logic circuits by A.Anand Kumar, PHI Learing

2. Jon M, Yarbrough, “Digital logic — applications and design”, Thomson — Brooks India edition.

**13EC2202-RANDOM SIGNALS AND STOCHASTIC PROCESSES**

 Credits: 4

Lectures/Week: 4Hrs. Sessional Marks: 40

Univ.Exam.Duration: 3Hrs Univ.Exam.Marks: 60

 **UNIT-I**

**Probability**: Axioms- Joint and conditional probability - Bayes’ theorem - Bernoulli trials.

**Random Variable**: concept — Distribution function — Density functions —conditional density functions — Expectation — Conditional expected value — Moments — Chebyshev, Markov’s, and Chemoffs inequalities — Characteristics and moment generating functions - Transformation of continuous discrete random variable.

 **UNIT -II**

**Multiple Random Variables**: Vector random variables — Joint distribution / Density functions — Conditional density / Distribution functions - Statistical independence — PDF and CDF for sum of random variables — Central limits theorem - Operations on multiple random variables — Expected value of function of random variables — Joint characteristic function — Joint by Gaussian random variables — Transformations of multiple random variables.

 **UNIT – III**

**Random Processes:** Concept - Stationarity — Independence — Time averages — Ergodicity — Correlation functions — Properties, Gaussian, Poisson, and Markov processes — Power spectral density and its properties — Relation between power spectral density and auto-correlation — Cross power spectral density and its properties — Power spectrum for discrete time processes and sequences — Definition of white and coloured noise.

 **UNIT-IV**

**Linear Systems with Random Inputs:** Random signal response of linear system — System evaluation using random noise— Spectral characteristics of system response - Band pass, Band limited, and Narrow band processes — Properties of band limited processes.

 **UNIT-V**

**Modeling of Noise Sources**: Classification of noise sources — Resistive (Thermal) noise — Effective noise temperature — Antenna as a noise source — Available power gain — Equivalent networks — Input noise temperature — Noise figure.

Optimum Linear Systems: Maximization of (S/N); matched filter for coloured and white noise — Minimization of mean squared error — Wiener filter.

**TEXT BOOKS:**

1. P.Z.Peebles Jr., “Probability Random Variables and Random Signal Principles”. Tata McGraw-Hill, 4 edition, 2001.

2. A.Papoulis and S.Unnikrishna Pillai, “Probability Random Variables and Stochastic Processes”, PHI, 4 edition, 2008

3. J.LAunon and V.Chandrasekhar, “Introduction to Probability and Random Processes”, McGraw-Hill 1997.

**REFERENCE:**

1. D.G. Childer, “Probability and Random Processes”, McGraw Hill, 1997.

5. GR.Babu and K. Pushpa, “Probability Theory and Stochastic Processes”, Premier Publishing House, 2003.

 **13EC2203-ANALOG COMMUNICATIONS**

 Credits: 4

Lectures/Week: 4Hrs. Sessional Marks: 40

Univ. Exam. Duration: 3Hrs Univ.Exam.Marks:60

**UNIT – I**

**Elements of Electrical communication systems** : Modulation and its need and types Fundamental Physical limitations - Electromagnetic Spectrum and Areas of applications

Amplitude Modulation: Full AM DSB-SC and SSB generation and detection methods VSB, Frequency translation, FDM, Nonlinear distortion and Inter modulation.

**UNIT -II**

**Angle modulation :** Phase and frequency modulation ,NBFM, WBFM , Multitone FM Transmission bandwidth of FM , Direct and Indirect generation of FM ,Demodulation methods, Nonlinear effects ,FM versus AM.

**UNIT -III**

**Pulse Analog Modulation:** Sampling Theorem - Nyquist rate - Aliasing effect - Sampling of band pass signals -PDM and PPM Generation and detection, Spectra –Synchronization, TDM Asynchronous TDM-Comparison of TDM & FDM.

**UNIT –IV**

**Effect of noise on linear modulation systems:** Base band systems, DSB-SC, SSB Conventional AM. Carrier phase estimation with a Phase Locked Loop (PLL), Effect of additive noise on phase estimation. Effect of noise on Angle modulation systems — Threshold effect in angle modulation, Pre-emphasis and De-emphasis. Comparison of Angle modulation systems. Effect of transmission losses and noise in analog communication systems.

**UNIT-V**

**Circuit Implementation of modulation systems:** Block diagram Study of Radio Broadcast AM and FM transmitters, Super heterodyne receivers, Choice of IF, AGC, Tracking Characteristics of Radio receivers, FM stereo.

**TEXT BOOKS:**

1. “Communication Systems” Simon Haykin, Wiley Eastern.

2. “Electronic communication systems” J.Kennedy TMH

**REFERENCE BOOKS:**

1. “Communication Systems Engineering” John Proakis, Masoud Saleb.

2. “Principles of Communication Systems” Taub and Schilling”, McGraw-Hill ISE.

3. “Electronic Communications” Dennis Roddy and John Coolen, PHI.

4. “Modern Digital and Analog Communication Systems” B.PLathi, Oxford Univ. Press.

**13EC2204-PULSE & ANALOG CIRCUITS**

(Common for EEE & ECE)

 Credits: 4

Lectures/Week: 4Hrs. Sessional Marks: 40

Univ.Exam.Duration: 3Hrs Univ.Exam.Marks: 60

**UNIT-I**

**Wave Shaping Circuits**: Types of waveforms, RC low pass and high pass circuits, rise time, tilt, Diode as a switch, Diode clipper and clamper circuits.

 **UNIT-II**

**Multivibrators:** BJT switch and switching times, Bistable & triggering methods, Schmitt-trigger, Mono-stable and Astable multi-vibrators using BJT.

**UNIT-III**

**Time Base circuits:** RC sweep circuits, constant current Miller and Bootstrap time base generators using BJT’s, UJT relaxation oscillators, and sampling gates.

**UNIT-IV**

**MOS Transistor:** MOS and CMOS Structure, operation (enhancement and depletion mode), I/V Characteristics, Second Order effects - MOS Device capacitance and Small signal model.

**UNIT-V**

**Power Amplifiers:** Class-A, Transformer coupled Class-A, Class-B Push-pull, Complementary Class-B push-pull amplifiers.

**Tuned amplifiers:** Introduction, Q-factor, small signal tuned amplifiers, effect of cascading single tuned amplifier on bandwidth and stagger tuned amplifiers.

**TEXT BOOKS:**

1. Milliman & Taub “Pulse & Digital switching waveforms”, McGraw-Hill.

2. Pulse and Digital circuits by A.Anand Kumar, 2005, PHI.

3. Design of analog CMOS Integrated circuits by Behadrazhavi.

4. Millman and Halkias, “Integrated Electronics”, McGraw- Hill Co.

5. Electronic Circuit analysis by A.P Godse & Bakshi

**REFERENCE:**

1. David A. Bell, Solid state pulse circuits, PHI.

2. Electronic devices and circuits by Boylestad, Louis Nashelsky, 9ed..,2008PE

**13SH2202 ECONOMICS & ACCOUNTANCY**

**II B.Tech II Semester**

 *Credits : 4*

*Lectures/Week : 4 Hrs Sessional Marks: 40*

*University Exam:3 Hrs End Examination Marks: 60*

**UNIT – I**

**Demand Analysis:** Definition and basic concepts of Economics – consumer’s equilibrium: Marginal Utility Analysis - the concept of Demand - Law of Demand – Elasticity of Demand: Types, determinants and its importance.

**UNIT – II**

**Theory of Production and Banking** Production function – Cobb – Douglas production function and its properties – Law of variable proportions – Law of Returns to Scale – Cost concepts – Revenue curves – Break-Even Analysis. Money-functions of Money-Functions of Commercial Banks-Features of Indian Economy.

**UNIT – III**

**Markets :** Classification of markets – Pricing under perfect Competition – Pricing under Monopoly – Price discrimination – Monopolistic Competition.

**UNIT – IV**

**Types of Business Organizations:** Sole tradership, partnership and Joint Stock Companies – Formation of companies - Shares and debentures.

**UNIT – V**

**Financial & Management Accounting:** Concepts and principles in Financial Accounting, Journal and Ledger, Trial Balance, Final Accounts: Trading Account, Profit and Loss account and Balance Sheet.

Basic concepts in Capital Budgeting process and Methods – Working Capital: operating cycle, factors and sources.

**TEXT BOOKS:**

1. Managerial Economics and Financial Analysis: A R Aryasri

2. Management Accounting : S N Maheswari

3. Economic Analysis : K. Sankaran

**REFERENCES**:

1. Double entry book keeping : Battlibai
2. Cost Accounting : Jain and Narang
3. Managerial Economics : Maheswari and Varshaney

**13EC22P2- ELECTRONIC CIRCUITS LAB**

 Credits: 2

Lectures/Week: 4Hrs. Sessional Marks: 40

Univ. Exam. Duration: 3Hrs Univ.Exam.Marks: 60

**LIST OF EXPERIMENTS**

1. **RECTIFIERS WITHOUT FILTERS(HWR, FWR, BWR)**
2. **RECTIFIERS WITH FILTERS(C, LC, CLC)**
3. **R-C COUPLED AMPLIFIER**
4. **FET AMPLIFIER**

**5. COLPITTS OSCILLATOR**

 **6. CURRENT SERIES FEEDBACK AMPLIFIER**

 **(WITH & WITHOUT FEEDBACK)**

**7. DETERMINATION OF fT OF A TRANSISTOR**

**8. R-C PHASE SHIFT OSCILLATOR**

**9. WEIN BRIDGE OSCILLTOR**

 **10. DARLINGTON PAIR AMPLIFIER**

**13EE22P9 CIRCUITS AND NETWORKS LAB**

 Credits: 2

 Lectures/Week: 3Hrs. Sessional Marks: 40

 Univ.Exam.Duration: 3Hrs Univ.Exam.Marks: 60

**LIST OF EXPERIMENTS**

1. Verification of Kirchhoff’s laws
2. Verification of Superposition Theorem
3. Verification of Reciprocity Theorem
4. Verification of Maximum Power Transfer Theorem
5. Determination of TWO-PORT Network Parameters
6. Measurement of Mutual Inductance
7. Locus Diagram of RC Series Circuit
8. Measurement of Power Using Wattmeter
9. Verification of Thevenin’s Theorem
10. Resonance in RLC Series Circuit
11. Measurement of Time Constant & Rise Time in a RC Series Circuit
12. Measurement of Power Using a) 3-Ammeter Method

 b) 3-Voltmeter Method