LAKIREDDY BALIREDDY COLLEGE OF ENGINEERING(AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: Krishna Dist.

B.TECH. (ELECTRONICS AND INSTRUMENTATION ENGINEERING)

COURSE STRUCTURE

III SEMESTER

Code No.	Name of the Course	Scheme of Instruction			Scheme of Examination		Total	Credits
		Periods per Week			Maximum Marks			
		Lectures	Tutorial	Lab	Internal	External		
EI301	Environmental Studies	4	--	--	25	75	100	3
EI302	Pulse and Digital Circuits	4	1	--	25	75	100	4
EI303	Electro Magnetic Fields and Waves	4	1	---	25	75	100	4
EI304	Network Analysis	4	1	--	25	75	100	4
EI305	Electronic Circuit Analysis	4	1	--	25	75	100	4
EI306	Fluid Mechanics and Thermal Engineering	4	1	--	25	75	100	4
EI351	Electronic Circuit Analysis Lab	--	--	3	25	75	100	2
EI352	Pulse and Digital Circuits Lab	--	--	3	25	75	100	2
EI353	Seminar	--	--	1	50	--	50	1
	TOTAL	**24**	**5**	**7**	**250**	**600**	**850**	**28**

EI301 – ENVIRONMENTAL STUDIES

Lecture	: 4 Periods/week		**Internal Marks**	: 25
Tutorial	:		**External Marks**	: 75
Credits	: 3		**External Examination**	: 3 Hrs

UNIT - I

Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance – Need for Public Awareness. - **Natural Resources :** Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems - Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT - II

Ecosystems : Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem – Ecological succession. - Food chains, food webs and ecological pyramids. Biodiversity and its conservation: Introduction - Definition: genetic, species And ecosystem diversity. - Bio-geographical classification of India - Value of Biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. - India as a mega diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT - III

Environmental Pollution: Definition, Types, Cause, effects and control measures of: a. Air pollution - b. Water pollution - c. Soil pollution - d. Marine pollution - e. Noise pollution - f. Thermal pollution - g. Nuclear hazards Solid waste Management: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT - IV

Social Issues and the Environment: From Unsustainable to Sustainable development - Urban problems related to energy -Water conservation, rain water harvesting, water shed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies -Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. - Wasteland reclamation. – Consumerism and waste products.

UNIT - V

Human Population and the Environment: Population growth, variation among nations. Population explosion – Family Welfare Programme -Environment and human health. -Human Rights. -Value Education. HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. –Case Studies. Environment Protection Act. -Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. - Public awareness.]

TEXT BOOK

Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.

REFERENCES

1.   Environmental Studies by R. Rajagopalan, Oxford University Press.
2.   Textbook of Environmental Sciences and Technology by M. Anji
        Reddy, BS Publication.

EI302 – PULSE AND DIGITAL CIRCUITS

Lecture	: 4 Periods/week	**Internal Marks**	: 25
Tutorial	: 1	**External Marks**	: 75
Credits	: 4	**External Examination**	: 3 Hrs

UNIT - I

LINEAR WAVESHAPING: High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. RC network as differentiator and integrator, attenuators, its applications in CRO probe, RL and RLC circuits and their response for step input, Ringing circuit.

UNIT - II

NON-LINEAR WAVE SHAPING : Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper, Comparators, applications of voltage comparators, clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem, practical clamping circuits, effect of diode. Characteristics on clamping voltage, Transfer characteristics of clampers.

UNIT - III

SWITCHING CHARACTERISTICS OF DEVICES & TIME BASE GENERATORS: Diode as a switch, piecewise linear diode characteristics, Transistor as a switch, Break down voltage consideration of transistor, saturation parameters of Transistor and their variation with temperature, Design of transistor switch, transistor-switching times. - General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators – basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator, and Current time base generators.

UNIT - IV

MULTIVIBRATORS: Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors

UNIT - V

SAMPLING GATES & REALIZATION OF LOGIC GATES USING DIODES & TRANSISTORS: Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Reduction of pedestal in gate circuits, Applications of sampling gates. AND, OR gates using Diodes, Resistor, Transistor Logic, Diode Transistor Logic.

TEXT BOOK

Pulse Digital and Switching Waveforms-J. Millman and H. Taub, McGraw-Hill, 1991.

REFERENCES

1.   Solid State Pulse circuits - David A. Bell, PHI, 4th Edn.., 2002.
2.   Pulse and Digital Circuits – A. Anand Kumar, PHI.
3.   Wave Generation and Shaping - L. Strauss.
4.   Pulse, Digital Circuits and Computer Fundamentals - R.Venkataraman.

EI303 – ELECTROMAGNETIC FIELDS AND WAVES

Lecture	: 4 Periods/week	**Internal Marks**	: 25
Tutorial	: 1	**External Marks**	: 75
Credits	: 4	**External Examination**	: 3 Hrs

UNIT - I

ELECTRIC FIELD -Introduction - Orthogonal co-ordinate systems – Divergence theorem, Stoke's theorem. Coulomb's law - Electric field intensity, electric fields due to point charge, line charge, surface charge and volume charge distributions – Electric flux density -Gauss's law and its applications - Electric potential – Potential gradient, Poisson and Laplace equations - Dipole and dipole moment. Capacitors - Capacitance of system conductors – Electric potential energy associated with different charge distribution – Energy density.

UNIT - II

MAGNETIC FIELD - Concepts **–** Vector magnetic potential – Force on a current element, Biot-savart's law and applications – Magnetic flux density and magnetic field intensity – Force between current carrying conductors – Torque on closed conductors, Ampere's law and modified Ampere's law, Helmholtz's theorem.

UNIT - III

ELECTROMAGNETIC INDUCTION : Faraday's law of electromagnetic induction– Inductance of solenoids, toroids, transmission lines and cables – Mutual inductance – Inductors in series and parallel circuits – Energy stored in magnetic fields and energy density – Force and torque on closed circuits. Boundary conditions at the surface of dielectric, conductor and magnetic.

UNIT - IV

EM WAVES AND WAVE EQUATIONS - Maxwell's equation in point and integral form– Poynting' s theorem – Energy in electromagnetic field, Electromagnetic wave equation, wave equation for free space and conducting medium.

UNIT - V

ELECTROMAGNETIC WAVES - Uniform plane wave - Characteristics impedance or intrinsic impedance – Wave propagation in a lossless medium, conducting medium, good dielectric, good conductor – phase velocity and group velocity – Depth of penetration – Polarization, linear polarization, circular polarization and elliptical polarization - Reflection and refraction of plane waves – Surface waves.

TEXT BOOK

1. Matthew N.O.Sadiku: "Elements of Engineering Electromagnetics" Oxford University Press, 4th edition, 2007

REFERENCES

1. David K. Cheng, "Field and Wave Electromagnetics", Second Edition, Pearson Education, Asia, 2008.
2. Edward C.Jordan and Keith G.Balaman, "Electromagnetic waves and radiating systems", Second Edition, PHI Learning, 2007
3. William H. Hayt, "Engineeering Electromagnetics", McGraw Hill, Fifth Edition, 2008. Curriculum & Syllabi B.Tech. Electronics & Communication Engineering
4. J. D. Kraus, "Electromagnetics", McGraw Hill, 2007.

EI304 – NETWORK ANALYSIS

Lecture	: 4 Periods/week	**Internal Marks**	: 25
Tutorial	: 1	**External Marks**	: 75
Credits	: 4	**External Examination**	: 3 Hrs

UNIT - I

Introduction to Electrical Circuits: Circuit Concept – R-L-C parameters – Voltage and Current sources – Independent and dependent sources- Source transformation – Voltage – Current relationship for passive elements – Kirchoff's laws – network reduction techniques – series, parallel, series parallel, star-to-delta or delta-to-star transformation.

UNIT - II

A.C Circuits: R.M.S and Average values and form factor for different periodic wave forms, Steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation – Concept of self and mutual inductances – co-efficient of coupling series circuit analysis with mutual inductance.
Resonance – series, parallel circuits, concept of band width and Q factor. Three phase circuits: Phase sequence – Star and delta connection – Relation between line and phase voltages and currents in balanced systems – Calculations of active and reactive power.

UNIT - III

Network topology: Definitions – Graph – Tree, Basic cutset and Basic Tieset matrices for planar networks – Loop and Nodal methods of analysis of Networks with independent and dependent voltage and current sources - Duality & Dual networks. Tellegens, Superposition, Reciprocity, Thevinin's, Norton's, Max Power Transfer theorem. Milliman's Theorem – Statement and proofs problem solving using dependent and independent sources for d.c and a.c excitation.

UNIT - IV

Two-port networks: Z, Y, ABCD, h-parameters – Conversion of one parameter to another parameter – condition for reciprocity and symmetry – 2 port network connections in series, parallel and cascaded – problem solving. - Transient Analysis: Transient response of R-L, R-C, R-L-C circuits (Series combinations only) for d.c. and sinusoidal excitations –Initial conditions - Solution using differential equation approach and Laplace transform methods of solutions.

UNIT - V

Filters: L.P, H.P, B.P, B.E, Prototype filters design – M-derived filters of L.P. and H.P.- Composite filter design of L.P and H.P design of various symmetrical attenuators.

TEXT BOOK

Network Analysis – ME Van Valkenburg, Prentice Hall of India, 3rd Edition, 2000.

REFERENCES

1.   Networks, Lines and Fields - JD Ryder, PHI, 2nd Edition, 1999.
2.   Engineering Circuit Analysis – William Hayt and Jack E Kemmerly,   McGraw Hill, 5th Edition, 1993.
3.   Network Analysis – N.C.Jagan and C.Lakshminarayana, B.S. Publications, 2006.
4.   Electric Circuits – J.Edminister and M.Nahvi – Schaum's Outlines, TMH, 1999.
5.   Electrical circuits by A.Chakarborthy, Dhanpath Rai & Co.,

EI305 – ELECTRONIC CIRCUIT ANALYSIS

Lecture	: 4 Periods/week	Internal Marks	: 25
Tutorial	: 1	External Marks	: 75
Credits	: 4	External Examination	: 3 Hrs

UNIT - I

SINGLE STAGE AMPLIFIERS: Review, Small signal analysis of junction transistor, Frequency response of CE Amplifier, CB Amplifier, CC Amplifier, JFET Amplifier, CD Amplifier, CG Amplifier, Gain bandwidth product.

UNIT - II

MULTI STAGE AMPLIFIERS: Multistage amplifiers, Methods of Inter stage coupling, n-stage cascaded Amplifier, Equivalent circuits, Millers Theorem, Frequency effects, Amplifier Analysis, High i/p Resistance Transistor circuit, Cascade-Transistor Configuration, CE-CC Amplifiers, Two stage RC coupled JFET Amplifier in common source configuration, Difference Amplifiers.

UNIT - III

HIGH FREQUENCY TRANSISTOR CIRCUITS: Transistor at High frequencies, Hybrid-∏ common emitter Transconductance model, Determination of Hybrid-∏ Conductance, Variation of Hybrid parameters with I_C ,V_{CE} and Temperature. The parameters I_t expression for I_b ,Current gain with Resistance load .CE short circuit current gain, Hybrid-∏ parameters, Measurement of I_t ,Variation of Hybrid-∏ parameters with voltage, current and temperature, Design of High frequency Amplifiers.

UNIT - IV

POWER AMPLIFIERS: Class A power Amplifier, Maximum value of efficiency of Class A Amplifier, Transformer coupled Amplifier, ,Transformer coupled Audio Amplifier, Push Pull Amplifier, Complementary symmetry Circuits (Transformer less Class B power Amplifier), phase Inverters, Class D operation, Class B operation, Class S operation , Heat Sinks.

UNIT - V

TUNED AMPLIFIERS: Single tuned capacitive coupled amplifiers, Tapped single tuned capacitance coupled amplifier, Single tuned transformer coupled or inductively coupled amplifiers, CE doubled tuned Amplifier, Stagger tuning, Stability consideration, Tuned Class B and Class C Amplifiers, Wide band Amplifiers, Tuned Amplifiers.

TEXT BOOK

Integra ted Electronics - Millman & Halkias.

REFERENCES

1. Electronic devices and Circuits - T.F.Bogart Jr, J.S.Beasley and G.Rico.
2. Electronic Devices and Circuits Theory-Robert L. Boylestad and Louis Nashelsky – Pearson/PHI, 9th edition.
3. Micro electronic circuits – By Sedre AS, and K.C. Smith =- Oxfor University Press – 5th edition.
4. Electronic Circuit Analysis – By K. Lal Kishore, BS publications, 2004.

EI306 – FLUID MECHANICS AND THERMAL ENGINEERING

Lecture	: 4 Periods/week	**Internal Marks**	: 25
Tutorial	: 1	**External Marks**	: 75
Credits	: 4	**External Examination**	: 3 Hrs

UNIT - I

Fluid Mechanics: Introduction- Properties of Fluids-Pressure, Density, Specific Weight, Specific Gravity, Viscosity-Types of Fluids-Types of Fluid Flows-Continuity, Momentum and Bernoullis Equation - Flow Through Pipes-Friction Losses in Pipes-Darcys Weisbach Equation-Reynolds Number and its significance (10)

UNIT - II

Pressure Measurement: Total and Static Pressure measurements using Pitot Tube, Pitot-Static Tube, Manometers, Mechanical Gauges
Velocity Measurement: Anemometers-Cup and Vane Types, Hot-wire Anemometer
Flow Measurements: Introduction, Orifice meter, Venturi meter, Rotameter and Elbow meter (10).

UNIT - III

Basic Thermodynamics: Fundamental Concepts -Thermodynamic System- -Zeroth Law – Work done in Constant Pressure, Constant Volume, Constant Temperature and Reversible Adiabatic, Polytropic Process.
First Law of Thermodynamics: Statement-Internal Energy-Enthalpy-Specific Heats – Steady Flow Energy Equation.
Second Law of Thermodynamics: Kelvin-Plank and Clasius Statements, Reversible Process-Carnot Cycle- Entropy. (10)

UNIT - IV

Gas Power Cycles: Introduction, Analysis of Power Cycles- Carnot, Otto, Diesel, Dual, and Brayton
Internal Combustion Engines: Classification-Working of Spark Ignition and Compression Ignition Engines-2 Stroke & 4 Stroke Engines (10)

UNIT - V

Vapor Power Cycles- Analysis of Carnot Vapor Cycle, Simple Rankine Cycle, Refrigeration Cycles–
Introduction, Refrigerator, Heat Pump, COP, Reveresd Carnot Cycle, Bell-Coleman Cycle, Vapor Compression Cycle(10)

TEXT BOOKS

1. Hydraulics, Fluid mechanics and Hydraulic machinery MODI and SETH.
2. Fundamentals of Engineering Thermodynamics- Second Edition, E. Rathakrishnan - PHI

REFERENCES:

1. Fluid Mechanics, White F.M. TMH
2. Fluid Mechanics-E. Rathakrishnan- PHI, 2007
3. Engineering Thermodynamics—Cengel & Boles, TMH
4. Engineering Thermodynamics -- P.K.Nag, TMH

EI351 – ELECTRONIC CIRCUIT ANALYSIS LAB.

Lab.	: 3 Periods/week	**Internal Marks**	: 25
		External Marks	: 75
Credits	: 2	**External Examination**	: 3 Hrs

I)   **LIST OF EXPERIMENTS**

1.   Common Emitter and Common Source amplifier

2.   Two Stage RC Coupled Amplifier

3.   Current shunt Feedback Amplifier

4.   Cascade Amplifier

5.   Class A Power Amplifier (Transformer less)

6.   Class B Complementary Symmetry Amplifier

7.   High Frequency Common base (BJT) / Common gate (JFET) Amplifier.

II)   **Testing in the Hardware Laboratory (Six Experiments : 3 + 3) :**

(A) Any Three circuits simulated in Simulation laboratory

(B)   Any Three of the following

a.   Class A Power Amplifier (with transformer load)

b.   Class B Power Amplifier

c.   Single Tuned Voltage Amplifier

d.   Series Voltage Regulator

e.   Shunt Voltage Regulator

EI352 – PULSE AND DIGITAL CIRCUITS LAB.

Lecture	**: 3 Periods/week**	**Internal Marks**	**: 25**
		External Marks	**: 75**
Credits	**: 2**	**External Examination**	**: 3 Hrs**

LIST OF EXPERIMENTS :

1. Linear Wave shaping.

2. Non Linear Wave shaping – Clipper.

3. Non Linear Wave shaping – Clamper.

4. Transistor as a switch.

5. Study of logic gates & some applications.

6. Study of Flip-Flop & some applications.

7. Astable Multivibrator.

8. Mono stable Multivibrator.

9. Bistable Multivibrator.

10. Schmitt Trigger.

11. UJT as a Relaxation oscillator.

12. Bootstrap sweep circuit.