ESTD: 1980

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (AUTONOMOUS)
(Affiliated to Andhra University, Visakhapatnam), (Recognised by AICTE, New Delhi)
Accredited by NAAC with 'A' Grade
Recognised as Scientific and Industrial Research Organisation
CHINNA AMIRAM (P.O):: BHIMAVARAM :: W.G.Dt., A.P., INDIA :: PIN: 534 204

SCHEME OF INSTRUCTION & EXAMINATION
(Regulation R16)

II/IV B.TECH
(With effect from **2016-2017** Admitted Batch onwards)
Under Choice Based Credit System

ELECTRICAL AND ELECTRONICS ENGINEERING

I-SEMESTER

Code No.	Course	Credits	Lecture Hrs	Tutorial Hrs	Lab Hrs	Total Contact Hrs/Week	Sessional Marks	Exam Marks	Total Marks
B16 ENG 2101	Mathematics-IV	4	3	1	--	4	30	70	100
B16 EE 2101	Network Analysis & Synthesis	4	3	1	--	4	30	70	100
B16 EE 2102	Electro Magnetic Field Theory	4	3	1	--	4	30	70	100
B16 EE 2103	Electrical Measurements & Instruments	4	3	1	--	4	30	70	100
B16 EC 2104	Electronics Devices &Circuits	4	3	1	--	4	30	70	100
B16 ME 2106	Engineering Mechanics &Strength Of Materials	4	3	1	--	4	30	70	100
B16 EE 2106	Networks & Measurements Lab	2	--	--	3	3	50	50	100
B16 EC 2105	Electronics Devices &Circuits Lab	2	--	--	3	3	50	50	100
B16 ENG 2104	English Proficiency	2	1	1	--	2	50	50	100
B16 ENG 2106	Industry Oriented Training.	1	--	--	2	2	50	--	50
TOTAL		**31**	**19**	**7**	**8**	**34**	**380**	**570**	**950**

II/IV B.Tech-I Sem
EEE

Code: B16 ENG 2101

MATHEMATICS – IV
(Common to CIV,ECE,EEE & ME)

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives:

Students learn

1. The concepts of Gradient, Divergence, Curl, Directional derivative, solenoidal and Irrotational fields
2. Green's, Stokes' and Divergence theorems
3. Classification of 2nd order Partial Differential Equations as well as solution of 1-Dimensional Wave equation and 1-Dimensional Heat equation
4. the concept of Analytic function, CR equations
5. Cauchy's Integral Theorem and Integral Formula
6. Taylor and Laurent series, Residues and Residue theorem

Course Outcomes:

Students will be able to

1. Apply the concepts of Gradient, Divergence, Curl, Directional derivative, solenoidal and Irrotational fields
2. Determine scalar potential, circulation and work done
3. Evaluate integrals using Green's, Stokes' and Divergence theorems
4. Obtain the solution of 1-D wave equation and 1-D heat equation
5. Determine the zeroes and poles of functions and residues at poles
6. Evaluate certain real definite integrals that arise in applications by the use of Residue theorem

SYLLABUS

Vector Calculus-1

Definitions of Scalar and Vector point functions, Differentiation of vectors, Vector differential operator del, Del applied to scalar point function – gradient, Del applied to vector point function- divergence and curl, physical interpretation of gradient, divergence and curl(without proof), Del applied twice to a point function, Del applied to product of two functions, Irrotational and Solenoidal Fields, scalar potential

Vector Calculus-2

Integration of vectors, line integral, circulation, work done, surface integral, Flux, Green's, Stokes' and Gauss Divergence Theorems (Without proofs). Introduction to orthogonal curvilinear coordinates, cylindrical polar coordinates and spherical polar coordinates.

Applications Of Partial Differential Equations

Classification of second order partial differential equations, Method of separation of variables, One –dimensional wave equation- vibrations of a stretched string (no derivation)-, one-dimensional heat equation – Heat flow along a long horizontal bar (no derivation) (problems on heat equation involving homogeneous end conditions only), two dimensional Laplace equation in Cartesian coordinates.

Complex Variables-1

Review- Cartesian form and polar form of a complex variable, Real and imaginary parts of z^n , e^z, sin z, sinh z and log z **.**

Limit and continuity of a function of the complex variable, derivative, analytic function, properties of Analytic functions, Cauchy- Riemann equations, Harmonic functions and Orthogonal system, application of analytic function to flow problems, geometric representation of w=f(z), conformal mapping – Bilinear transformation only.

Complex Variables-2

Integration of complex functions, Cauchy's theorem, Cauchy's integral formula (statements only) . Taylor and Laurent series expansions of functions (statement of theorems only), zeros and singularities, Residue, calculation of residues, Cauchy's Residue theorem (without proof), Evaluation of real and definite integrals- integration around a unit circle

Text Book:

1. "Higher Engineering Mathematics", by Dr.B.S.Grewal, 43rd Edition, Khanna Publishers.

Reference Books:

1. Advanced Engineering Mathematics, by Erwin Kreyszig, Wiley.
2. A text book of Engineering Mathematics, by N.P.Bali and Dr. Manish Goyal, Lakshmi Publications.
3. Advanced Engineering Mathematics, by H.K.Dass, S.Chand Company.
4. Higher Engineering Mathematics, by B.V.Ramana, Tata Mc Graw Hill Company.
5. Higher Engineering Mathematics, by Dr. M.K.Venkatraman, The National Publishing Company.

Code: B16 EE 2101

NETWORK ANALYSIS & SYNTHESIS

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives:

1. To learn source free and forced responses of RL, RC and RLC circuits and evaluation of initial conditions
2. To learn the concept of two-port network analysis and find models using different parameter sets.
3. To learn the concepts of Laplace transform and its application to circuit analysis.
4. Fundamental understanding of the mathematics used to analyze, evaluate, and design transmission network problems.
5. Understand methods for designing transmission networks using synthesis by pole zero methods, foster and cauer form methods.

Course Outcomes:

CO1:Students will outline the significance of energy storing elements (Inductance & Capacitance) in circuits and study transient behavior of responses.
CO2:Students will learn to apply Laplace transform technique for circuit analysis and know its advantages.
CO3:Students will learn to apply two-port network analysis for devices like amplifiers, transmission lines and understand how magnetic coupling can be included in circuit models.
CO4: Students will learn the concept of network functions, poles and zeros and to determine the response of network from poles and zeros.
CO5: Students will learn to apply the synthesis procedure for RC, LC &RL networks (Foster, Cauer methods).

SYLLABUS

DC Transients:
Inductor, capacitor, source free RL, RC & RLC response, evaluation of initial conditions, application of unit-step function to RL, RC & RLC circuits, concepts of natural, forced and complete response.

Laplace Transform Techniques:
Transforms of typical signals, response of simple circuits to unit step, ramp and impulse functions, initial and final value theorems, convolution integral, time shift and periodic functions, transfer function.

Coupled Circuits & Two-port Network parameters:
Magnetically coupled circuits, dot convention, reciprocity theorems, concept of duality,
Two-port Network parameters - Z, Y, H & T parameters.

Network Functions:
Generalized network functions(driving point and transfer), Network functions for ladder & T-networks, concept of poles and zeros, determination of free and forced response from poles and zeros.

Network Synthesis:
Synthesis problem formation, Hurwitz polynomials, properties and test for positive real functions, elementary synthesis operations, Foster and Cauer Forms of LC, RC and RL networks.

Text Books

1. Engineering circuit analysis by W.H. Hayt Jr & J.E. Kemmerly, McGraw Hill Education; Eighth edition (4 August 2013).

Reference Books:

1. Network analysis by M.E. Van Valkenberg, 3rd Edition,2006, Prentice Hall India Learning Private Limited.
2. Modern network synthesis by M.E. Van Valkenberg, John Wiley & Sons ,1966.

Code: B16 EE 2102

ELECTRO MAGNETIC FIELD THEORY

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives:

1. All the electric equipment is developed by using the magnetic material, conductors and insulators. It is very much essential to know the behavior of these materials in the presence of electric and magnetic fields.
2. The main objective of this course is to provide the basic concepts about the effects of electric and magnetic fields on conductors, magnetic materials, and insulators under various operating conditions.

Course Outcomes:

Students are able to

CO1. Find the electrostatic and magneto static fields for different configurations.

CO2. Apply various principles and laws to estimate the effect of electric and magnetic fields.

CO3 Distinguish between the effects of electrostatic and magneto static fields.

CO4. Apply Maxwell's equations for static and time varying fields.

CO5. Analyze the EM wave in different domains and compute average power density

SYLLABUS

Coordinate systems:

Rectangular, cylindrical and spherical coordinate systems.

Electrostatics:

Coulomb's law and superposition principle, different types of charge configurations, electric flux, electric field intensity and electric flux density, electric field intensity and electric flux density due to different charge configurations, Gauss's law in integral form and point form in terms of D, applications of Gauss' law, Divergence theorem.

Electric potential, calculation of electric potential for giving charge configuration, electrostatic energy, Electrostatic boundary conditions, basic properties of conductors in electrostatic fields, capacitance, Poisons and Laplace's equations, solutions of Laplace's equations, uniqueness theorems, methods of images, electric dipoles, polarization of dielectrics, bound charges.

Magneto statics:

Biot-savart's law, determination of magnetic field intensity and magnetic flux density due to various steady current configurations, continuity equation, curl of $\overline{H}$, Ampere's circuital law in integral and differential form, applications of Ampere's law, Stokes theorem.

The scalar and vector magnetic potential and calculation of magnetic field through the vector magnetic potential for given steady current configurations, magnetostatic boundary conditions.

The magnetic dipole, magnetization, properties of magnetic materials, torques and forces on magnetic dipoles, bound current, Faraday's laws, Lenz's law, inductance and energy in magnetic fields.

Time varying fields and Maxwell's equations:
Lorentz force equation, Maxwell's equations, modification of ampere's circuital law for time varying fields – displacement current and current density, the uniform plane wave, plane wave propagation, phase velocity and wavelength, intrinsic impedance, perfect dielectrics, attenuation, phase and propagation constants, skin depth, the poynting vector, poynting theorem and power considerations.

Textbooks:

1. Introduction to electro dynamics by D.J. Grifiths, PHI Learning; 3rd Edition (2012).
2. Engineering electromagnetics by William H. Hayt , John A. Buck McGraw-Hill Publishing Co. (2001).

Reference books:

1. Principles of Electromagnetics by Mathew N.O. Sadiku, Oxford; Fourth edition. (2009).

Code: B16 EE 2103

ELECTRICAL MEASUREMENTS & INSTRUMENTS

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course objectives

1. The students learn about measuring instruments to measure electrical quantities like current, voltage etc.
2. This course familiarizes with Wattmeter's, Energy meters, power factor meters, frequency meters etc.
3. The students learn to measure resistance, inductance, capacitance, etc. using bridges
4. The course familiarizes ballistic galvanometer, flux meter, testing of ring and bar specimens for magnetic measurements.
5. Students learn about AC & DC potentiometers, phase & amplitude measurements, use of a CRO, instrument transformers.

Course Outcomes

Upon successful completion of this course, the students will be able to:

CO1: illustrate the characteristics of measuring instruments (K3)
CO2: Discriminate measuring instruments based on their principle & operation(K4)
CO3: Calculate power and energy in 1Ø, 3Ø & polyphase circuits (K3)
CO4: Measure electrical parameters using a bridge (K3)
CO5: Find magnetic measurements using Ballistic Galvanometers and Flux meters. (K4)
CO6: Apply potentiometers & instrument transformers to measure electrical elements, calibration of the meters. (K3)

SYLLABUS

Philosophy of measurement
Methods of measurement, measurement system, classification of instrument system, characteristics of instruments & measurement system, errors in measurement & its analysis, standards.

Analog measurement of electrical quantities
Moving coil, moving iron, Electrodynamometer type, electrostatic and induction type instruments, electrodynamic wattmeter, three phase wattmeter, power in three phase system, errors & remedies in wattmeter and energy meter. Extension of instrument range, introduction to measurement of frequency and power factor.

Measurement of parameters
Different methods of measuring low, medium and high resistances, measurement of inductance & capacitance with the help of AC bridges. DC potentiometers and its applications. AC potentiometer - types & applications.

Magnetic measurement
Ballistic galvanometer, flux meter, determination of B-H curve and hysteresis loop, measurement of iron losses, current transformers and potential transformers.

Cathode Ray Oscilloscope:
Basic CRO circuit (block diagram), cathode ray tube (CRT) & its components , application of CRO in measurement of B-H curve.

Digital measurement of electrical quantities
Digital Instruments, Concept of digital measurement,Analog to digital & Digital to analog conversion, advantages of digital Instruments, digital display units, Resolution in digital meters,sensitivity & Accuracy of digital meters.

Text Books:

1. E.W. Golding & F.C. Widdis, "Electrical Measurement &Measuring Instrument", Reem Publications Pvt. Ltd.; Third edition (2011).
2. A.K. Sawhney, "Electrical & Electronic Measurement & Instrument", Dhanpat Rai & Co. (P) Limited; 2014 edition (2015)
3. W.D. Cooper," Electronic Instrument & Measurement Technique " Prentice Hall International.

Reference Books:

1. Forest K. Harries,"Electrical Measurement",Willey Eastern Pvt. Ltd. India .
2. M.B. Stout,"Basic Electrical Measurement" Prentice Hall of India.
3. Rajendra Prashad ,"Electrical Measurement &Measuring Instrument" Khanna Publisher.
4. J.B. Gupta, "Electrical Measurements and Measuring Instruments", S.K. Kataria & Sons, 2012 Edition.

Code: B16 EC 2104

ELECTRONICS DEVICES &CIRCUITS

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course objectives:

1. To give the exposure to the students on semiconductor physics of the intrinsic and extrinsic semiconductors.
2. To give the exposure to the students on the basics of semiconductor diodes, special purpose diodes like Zener diode, Photo diode, LED, Schottky barrier diode, PIN diode, varactor diode and tunnel diode etc.
3. To give the exposure to the students on rectifier circuits using diodes.
4. To give the exposure to the students on basics of BJT, JFET and MOSFET and biasing of BJT and FET's.
5. To give the exposure to the students on the analysis of transistor at low and high frequencies.

Course outcomes:

After completion of the course the students will be able to

CO1: Understand the physical structure, principles of operation, electrical characteristics and circuit models of diodes, BJT's and FET's.

CO2: Use this knowledge to analyze and design basic electronic application circuits.

CO3: Extend the understanding of how electronic circuits and their functions fit into larger electronic systems.

SYLLABUS

Transport Phenomena in Semiconductors

Mobility and conductivity, intrinsic and extrinsic semiconductors, mass action law, charge densities in a semiconductors, Hall Effect, generation and recombination of charges, drift and diffusion currents, the continuity equation, injected minority carrier charge, potential variation in graded semiconductors.

PN junction diode

Open circuited PN junction , PN junction as a rectifier, current components in a PN diode, V-I characteristics and its temperature dependence, transition capacitance, charge control description of a diode, diffusion capacitance, junction diode switching times, Zener diode, Tunnel Diode, Photo diode, Point Contact diode, Schottky barrier diode, varactor diode, PIN diode, LED.

Diode Rectifiers

Half wave, full wave and bridge rectifiers with and without filters, ripple factor and regulation characteristics.

Bipolar junction transistors

Introduction to BJT, operation of a transistor and transistor biasing for different operating conditions, transistor current components, transistor amplification factors: α,β,γ relation between α and β,γ early effect or basewidth modulation, common base configuration and its input and output characteristics, common emitter configuration and its input and output characteristics, common collector configuration and its input and output characteristics, comparison of CE, CB and CC configurations, break- down in transistors, photo transistor.

Field Effect transistors
JFET and its characteristics, pinch off voltage, FET small signal model, MOSFET and its characteristics.

Transistor Biasing Circuits
The operating point, bias stability, different types of biasing techniques, stabilization against variation in I_{co} , $V_{BE,}$ & β. bias compensation, thermal runaway, thermal stability, biasing of FETs.

Transistors at low and High frequencies
Transistor hybrid model, H-parameters, Analysis of transistor amplifier circuits using h-parameters, comparison of transistor amplifier configurations, analysis of single stage amplifier, effects of bypass and coupling capacitors, frequency response of CE amplifier, Emitter follower, high frequency model of transistor.

Text Books:

1. Integrated electronics analog and digital circuits and systems: Jacob Millman, C Halkias, Chetan D Parikh.
2. Electronic Devices and Circuits Theory, BoyIsted, Prentice Hall Publications.

Reference Books:

1. Electronic Devices and Circuits by G.S.N.Raju., Published by I.K. International 2006, pbk, 2006.
2. Electronic Devices and Circuits by Salivahanan., 2nd Edition, Tata McGraw-Hill pub.

Code: B16 ME 2106

ENGINEERING MECHANICS & STRENGTH OF MATERIALS

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives:

1. To make the students to understand the principles of the effect of forces under the static and dynamic conditions and apply them to some practical applications.
2. To make the students to understand the principles of the effect of forces on deformable rigid bodies under various loading conditions, and thus measure various types' stresses such as direct stresses, bending stresses, torsional stresses

Course Outcomes:

Students will be able to:
CO1: Evaluate the forces in concurrent and coplanar force systems, using various principles and also under different conditions of equilibrium. Analyze the forces in various applications and apply the concepts of friction to some basic applications of Electrical engineering.
CO2: Understand and apply principles of parallel force systems to find centroid and moment of inertia of different objects.
CO3: Apply the concepts of kinematics and kinetics to analyze force on particles under rectilinear.
CO4: Distinguish between various mechanical properties like yield strength, ultimate strength etc., of a given material and also to determine various types of direct stresses. Analyze the effect of shear force & bending moment on various beams.
CO5: Determine the bending stresses in different beams of various cross sections and to find torsional stresses in shafts

SYLLABUS

Part –A: Engineering Mechanics

Statics:
Fundamentals of Mechanics: Basic Concepts, Force Systems and Equilibrium, Moment and Couple, Principle of Superposition & Transmissibility, Varignon's theorem, Resultant of force system – Concurrent and non concurrent coplanar forces, Condition of static equilibrium for coplanar force system, concept of free body diagram, applications in solving the problems on static equilibrium of bodies.

Friction Concept of dry friction, limiting friction, angle of friction, Friction problems related to connecting bodies and ladder.

Properties of bodies:
Center of Gravity: Center of Gravity of Plane figures, Composite Sections and shaded areas.
Area Moment of Inertia: Parallel and Perpendicular axis theorem, Moment of Inertia of symmetrical and unsymmetrical sections

Dynamics:
Kinematics – Introduction to kinematics, Equations of motion for uniform and variable motion; Projectiles.
Kinetics – D'Alemberts principle, Work energy method, Impulse momentum methods.

Part – B: Strength of Materials

Simple Stresses and Strains: Stresses and Strains, stress-strain curve, Bars of uniform, varying and tapered cross –sections, Poisons ratio, volumetric strain and relation between moduli of elasticity
Shear Force and Bending Moment: Cantilever, Simply Supported and Overhanging beams subjected to point loads and uniformly distributed loads.

Bending stresses in beams: Theory of pure bending, Flexure formula, Section modulus for cantilever and simply supported beams having symmetrical and unsymmetrical sections
Torsion of Shafts: Torsion equation for circular shaft, polar modulus and related problems.

Text Books:

1. Engineering mechanics by Bhavikatti. New age international.
2. Engineering mechanics by A.K. Tayal.
3. S. Ramamrutham & R, Narayanan, Strength of Materials, Dhanpat Rai publications.
4. R.K. Bansal "A Text Book of Strength of Materials, Lakshmi Publications Pvt. Ltd,NewDelhi

Reference Books:

1. Engineering Mechanics by S.Timoshenko and D.H. Young McGraw-Hill.
2. Mechanics of Materials by E P Popov
3. Dr Sadhu Singh, Strength of Materilas.

Code: B16 EE 2106

NETWORKS & MEASUREMENTS LAB

		Sessionals	**: 50**
Lab	**: 3 Period**	**Ext. Marks**	**: 50**
Exam	**: 3 Hrs.**	**Credits**	**: 2**

Course Objectives:

1. To learn to make simple electric circuits by using different sources, loads and components and verify basic laws.
2. To experimentally verify various theorems of circuit analysis.
3. To learn to find circuit models for two-terminal devices and two-port networks.
4. To explore the sinusoidal steady state behavior and resonance phenomenon in electric circuits.
5. To measure different electrical parameters by using different meters.

Course Outcomes:

CO1: Students will gain the skill to make and experiment with practical electric circuits.
CO2: Students will be able to measure voltage, current, power in practical electric circuits.
CO3: Students will know the significance of various theorems and their applications.
CO4: Students will be able to assess the behavior of electric circuits.
CO5: Students will be able to calibrate single phase energy meter, voltmeter & wattmeter
CO6: Students will be able to measure resistance, inductance & capacitance.

LIST OF EXPERIMENTS

1. Verification of Ohms Law and resistance of a filament Lamp
2. Verification of superposition theorem
3. Verification of Thevinen's theorem
4. Verification of Norton's theorem
5. Verification of maximum power transfer theorem
6. Series resonance
7. Calculation two port network parameters
8. Calibration of wattmeter
9. Calibration of energy meter
10. Three voltmeter method
11. Measurement of 3 phase power using two wattmeter method
12. Parameters of choke coil.
13. Measurement of three phase power by using 2 C.T's and Single Wattmeter
14. Crompton's DC potentiometer
15. Kelvin's double bridge
16. Schering bridge

Reference Books:

1. A.K. Sawhney, "Electrical & Electronic Measurement & Instrument", Dhanpat Rai & Co. (P) Limited; 2014 edition (2015).
2. Engineering circuit analysis by W.H. Hayt Jr & J.E. Kemmerly, McGraw Hill Education; Eighth edition (4 August 2013).

Code: B16 EC 2105

ELECTRONIC DEVICES & CIRCUITS LAB
(Common to ECE & EEE)

Lab	**: 3 Periods**	**Sessionals**	**: 50**
Exam	**: 3 Hrs.**	**Ext. Marks**	**: 50**
		Credits	**: 2**

Course Objectives:

1. To familiarize the student with test and measuring equipment like CROs, Multimeters, Ammeters, Voltmeters etc. and also to prepare the student to use signal generators, bread boards and to make the student identify the terminals of basic electronic devices like diodes, transistors and JFETs.
2. To familiarize the student with features of Multisim and to prepare the student to construct and simulate various electronic circuits using Multisim.
3. To make the student study experimentally the characteristics of basic electronic devices like ordinary pn diodes, LEDs, Zener diodes, BJTS, JFETs and rectifiers with and without filters.
4. To make the student to conduct experiments to analyze various parameters of BJT amplifiers and FET amplifiers.

Course Outcomes:

After the successful completion of the lab course, the students will be able

1. To understand the role of basic electronic devices like ordinary Pn diodes, Zener diodes, LEDs, BJTS and JFETs in achieving various functionalities like rectification, voltage regulation, amplification, switching action etc. in various electronic circuits.
2. To construct and simulate different electronic circuits using Multisim.
3. To have the hardware skills and software skills required in the design of electronic systems for various applications.

List Of Experiments

1. V-I characteristics of semiconductor diode, LED and Zener diode.
2. Half wave and full wave rectifier with and without filters.
3. Input and output characteristics of transistor in CE configuration.
4. Transistor biasing circuits and transistor as a switch.
5. CE amplifier.
6. JFET common source amplifier.

List Of Simulation Experiments

7. V-I characteristics of semiconductor diode, LED and Zener diode.
8. Regulation characteristics of Zener diode.
9. Input and output characteristics of transistor in CB configuration
10. JFET Characteristics.
11. CC amplifier
12. JFET common source amplifier

Reference: Lab Manual

Code: B16 ENG 2104

ENGLISH PROFICIENCY
(Common to All Branches)

Theory	**: 1 Period**	**Sessionals**	**: 50**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 50**
Exam	**: 3 Hrs.**	**Credits**	**: 2**

AIM:

Enriching the communicative competency of the students by adopting the activity-based as well as the class-oriented instruction with a view to facilitate and enable them to enhance their language proficiency skills.

Course Objectives:

Students be able to

1. Understand the importance of professional communication.
2. Learn language skills and vocabulary in order to improve their language competency.
3. Know and perform well in real life contexts.
4. Identify and examine their self-attributes which require improvementand motivation.
5. Build their confidence and overcome their inhibitions.
6. Improve their strategies in reading skills.

Course Outcomes:

1. Students enhance their vocabulary and use it in the relevant contexts .
2. They improve speaking skills.
3. They learn and practice the skills of composition writing.
4. They enhance their reading and understanding of different texts.
5. They enrich their communication both in formal and informalcontexts.
6. They strengthen their confidence in presentation skills.

SYLLABUS

Speaking Skills
PPT
Describing event/place/thing
Picture Description
Extempore
Debate
Telephonic Skills
Analyzing Proverbs

Vocabulary
Affixes
Pairs of Words

Reading Skills
Reading Comprehension
Reading/Summarizing News Paper Artic

Writing Skills
Designing Posters
Essay writing
Resume Writing

Reference Books:

1. Interchange (4th edition) Student's books 1&2 by Jack C. Richards, CUP.
2. Fundamentals of Technical Communication by Meenakshiraman, Sangeta Sharma of OUP
3. English and Communication Skills for Students of Science and Engineering, by S.P.
4. Dhanavel, Orient Blackswan Ltd. 2009
5. Enriching Speaking and Writing Skills, Orient Blackswan Publishers
6. The Oxford Guide to Writing and Speaking by John Seely OUP

(***Note: Sessional Marks will be evaluated based on Continuous Comprehensive Evaluation of the students' Performance - 40M, Attendance – 10M and External Marks will be evaluated basing on Presentation Skills – 30M, Project 20M)

Code: B16 ENG 2106

INDUSTRY ORIENTED TRAINING
(Common to ECE & EEE)

Lab : 2 Periods	**Sessionals : 50**
Exam : 3 Hrs.	**Credits : 1**

Course Objectives:

1. Be familiar with basic Data structures.
2. Master the implementation of linear data structures.
3. Master the implementation of non linear data structures.
4. Be familiar with Object Oriented Concepts.

Course Outcomes:

1. Application using implementation of Data structures.
2. Application using implementation of Linear and non linear Data structures in view of industry.
3. Applications using Object Oriented Concepts in view of industry.

Syllabus: Industry Oriented Applications on following topics.

BASIC CONCEPTS

System Life Cycle, Algorithm Specification, Recursive Algorithms, Data Abstraction, Performance Analysis, Space Complexity, Time Complexity, Asymptotic Notation, Comparing Time Complexities

IMPLEMENTATION (Using C)

Arrays
Stacks
Queues
Linked List
Double linked lists
Trees
Graphs

Applications of linear and nonlinear data structures and solving simple to complex problems in perspective of industry requirements.

Basic Concepts of OOP

Procedural Paradigms, Object Oriented Paradigm, OOP Principles and Terminology, OOP benefits, Procedure and Object Oriented programming languages, advantages and disadvantages, creating class, defining objects in C++ and JAVA.

Applications using OOP in solving simple to complex problems in perspective of industry requirements.

(Note: Total Marks will be evaluated based on Continuous Evaluation - 25 Marks, Coding Contest – 25 Marks)

SCHEME OF INSTRUCTION & EXAMINATION
(Regulation R16)

II/IV B.TECH
(With effect from **2016-2017** Admitted Batch onwards)
Under Choice Based Credit System

ELECTRICAL AND ELECTRONICS ENGINEERING

II-SEMESTER

Code No.	Course	Credits	Lecture Hrs	Tutorial Hrs	Lab Hrs	Total Contact Hrs/Week	Sessional Marks	Exam Marks	Total Marks
B16 EE 2201	Electrical Machines-1	4	3	1	--	4	30	70	100
B16 EE 2202	Signals & Systems	4	3	1	--	4	30	70	100
B16 EC 2206	Analog Electronics Circuits	4	3	1	--	4	30	70	100
B16 ME 2204	Primemovers & Pumps	4	3	1	--	4	30	70	100
B16 EE 2203	Electrical Power Generation,Transmission & Distribution	4	3	1	--	4	30	70	100
B16 ENG 2201	Enivronmental Studies	2	3	1	--	4	30	70	100
B16 ME 2207	Thermal Prime Movers Lab	2	--	--	3	3	50	50	100
B16 EC 2208	Analog Electronic Circuits Lab with Simulation	2	--	--	3	3	50	50	100
B16 EE 2205	Industry Oriented Technology Lab	1	--	--	2	2	50	--	50
B16 ENG 2204	Industry Oriented Training	1	--	--	2	2	50	--	50
Total		**28**	**18**	**6**	**10**	**34**	**380**	**520**	**900**

II/IV B.Tech-II Sem
EEE

Code: B16 EE 2201

ELECTRICAL MACHINES-1

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives:

The course will enable the students to understand

1. Electro-mechanical energy conversions in D.C. machines and energy transfer in transformers
2. Principle of operation of DC machines and transformers
3. Speed control methods of DC motors and parallel operation, testing of DC machines and transformers.
4. Different types of three phase transformer connections.

Course Outcomes:

Students are able to

1. Identify the concepts of electro mechanical energy conversion. K2
2. Describe the concepts of construction, operating principle, different types of DC machines and transformers, effects on DC machine and parallel operation of DC generators. K2
3. Interpret the characteristics of DC machines. K3
4. Discriminate different types of speed control methods of DC motors. K4
5. Examine the performance of DC machines and transformers by different testing methods. K4
6. Discriminate different types of transformer connections K4

SYLLABUS

Electromechanical energy conversion- Basic principles of energy, force and torque in singly and multiply excited systems.

Transformers- Principle, construction and operation of single phase transformers, phasor diagram, equivalent circuit, voltage regulation, losses and efficiency. Testing- open & short circuit tests, sumpner's test.

Autotransformers- construction, principle, applications and comparison with two winding transformer.

Three phase transformer: Construction, various types of connection and their comparative features. Parallel operation of single phase and three phase transformers. Three phase transformer connections. Scott connection, tap changing transformers- no load and on load tap changing of transformers. Cooling methods of transformers.

D.C. Machines- Working principle, construction and methods of excitation. D.C generators emf equation, armature reaction,commutation. Compensating winding, characteristics of various types of generators, applications. D.C. motors- torque equation, D.C. shunt, series and compound motors – characteristics & applications.

Starting & Speed control- Starting methods and speed control of D.C. shunt and series motors testing of D.C motors - direct and regenerative methods to test D.C. machines. Swinburne's test, field's test and separation of losses.

Text books

1. Kothari.D.P and Nagrath.I.J., "Electrical machines", McGraw Hill Education; 4 edition (2010).
2. Bimbhra.P.S, Electrical Machinery, Khanna Publishers, 2011.
3. Irving L. Kosow, "Electrical Machines & Transformers", Prentice Hall; 2nd Revised edition 1990.

Reference Books

1. Clayton. A.E,,,Performance and Design of direct current machines" CBS; 1ST edition (2004).
2. Mg Say, theory, "Performance & Design of A.C Machines", CBS publishers.
3. Fitgerald, A.E., Charles Kingsely jr. Stephen D.Umans, "electric machinery" McGraw-Hill; 6th edition (2005).
4. Hill Stephen, Chapman.j, "Electric Machinery Fundamentals", McGraw-Hill Higher Education; 4 edition (2004).

Code: B16 EE 2202

SIGNALS & SYSTEMS

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives

1. Coverage of continuous and discrete-time signals and systems, their properties and representations and methods those are necessary for the analysis of continuous and discrete-time signals and systems.
2. Knowledge of time-domain representation and analysis concepts as they relate to difference equations, impulse response and convolution, etc.
3. Knowledge of frequency-domain representation and analysis concepts using Fourier Analysis tools, Z-transform
4. Concepts of the sampling process.

Course Outcomes

Upon the completion of the course, students will be able to:

CO1: Characterize and analyze the properties of continuous and discrete time signals and systems. [K2]
CO2: Apply the convolution for continuous time signals and discrete time signals. [K3]
CO3: Evaluate the Fourier Series of periodic signals. [K1]
CO4: Determine the Fourier Transform and Z-Transform of different type's of signals and make use of their Properties. [K1]
CO5: Convert a continuous time signal to the discrete time domain and reconstruct using the sampling theorem. [K2]

SYLLABUS

Classification of Signals & Systems:
Basic continuous time signals, basic discrete time signals transformations of independent variables, classification of systems, properties of linear time – invariant systems.

Linear Time – Invariant (LTI) Systems:
Representation of signals in terms of impulses for discrete time and continuous time signals, convolution sum and convolution integral. systems described by differential and difference equations. Block diagram representation of LTI systems described by differential and difference equations, singularity functions.
Analogy between vectors and signals, orthogonal vector and signal spaces. Approximation of a function by a set of mutually orthogonal functions.

Fourier analysis:
The response of continuous time LTI systems to complex exponentials – the continuous time and discrete time exponential fourier series, convergence of fourier series.

Fourier Transform:
Fourier transform of continuous time and discrete time aperiodic signals and periodic signals. properties of continuous time and discrete time fourier transforms. Frequency response characterized by linear constant coefficient differential and difference equations. first order and second order systems.

Z –transform:
Z–transform of discrete time sequence, region of convergence. relation between Z and fourier transform, properties of z-transforms. inverse z-transform, determination of transfer function and impulse response of an LTI system, poles and zeros and system stability.

Sampling Theorem :
The effect of under-sampling, methods of reconstruction of a signal from samples, discrete time processing of continuous time signals. sampling in frequency domain, sampling of discrete time signals.

Text Books:

1. Signals and Systems, Alan V. Oppenheim, Alan S. Willsky and Ian T. Young, Prentice-Hall; New edition (1984).

Reference Books:

1. Communication Systems, B. P. Lathi., BS PUBLICATION (2001).
2. Signals and Systems, B. P. Lathi., Oxford University Press; 2nd edition (2004).

Code: B16 EC 2206

ANALOG ELECTRONICS CIRCUITS

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives:

The aim of this course is to

1. Understand the concepts of different type of amplifiers and analyze them.
2. Learn the classification of feedback amplifiers and analyze them.
3. Compare the voltage and power amplifiers and analyze them.
4. Understand the principle of oscillator and analyze different types of sinusoidal oscillators.
5. Learn the classification of tuned amplifiers and analyze them.
6. Understand the concept and analyze applications of op-amp.

Course Outcomes:

After the completion of the course, students will be able to:

CO1: Know the equivalent circuit of multistage amplifier and its analysis. [K3]

CO2: Identify the different feedback topologies and analyze them. [K1]

CO3: Explain the principle of oscillator and design different types of sinusoidal oscillators.[K3]

CO4: Define the difference between voltage and power amplifiers and design different classes. [K1, K3]

CO5: Know that Tuned amplifiers amplify a narrow band of frequencies and will also be able to analyze them.[K2, K3]

CO6: Identify that Op-amp not amplifies but also perform different operations and analyze some applications.[K1,K2]

SYLLABUS

Multistage Amplifiers

Transistor at high frequencies, CE short circuit current gain and concept of Gain Bandwidth Product. BJT and FET RC Coupled Amplifiers at low and high frequencies. Frequency Response and calculation of Band Width of Multistage Amplifiers.

Feed Back Amplifiers

Concept of Feed Back Amplifiers - Effect of Negative Feedback on the amplifier characteristics. Four feedback topologies, Method of analysis of Voltage Series, Current Series, Voltage Shunt and Current Shunt feedback Amplifiers.

Sinusoidal Oscillators

Condition for oscillations –LC Oscillators – Hartley, Colpitts, Clapp and Tuned Collector Oscillators – Frequency and amp litude Stability of Oscillators – Crystal Oscillators – RC Oscillators -- RC Phase Shift and Weinbridge Oscillators.

Power Amplifiers
Classification of Power Amplifiers – Class A, Class B and Class AB power Amplifiers. Series Fed, Single Ended Transformer Coupled and Push Pull Class A and Class B Power Amplifiers. Cross-over Distortion in Pure Class B Power Amplifier, Class AB Power Amplifier – Complementary Push Pull Amplifier with trickle Bias, Derating Factor – Heat Sinks.

Tuned Voltage Amplifiers
Single Tuned and Stagger Tuned Amplifiers – Analysis – Double Tuned Amplifier – Bandwidth Calculation.

Operational Amplifiers
Concept of Direct Coupled Amplifiers. Ideal Characteristics of an operational Amplifier – Differential Amplifier - Calculation of common mode Rejection ratio – Differential Amplifier supplied with a constant current – Normalized Transfer Characteristics of a differential Amplifier – Applications of OP-Amp as an Inverting and Non-Inverting Amplifier, Integrator, Differentiator Summing and Subtracting Amplifier and Logarithmic Amplifier. Parameters of an Op-Amp, Measurement of OP-Amp Parameters.

Text Books:

1. Integrated Electronics- Millman and Halkias.
2. Electronic devices and circuits - Mottershead
3. Op-amps and Linear Integrated Circuits – Gayakwad

Reference Books:

1. Electronic Devices and Circuits by G.S.N.Raju., Published by I.K. International 2006, pbk, 2006.
2. Electronic Devices and Circuits by Salivahanan., 2nd Edition, Tata McGraw-Hill pub.

Code: B16 ME 2204

PRIMEMOVERS & PUMPS

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives:

The objectives of the course are:

1. To make the students understand the various types of prime movers which can be connected to generators for power production
2. To impart the knowledge of various types of pumps.

Course Outcomes:

After the completion of the course, students are able to

CO1: Understand the concepts of hydrodynamic force of jets on stationary and moving flat inclined and curved vanes.

CO2: Apply the concepts of momentum equation for finding the forces acting on the vanes of the turbines.

CO3: Understand the carnot, otto, Diesel, Rankine, Joule Cycles.

CO4: Apply the otto, Diesel cycles for finding the performance of S.I and C.I engines.

CO5: Understand the working principle of steam turbines and gas turbines.

CO6: Evaluate the performance characteristics of steam and gas turbines.

CO7:Understand the working principle of centrifugal and reciprocating pumps.

CO8: Evaluate the performance characteristics of centrifugal and reciprocating pumps.

SYLLABUS

Basics of Turbo Machinery

Hydrodynamic force of jets on stationary and moving flat inclined and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency. Hydraulic Turbines: Classification of turbines, impulse and reaction turbines, pelton wheel, Fancis turbine and Kaplan turbine, wok done, efficiency and draft tube theory.

Thermo dynamic cycles

Carnot, otto, Diesel, Rankine, Joule Cycles- Description and representation on P-V diagram. IC Engines: Working of petrol and Diesel Engines- Two stroke and four stroke engines- Comparison

Turbines

Steam Turbines: Classification – Impulse and reaction turbines – principle of operation – simple impulse turbine, velocity compounding, pressure compounding and pressure – velocity- compounding.

Gas turbines: Simple gas turbine plant, principle of working, Ideal and actual cycles – Open and closes cycles.

Pumps

Reciprocating Pumps: Working, Discharge, slip and indicator diagrams Centrifugal Pumps: Classification, working, workdone- manometric head- losses, efficiencies &specific speed.

Text Books:

1. Fluid Mechanics & Hydraulic Machines – by Modi & Seth, PHI Publications.
2. Engineering Thermodynamics – by P K Nag, Tata McGraw-Hill Companies.

Reference Books:

1. Fluid Mechanices & Hydraulic Machines- by R.K.Bansal, Laxmi Publications.
2. Thermodynamics & Heat Engines – by B.Yadav, Central Book Depot, Allahabad.
3. I C Engines – by V Ganeshan, Tata McGraw-Hill Companies.

Code: B16 EE 2203

ELECTRICAL POWER GENERATION, TRANSMISSION & DISTRIBUTION

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 4**

Course Objectives

1. Understand the general arrangement, principles and components & their functions present in thermal, hydro, nuclear and gas power plants.
2. Understand the load curves and different types of tariffs.
3. Know the performance analysis of transmission lines
4. Give emphasis on mechanical design of transmission line cables and insulators.
5. To study the different types of distribution systems.

Course Outcomes

After completion of the course student will be able to

CO1: Explain the power generation from different energy sources.
CO2: Evaluate different tariffs.
CO3: Analyze the various transmission and distribution systems.
CO4: Design overhead transmission systems under various conditions.
CO5: Calculate Inductance & Capacitance of transmission lines.

SYLLABUS

Electric Power Generation& Economic Considerations:
Layout of thermal, hydro, nuclear and gas power plants, brief description of various parts of different power plants. Load curves and associated definitions, load duration curves, different types of tariffs and examples.

Power Supply Systems& Distribution Systems:
Transmission and distribution systems- D.C 2-wire and 3- wire systems, A.C single phase, three phase and 4-wire systems, comparison of copper efficiency. Primary and secondary distribution systems, concentrated & uniformly distributed loads on distributors fed at both ends, ring distributor, voltage drop and power loss calculation, Kelvin's law.

Inductance & Capacitance calculations:
Types of conductors, line parameters, calculation of inductance and capacitance of single and double circuit transmission lines, three phase lines with bundle conductors. Skin effect and proximity effect.

Performance of transmission lines:
Generalized network constants and equivalent circuits of short, medium, long transmission line. Line performance: regulation and efficiency, Ferranti effect.

Overhead Line Insulators:
Types of insulators, potential distribution over a string of suspended insulators, methods of equalizing potential. Corona: phenomenon of corona, corona loss, concept of radio interference.

Mechanical Design of Transmission Lines :
Different types of tower, sag –tension calculations, sag template, string charts.

Text Books:

1. Wadhwa,C.L., " Electric Power Systems", New Age International Private Limited; Sixth edition (2010).
2. Power System Analysis and Design by Dr. B.R Gupta S Chand & Company; 2005.
3. Nagarath,I.J, and Kothari, D.P., "Power System Engineering", McGraw Hill Education; 2 edition (2007).
4. "A Course in Power Sytems" by J.B Gupta, S.K. Kataria & Sons; 2013 edition.
5. " Principles of power systems" by V.k Mehta & Rohit Mehta by S.CHAND Publications, 3rd edition 2005.

Reference Books:

1. Burke James,J., "Power Distribution Engineering; Fundamentals and Applications " Marcel Dekker 1996.
2. Grainger john, J. and Stevenson ,Jr. W.D., "Power System Analysis", McGraw Hill,1994.
3. Harder Edwin,I., "Fundamentals of Energy Production",John Wiely and Sons,1982.
4. Deshpande, M.V., "Elements of Electric Power Station Design",A.H Wheeler and Co.Allahabad,1979.

Code: B16 ENG 2201

ENIVRONMENTAL STUDIES
(Common to ECE, EEE & ME)

Theory	**: 3 Periods**	**Sessionals**	**: 30**
Tutorial	**: 1 Period**	**Ext. Marks**	**: 70**
Exam	**: 3 Hrs.**	**Credits**	**: 2**

Course Objectives:

Students learn

1. To develop an awareness and sensitivity to the total environment and its related problems.
2. To participate actively participation in environmental protection and improvement.
3. To develop skills for active identification and development of solutions to environmental problems
4. To evaluate environment programmes in terms of social, economic, ecological and aesthetic factors.
5. To Create a "CONCERN AND RESPECT FOR THE ENVIRONMENT"

Course Outcomes:

Students will be able to

1. Get awareness among the students about the nature and natural ecosystems.
2. Learn sustainable utilization of natural resources like water, land, minerals, air.
3. Learn resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc to inculcate the students about environmental awareness and safe transfer of our mother earth and its natural resources to the next generation.
4. Safe guard against industrial accidents particularly nuclear accidents.
5. Learn Constitutional provisions for the protection of natural resources.

SYLLABUS

Global Environmental Crisis:

Environmental Studies - Definition, Scope and importance, Need for public awareness. Global Environmental Crisis

Ecosystems:

Basic concepts, Forest Ecosystems, Grassland Ecosystems and Desert Ecosystems, Aquatic Ecosystems

Biodiversity:

Introduction to Biodiversity**,** Value of Bio-diversity, Bio-geographical classification of India, India as a Mega-diversity habitat, Threats to biodiversity, Conservation of Biodiversity: In-situ and Ex-situ conservation of bio-diversity.

Environmental and Natural Resources Management:

Land Resources: Land degradation, soil erosion and desertification, Effects of modern agriculture **Forest Resources:** Use and over exploitation-Mining and Dams-their effects on forest and tribal people, **Water resources**: Use and over utilization of surface and ground water, Floods, droughts, conflict over water, water logging and salinity, dams – benefits and problems
Energy Resources: Renewable and non-renewable energy sources, use of alternate energy sources-impact of energy use on environment.

Environmental Pollution:

Causes, Effects and Control measures of - Air pollution, Water pollution, Soil pollution, Marine Pollution, Thermal pollution, Noise pollution, Nuclear Hazards; Climate change and global warming, acid rain and Ozone layer depletion.

Environmental Problems in India:

Drinking water, Sanitation and Public health, population growth and environment; Water Scarcity and Ground Water Depletion; Rain water harvesting, Cloud seeding and Watershed management.

Text Books:

1. Environmental Studies (From Crisis to Cure) by R. Rajagopalan, Oxford university Press, 2008
2. Environmental Studies by Anubha Kaushik & C.P. Kauskik, New Age International (P) Ltd, New Delhi, 2006

Reference Books:

1. Environmental Sciences by G.Tyler Miller, JR,10^{th} ed, Thomson publishers, 2004

Code: B16 ME 2207

THERMAL PRIME MOVERS LAB

		Sessionals	**: 50**
Lab	**: 3 Periods**	**Ext. Marks**	**: 50**
Exam	**: 3 Hrs.**	**Credits**	**: 2**

Course Objectives:

1. To understand the principle and functioning of various IC engines.
2. Ability to understand the working of two stroke and four stroke engines.
3. Acquiring the knowledge of operation of a turbines and pumps.
4. The way of determination of flash and fire points of oil samples.and their importance is acquired.
5. The procedure for determination of viscosities of oil samples can be understood.

Course Outcomes:

Students will be able to:

CO1: Explain the working principle of different types of IC Engines and illustrate the valve timing and port diagrams of an IC engines.

CO2: Determine the viscosities of oil samples, Flash and Fire point values of fuels.

CO3: Perform the load, Morse, Heat balance and economical speed test on IC Engines.

CO4: Discuss the working principle of different types of hydraulic turbines

CO5: Illustrate the working principle of centrifugal and reciprocating pumps

SYLLABUS

1. Drawing of VTD for four-stroke and PTD of two-stroke engines.
2. Determination of flash and fire points
3. Determination of the kinematic and absolute viscosity of the given sample oils.
4. Load test and smoke test on I.C. engines.
5. Morse test on multi-cylinder engine.
6. Heat balance sheet on I.C. engines.
7. Study of multi-cylinder engines and determination of its firing order.
8. Economical speed test on IC engines.
9. Study on impulse and reaction turbines
10. Study on reciprocating and centrifugal pumps

Reference Books:

1. Thermal Engineering, by R. K. Rajput, Lakshmi Publications.
2. Thermal Science and Engineering by D.S. Kumar, S.K. Kataria and Sons.
3. I.C engines by V. Ganesan, Mc Graw Hill Publications.

Code: B16 EC 2208

ANALOG ELECTRONIC CIRCUITS LAB WITH SIMULATION
(Common to ECE & EEE)

Lab	**: 3 Periods**	**Sessionals**	**: 50**
Exam	**: 3 Hrs.**	**Ext. Marks**	**: 50**
		Credits	**: 2**

Course Objectives:

1. This laboratory course enables students to get practical experience in design, assembly and evaluation of analog electronic circuits. They will use Multisim to test their electronic designs.

Course Outcomes:

Students will be able to:

1. Acquire a basic knowledge on simple applications of operational amplifier.
2. Observe the amplitude and frequency responses of negative feedback amplifier and two stage RC coupled amplifier.
3. Design and test sinusoidal oscillators.
4. Design and test a power amplifier.
5. Design,construct,and take measurement of the analog electronic circuits tocompare experimental results in the laboratory with theoretical analysis.
6. Use Multisim to test their electronic design.

LIST OF EXPERIMENTS

1. Design of LC Oscillators (Hartley Oscillator,Colpitts Oscillator)
2. Design of RC Oscillators (Wien Bridge Oscillator,RC phase Shift Oscillator)
3. Design of Basic Applications of Operational Amplifier.
4. Frequency response of Two Stage RC Coupled Amplifier.
5. Frequency response ofCurrent Series Feedback Amplifier(with and without feedback)
6. Measurement of resonant frequency, bandwidth and quality factor of single Tuned Voltage Amplifier.
7. Calculation of Collector Circuit efficiency of Class B Push Pull Power Amplifier.

LIST OF EXPERIMENTS
(Simulation)

8. Design of LC Oscillators (Hartley Oscillator,Colpitts Oscillator)
9. Design of RC Oscillators (Wien Bridge Oscillator,RC phase Shift Oscillator)
10. Design of Basic Applications of Operational Amplifier.
11. Frequency response of Two Stage RC Coupled Amplifier.
12. Frequency response ofCurrent Series Feedback Amplifier(with and without feedback)
13. Measurement of resonant frequency, bandwidth and quality factor of single Tuned Voltage Amplifier.
14. Calculation of Collector Circuit efficiency of Class B Push Pull Power Amplifier.

Reference : Lab Manuals

Code: B16 EE 2205

INDUSTRIAL ORIENTED TECHNOLOGY LAB

Lab : 2 Periods	**Sessionals : 50**
Exam : 3 Hrs.	**Credits : 1**

Objective:

This lab is designed to provide students to learn the latest technologies so that they will be Industry ready.

List of Projects :

1. Solar based automated irrigation system.
2. Smart key: a high security based door locked system.
3. Obstacle movement based automatic head lighter blinker and motion controller.
4. Sun tracking solar panel.
5. Foot step power generation.
6. Autonomous solar car to avoid road accidents.
7. Helmet operated smart e bike.
8. Cross roads traffic controller suing e-subway system.
9. Voice command page turning robot for physically challenged people.
10. Automatic fire alerting system in trains

(Note: Total Marks will be evaluated based on Continuous Evaluation - 25 Marks, Record/Report-10 Marks, Exam-10 Marks and Attendance-5 Marks)

Code: B16 ENG 2204

INDUSTRY ORIENTED TRAINING
(Common to ECE & EEE)

Lab : 2 Periods	**Sessionals : 50**
Exam : 3 Hrs.	**Credits : 1**

Course Objectives:

1. Be familiar with core JAVA.
2. Master the implementation of Applet programming.
3. Master the implementation of Networking concepts in core JAVA.
4. Be familiar with CORBA , J2EE, RMI concepts..

Course Outcomes:

1. Application using implementation of core JAVA concepts.
2. Application using implementation of AWT, Applets
3. Applications using Networking concepts in view of industry.

Syllabus: Industry Oriented Applications on following topics.

BASIC CONCEPTS

Fundamentals: HTML, OOP Concepts, Comparing JAVA with C & C++,JAVA Programming language Syntax, Variables, Data types, statements and expressions.

Control Statements: If else, for, while, and do while loops, Switch statements.

Arrays & Structures: One Dimensional & Two Dimensional Arrays, Named Structures.

Functions: Parameter Passing, Static Modifier.

IMPLEMENTATION (Using JAVA)
Classes and Interfaces
Threads and multithreaded programming
packages.

Applications of AWT, Applets and Networking concepts and solving simple to complex problems in perspective of industry requirements.

(Note: Total Marks will be evaluated based on Continuous Evaluation - 25 Marks, Coding Contest – 25 Marks)