Scheme of Instruction and Syllabi

of

BE / B.TECH B.E. (EEE) III to IV SEMESTERS

of

FOUR YEAR DEGREE COURSE

IN

B.E. (EEE)

under AICTE Model Curriculum

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY
(An Autonomous Institution)
Affiliated to OU; All U.G. and 5 P.G. Programmes (Civil, CSE, ECE, Mech. & EEE)
Accredited by NBA; Accredited by NAAC - 'A' Grade (UGC);
ISO Certified 9001:2015

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CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY (A)
SCHEME OF INSTRUCTION AND EXAMINATION
B.E/B.Tech under AICTE Model Curriculum
B.E. (EEE)

SEMESTER-III

Sl. No	Course Code	Title of the Course	Scheme of Instruction			Scheme of Examination			
			Hours per week			Duration In Hours	Maximum Marks		Credits
			L	T	P		CIE	SEE	
1.	18MT C07	Applied mathematics	3	1	-	3	30	70	4
2.	18EE C03	Analog Electronic Circuits	3	1	-	3	30	70	4
3.	18EE C04	Electrical Measurements and Instrumentation	3	-	-	3	30	70	3
4.	18EE C05	Electromagnetic Fields	3	1	-	3	30	70	4
5.	18EE C06	Electrical Circuit Analysis	3	1	-	3	30	70	4
6.	18EG M 01	Indian constitution	2	-	-	2	-	50	-
7.	18EE M01	Indian Traditional Knowledge	2	-	-	2	-	50	-
PRACTICALS									
8.	18EE C07	Analog Electronic Circuits Lab	-	-	2	2	15	35	1
9.	18EE C08	Electrical Measurements and Instrumentation Lab	-	-	2	2	15	35	1
		Total	19	4	4	-	180	520	21

L: Lecture T: Tutorial D: Drawing P: Practical
CIE - Continuous Internal Evaluation SEE - Semester End Examination

Core Courses offered to other Departments:

SEMESTER-III

Sl. No	Course Code	Title of the Course	Scheme of Instruction			Scheme of Examination			
			Hours per week			Duration In Hours	Maximum Marks		Credits
			L	T	P		CIE	SEE	
1	18EE C01	Basic Electrical and Electronics Engineering	3	1	-	3	30	70	4
PRACTICALS									
2	18EE C02	Basic Electrical and Electronics Engineering Lab	-	-	2	2	15	35	1

18MT C07

APPLIED MATHEMATICS
(For ECE/EEE)

Instruction	3L+1T Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	4

Course Objectives:

1. To form PDE and solve Linear and Non-Linear equations.
2. To learn the Laplace, Inverse Laplace Transform and Z-Transforms.
3. To find roots of equations, interpolation and Numerical differentiation.
4. To learn Numerical solution of ODE and Engineering problems.
5. To learn fitting of distribution and predicting the future values.

Course outcomes: After completion of this course, students will be able to:

1. Understand the methods to find solution of linear and non-linear PDE and solution of wave equation.
2. Find Laplace, Inverse Laplace and Z-Transforms and solution of engineering problems.
3. Solve Non-Linear algebraic and transcendental equations to find interpolations when tabular values are given.
4. Find solution of initial value problems of ODE.
5. Understand the Methods for analysing the random fluctuations using probability distribution and also identify the importance of principle of Least squares approximations for predictions.

UNIT-I

Partial Differential Equations: Formation of Partial Differential Equations, Solution of Linear (Lagrange's) and Non-linear PDE of First order standard forms and Charpit's Method, Solutions of PDE by method of separation of variables, solution of one dimensional wave equation and its applications.

UNIT-II

Transform Theory: Laplace Transform, Properties of Laplace Transform, Laplace transform of periodic functions. Finding inverse Laplace transform by partial fractions and residue method, solving ODEs by Laplace Transform method.Z-transforms and its basic properties, inverse Z-transform and solutions of difference equation by Z-transform.

UNIT-III

Numerical Analysis: Solution of Algebraic and transcendental equations by Bisection method, Newton-Raphson method and Regula-Falsi method. Interpolation, Newton's forward and backward difference formulae.Newton's divided difference and Lagrange'sformulae.Numerical Differentiation.

UNIT-IV

Numerical Solutions of ODE: Solutions of First Order Ordinary differential equations, Taylor's series, Euler and modified Euler's methods. Runge-Kutta method of fourth order for solving first and second order equations. Milne's and Adam's predicator corrector methods.

UNIT-V

Basic Statistics: Measures of Central tendency for continuous random variable, Moments, skewness and Kurtosis, Probability distributions: Normal (Gaussian),Rayleigh, Exponential and uniform distributions Correlation and regression. Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas.

Text Books:

1. P. Kandasamy, K. Thilagavathy, K. Gunavathi, "Numerical Methods", S. Chand & Company, 2nd Edition, Reprint 2012.
2. S.S. Sastry, "Introductory methods of numerical analysis", PHI, 4th Edition, 2005.
3. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 35th Edition, 2010.
4. Sheldon Ross, "A First Course in Probability", 9th Edition, Pearson publications, 2014.

Suggested Reading:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", 9th Edition, John Wiley & Sons, 2006.
2. Veerarajan T, "Engineering Mathematics", Tata McGraw-Hill, New Delhi, 2008.
3. S.C.Gupta, V.K.Kappoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons, 2014.

***Education** is the process of imparting knowledge, values, skills and attitudes, which can be beneficial to an individual. On the contrary, **Learning** is the process of adopting knowledge, values and skills.*
Concept-Based Curriculum and Instruction

18EE C03

ANALOG ELECTRONIC CIRCUITS

Instruction	3L+1T Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	4

Course Objectives:

1. To understand the characteristics of diodes, BJTs, MOSFETS and the biasing techniques of transistors.
   2. To understand the functioning, DC characteristics of operational amplifiers and also different linear applications of operational amplifiers
3. Study the different non-linear applications of operational amplifiers

Course Outcomes: After completion of this course, students will be able to:

1. Analyze the characteristics of Diodes ,transistors and MOFETS.
2. Understand biasing techniques of transistor and its application as differential and multi stage amplifier
3. Understand the basic characteristics of op-amps and their significance.
4. Analyze different linear application circuits of operational amplifiers
5. Analyze different non-linear application circuits of operational amplifiers

UNIT-I

Diode circuits and BJT Circuits: P-N junction diode, I-V characteristics of a diode; review of half-wave and full-wave rectifiers, Zener diodes.
Structure and I-V characteristics of a BJT; BJT as a switch. BJT as an amplifier: small-signal model, biasing circuits, current mirror; common-emitter, common-base and common collector amplifiers; Small signal equivalent circuits.

UNIT-II

MOSFET Circuits: MOSFET structure and I-V characteristics, MOSFET as a switch, MOSFET as an amplifier: small-signal model and biasing circuits, common-source, common-gate and common-drain amplifiers, small signal equivalent circuits, gain, input and output impedances, trans-conductance.

UNIT-III

Differential, multi-stage and operational amplifiers: Differential amplifier; power amplifier; direct coupled multi-stage amplifier; internal structure of an operational

amplifier, ideal op-amp, non-idealities in an op-amp (Output offset voltage, input bias current, input offset current, slew rate, gain bandwidth product)

UNIT-IV

Linear applications of op-amp: Idealized analysis of op-amp circuits. Inverting and non-inverting amplifier, differential amplifier, instrumentation amplifier, integrator, active filter, P, PI and PID controllers, Series voltage regulator , oscillators (Wein bridge and phase shift).

UNIT-V

Nonlinear applications of op-amp: Hysteretic Comparator, Zero Crossing Detector, Square-wave and triangular-wave generators. Precision rectifier, peak detector. Monoshot. clamping and clipping circuits

Text Books:

1. A. S. Sedra and K. C. Smith, "Microelectronic Circuits", New York, Oxford University Press, 1998.
2. J. V. Wait, L. P. Huelsman and G. A. Korn, "Introduction to Operational Amplifier theory and applications", McGraw Hill U. S., 1992.
3. J. Millman and A. Grabel, "Microelectronics", McGraw Hill Education, 1988.
4. Analog Electronics, A.K. Maini, Khanna Publishing House

Suggested Readings:

1. Millman and Halkias, " Electronic Devices and Circuits" 2nd Edition, McGraw Hill Publication 2007.
2. Robert L. Boylestad, "Electronic Devices and Circuit Theory", 10th Edition, PHI, 2009
3. D.Roy Choudhury, Linear Integrated Circuits, Shail B.Jain, , New Age Intern.(P) Ltd., 3rd Edition 2007.
4. Gayakwad R.A. Op-Amps and Linear Integrated Circuits, PHI, 4th Edition, 2002.
5. David Bell, "Fundamentals of Electronic Devices and Circuits", 5th Edition, Oxford University Press 2008.

18EE C04

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

Instruction	3 Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	3

Course Objectives:

1. To understand the principle behind various instruments.
2. To know the various bridges for measurement of R, L and C.
3. To measure various magnetic and electric parameters.

Course Outcomes: After completion this course, students will be able to:

1. Identify a suitable instrument to measure a given parameter.
2. Analyze the need of CT/PT for a given system.
3. Illustrate the concept of the instrument with relevant examples and proper justification.
4. Distinguish between electrical and magnetic measurements and their instruments.
5. Specify the right transducer for a given requirement.

UNIT-I

Introduction to Measurements: Objectives of measurement, static and dynamic characteristics, errors and their classification.

Introduction to Instruments-1: Types of instruments, classification of instruments based on type of measurement and principle of working (PMMC, MI, Dynamometer, Induction and Electrostatic), types of torques (torque equations for MC, MI and dynamometer type instruments).

UNIT-II

Introduction to Instruments-2: Single phase Induction type energy meter, concept of driving torque & braking torque equations, (no derivation) ; Errors and their Compensation, Single phase Dynamometer type Power factor meter, Weston type frequency meter. Construction & theory of Instrument Transformers, Equations for ratio and phase angle error of C.T & P.T (Elementary treatment only).

UNIT-III

Resistance, Inductance and Capacitance parameters: Classification of resistance measuring methods Kelvin's double bridge, Wheatstone bridge and meggar.

Measurement of inductance using Maxwell's inductance bridge, Anderson's bridge. Measurement of capacitance using De-Sauty's bridge and Schering bridge., merits and demerits, applications and related numerical problems.

UNIT-IV

Measurements of Magnetic and Electric Parameters: Ballistic galvanometer-Principle of operation, construction and applications of Ballistic galvanometer, flux meter its construction and principle of operation. Epstein square bridge for measuring Iron losses. Potentiometers,-Principle - Classification – Salient features related to Practical applicability.

UNIT-V

Introduction to Digital Instruments (DVM and Transducers): Introduction to digital Instruments, Digital Voltmeters (DVM), Speed reading, Range selection, Over ranging, Common mode rejection, Digital Multi meters.

Transducers: Introduction, Role of Transducers in measurement system, Strain Gauge, Linear variable Differential transformer (LVDT), Temperature transducers, bimetallic strip, Thermocouples, Resistance Temperature Detectors (RTD), Thermostats, Radiation pyrometers.

Text Books:

1. F.W.Golding and Widdis, Electrical Measurements and measuring Instruments, A.H.Wheeler & Co., 5th Edition, 2007.
2. A.K.Sawhney, A Course in Electrical and Electronics Measurements and Instrumentation, Dhanapat Rai & Sons, NewDelhi, 19th Edition, 2011.
3. CT. Baldwin, Fundamentals of Electrical measurements, Kalyani publications, 2001.

Suggested Readings:

1. Helfrick, Albert D., Cooper, William D., Modern Electronic Instrumentation and Measurement Techniques, PHI Publications, 1990.
2. Stanley Wold, Richard F.M.Smith, Student reference manual for Electronic Instrumentation Laboratories, 2nd Edition, PHI.
3. Alan. S. Morris, Essence of Measurement, PHI, 1996.

Teaching with dialogue education involves listening to learners at every level, respecting them as subjects or decision makers of their own learning and evoking their innate power.

Concept-Based Curriculum and Instruction

18EE C05

ELECTRO MAGNETIC FIELDS

Instruction	3L+1T Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	4

Course Objectives:

1. To understand coordinate systems, vector calculus and their applications to electrostatic and magnetic fields.
2. To figure out Maxwell's equations, uniform plane wave and its propagation through different media.
3. To know the sources, effects & control techniques of EMI & EMC.

Course Outcomes: After completion of this course, students will be able to

1. Recognize the importance of different coordinate systems and vector calculus in EM theory.
2. Analyze electric and magnetic field intensity, flux density and potential due to various charge configurations.
3. Differentiate between conduction & convection currents through various materials.
4. Illustrate the Maxwell's equations and EM wave equations in different media.
5. Identify EMI & EMC, the causes and effects, various control methods of EMI.

UNIT-I

Orthogonal Coordinate Systems: Review of Vector Calculus, Rectangular, Cylindrical, Spherical coordinate systems; Line, Surface and Volume integrals; Operator Del, Gradient, Divergence, Curl & Laplacian of a field; Divergence and Stoke theorems.

Electrostatic fields: Various charge configurations, Coulomb's law, Electric field intensity and flux density of different charge distributions, Gauss law, Integral and Point form of Maxwell's Electrostatic Equation.

UNIT-II

Electrostatic Field in Materials: Electrical Potential, Capacitance of Parallel plate capacitor, Equi-potential lines, Properties of materials, convection and conduction currents, conductors, dielectric constant, continuity equation and relaxation

time, boundary conditions, Poisson's and Laplace's equations, Uniqueness theorem.

UNIT-III

Magneto Static Fields: Biot-Savart's law, Ampere's law, Displacement current, Magnetic scalar and Vector Potentials, boundary conditions, Forces in Magnetic fields, Lorentz force equation, Force between parallel conductors, Inductance Calculations (Solenoid, Toroid), Mutual Inductance.

UNIT-IV

Time Varying Electromagnetic Fields: Faraday's laws of electromagnetic induction, Final forms of Maxwell's Equations, Power and Poynting theorem, Time-Harmonic Electromagnetic fields, Wave equations (One dimension), Plane Wave, Propagation in perfect and lossy-dielectrics.

UNIT-V

Electromagnetic Interference and Compatibility (Theoretical Aspects only): Introduction to Electromagnetic Interference and Electromagnetic Compatibility (EMI & EMC)- Sources and Characteristics of EMI, Control Techniques of EMI, Grounding, Shielding, Filtering. Introduction to numerical electromagnetic.

Text Books:

1. Hayt, W.H and J.A Buck, Engineering Electromagnetics, Tata McGraw Hill, 8th Edition, 2014.
2. Sadiku, M.N.O,S.V. Kulkarni, Principles of Electromagnetics, Oxford University press, 6th Edition, 2015.

Suggested Readings:

1. S. P. Seth, Elements of Electromagnetic Fields, Danpat Rai& Co, 2011.
2. David K. Cheng, Field and Wave Electromagnetics, Pearson Education. 2nd Edition 2014.
3. Ashutosh Pramanik, Electromagnetism Theory and Applications, PHI Pvt. Ltd., 3rd Edition, 2014.

18EE C06

ELECTRICAL CIRCUIT ANALYSIS

Instruction	3L+1T Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	4

Course Objectives:

1. To understand the nature of different circuit elements, laws and network theorems.
2. To study transient response of circuits with initial conditions & forcing functions and also basics of network topology.
3. To understand the Laplace transforms and two-port networks.

Course Outcomes: After completion of this course, students will be able to:

1. Apply network theorems for the analysis of electrical circuits.
2. Understand the circuit analysis using graph theory &Coupled circuits.
3. Obtain the transient and steady-state response of electrical circuits.
4. Analyze circuits using Laplace transformations.
5. Analyze behavior of two port networks.

UNIT I

Sinusoidal steady state analysis: Review of AC fundamentals, effective or RMS values, Steady state response of RLC networks with sinusoidal excitations, average power and complex power, series and parallel resonance, Three phase circuits with balanced & unbalanced loads, Displacement neutral, Mutual coupled circuits, Dot Convention in coupled circuits, Ideal Transformer.

UNIT II

Network Theorems: Node and Mesh Analysis, Analysis with dependent current and voltage sources, Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Reciprocity theorem, Compensation and Milliman's theorems.

UNIT III

Graph Theory: Formation of Incident, fundamental Tie-set and Cut-set matrices, Concept of duality and dual networks.

Solution of First and Second order networks: Review of solution of first and second order differential equations for Series and parallel RL, RC, RLC circuits,

initial and final conditions in network elements, forced and force-free responses, time constant, steady state and transient state responses.

UNIT IV

Electrical Circuit Analysis Using Laplace Transforms: Review of Laplace Transform, Analysis of electrical circuits using Laplace Transform for standard inputs, convolution integral, inverse Laplace transform, transformed network with initial conditions. Transfer function representation. Poles and Zeros. Frequency response (magnitude and phase plots),

UNIT V

Two Port Networks: Two Port Networks, terminal pairs, relationship of two port variables, impedance parameters, admittance parameters, transmission parameters and hybrid parameters, interconnections of two port networks.

Text Books:

1. M. E. Van Valkenburg, "Network Analysis", 3rd Edition, Prentice Hall, 2015.

2. C. K. Alexander and M. N. O. Sadiku, "Electric Circuits",6th Edition, McGraw Hill Education, 2019.

3. W. H. Hayt and J. E. Kemmerly, "Engineering Circuit Analysis", McGraw Hill Education2013.

Suggested Reading:

1. D. Roy Choudhury, "Networks and Systems", 2nd Edition, New Age International, 2010.
2. K. V. V. Murthy and M. S. Kamath, "Basic Circuit Analysis", Jaico Publishers, 2002.

18EG M 01

INDIAN CONSTITUTION

Instruction	2 Hours per week
Duration of Semester End Examination	2 Hours
SEE	50 Marks

Course Objectives:The course will introduce the students to :

1. The history of Indian Constitution and how it reflects the social, political and economic perspectives of the Indian society.
2. Address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
3. Have knowledge of the various Organs of Governance and Local Administration.

Course Outcomes :After successful completion of the course the students will be able to :

1. Understand the making of the Indian Constitution and its features.
2. Have an insight into various Organs of Governance - composition and functions.
3. Understand powers and functions of Municipalities, Panchayats and Co-operative Societies.
4. Be aware of the Emergency Provisions in India.
5. Understand the Right To equality, the Right To freedom and the Right To Liberty.

Unit-I

Constitution of India - Introduction and salient features . Constitutional history. Directive Principles of State Policy - Its importance and implementation.

Unit II

Union Government and its Administration - Structure of the Indian Union: Federalism, distribution of legislative and financial powers between the Union and the States.

Parliamentary form of government in India. President: role, power and position.

Unit III

Emergency Provisions in India - National emergency, President rule, Financial emergency

Unit IV

Local Self Government - District's Administration Head: Role and Importance. Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation.
Panchayati Raj: Introduction, Zilla Panchayat, Elected officials and their roles, CEO Zilla Panchayat: Position and role. Block level: Organizational Hierarchy (Different departments). Village level: Role of Elected and officials.

Unit V

Scheme Of The Fundamental Rights & Duties: Fundamental Duties - the legal status.
Scheme Of The Fundamental Rights - To Equality, to certain Freedom Under Article 19, to Life And Personal Liberty Under Article 21.

Suggested Reading:

1. **The Constitution of India**, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar, **Framing of Indian Constitution**, 1st Edition, 2015.
3. M. P. Jain, **Indian Constitution Law**, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu**, Introduction to the Constitution of India**, Lexis Nexis, 2015

Online Resources:

http://www.nptel.ac.in/courses/103107084/Script.pdf

18EE M01

INDIAN TRADITIONAL KNOWELDGE

Instruction	2 Hours per week
Duration of Semester End Examination	2 Hours
Semester End Examination	50 Marks
Credits	0

Course Objectives:

1. To get a knowledge in Indian Culture
2. To Know Indian Languages and Literature and the fine arts in India
3. To explore the Science and Scientists of Medieval and Modern India

Course Outcomes: After completion of this course, students will be able to:

1. Understand philosophy of Indian culture
2. Distinguish the Indian languages and literature
3. Learn the philosophy of ancient, medieval and modern India
4. Acquire the information about the fine arts in India
5. Know the contribution of scientists of different eras.

UNIT-I

Introduction to Culture: Culture, civilization, culture and heritage, general characteristics of culture, importance of culture in human literature, Indian Culture, Ancient India, Medieval India, Modern India

UNIT-II

Indian Languages, Culture and Literature:
Indian Languages and Literature-I: the role of Sanskrit, significance of scriptures to current society, Indian philosophies, other Sanskrit literature, literature of south India.
Indian Languages and Literature-II: Northern Indian languages & literature

UNIT-III

Religion and Philosophy: Religion and Philosophy in ancient India, Religion and Philosophy in Medieval India, Religious Reform Movements in Modern India (selected movements only)

UNIT-IV

Fine arts in India (Art, Technology& Engineering): Indian Painting, Indian handicrafts, Music, divisions of Indian classic music, modern Indian music, Dance and Drama, Indian Architecture (ancient, medieval and modern), Science

and Technology in India, development of science in ancient, medieval and modern India

UNIT-V

Education system in India: Education in ancient, medieval and modern India, aims of education, subjects, languages, Science and Scientists of Ancient India, Science and Scientists of Medieval India, Scientists of Modern India

Text Books:

1. Kapil Kapoor, Text and Interpretation: The India Tradition,ISBN: 81246033375, 2005
2. Science in Samskrit, Samskrita Bharti Publisher, ISBN-13: 978-8187276333, 2007
3. S. Narain, Examinations in ancient India, Arya Book Depot, 1993
4. Satya Prakash, Founders of Sciences in Ancient India, Vijay Kumar Publisher, 1989
5. M. Hiriyanna, Essentials of Indian Philosophy, Motilal Banarsidass Publishers, ISBN-13: 978-8120810990, 2014

Suggested Reading:

1. Kapil Kapoor, Language, Linguistics and Literature: The Indian Perspective, ISBN-10: 8171880649, 1994.
2. Karan Singh, A Treasury of Indian Wisdom: An Anthology of Spiritual Learn,ISBN: 978-0143426158, 2016.

18EE C07

ANALOG ELECTRONICS CIRCUTS LAB

Instruction	2 Hours per week
Duration of Semester End Examination	2 Hours
Semester End Examination	35 Marks
CIE	15 Marks
Credits	1

Course objectives:

1. The V-I Characteristics of diode, Transistor and MOSFET.
2. The frequency response of BJT and FET amplifiers and the performance analysis of multistage amplifiers.
3. To analyze and design various applications of Op-Amp.

Course Outcomes: After completion of this course, students will be able to:

1. Verify the working of PN junction diodes, transistors and their characteristic behavior.
2. Design various rectifiers with different filter combinations.
3. Set up bias point in a transistor.
4. Build a multi stage amplifier and find the frequency response of amplifier.
5. Design and analyze circuits for inverting and non-inverting amplifiers, and linear and non linear applications of Op-Amp

LIST OF EXPERIMENTS

Part A

1. V-I characteristics of (Silicon and Germanium) diodes and measurement of static and dynamic resistance.
2. Zener diode characteristics and its application as an voltage regulator.
3. (a) Design, realization and performance evaluation of rectifier circuits with and without filters (C & ð section) Half wave rectifier.
   (b) Design, realization and performance evaluation of rectifier circuits with and without filters (C & ð section) Full wave rectifier.
4. Plotting the characteristics of BJT and MOSFET.
5. Design of Biasing circuits for BJT
6. Design and Frequency response of Common Emitter BJT amplifier and measurement of Gain, Bandwidth, Input and Output impedances.
7. Design and Frequency response of Single stage and Multi stage RC coupled amplifier using BJT.

Part B

1. Measurements of Op Amp parameters:
2. Inverting and Non Inverting Amplifiers
3. Design of integrator and differentiator using Op-Amp.
4. Generation of triangular, sine and square wave using IC's.
5. Peak Clamper using Op-Amps.
6. Clippers using Op-Amps..
7. Schmitt Trigger,

Note: At least **FIVE** experiments from **Part-A** and **FIVE** from **Part-B** should be conducted in the semester.

18EE C08

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION LAB

Instruction	2 Hours per week
Duration of Semester End Exam	2 Hours
Semester End Exam	35 Marks
CIE	15 Marks
Credits	1

Course Objectives:

1. To understand the various Electrical Measuring instruments for measuring various electrical quantities.
2. To measure the unknown values of different electrical elements.
3. To become familiar with digital instruments.

Course Outcomes: After completion of this course, students will be able to:

1. Design and validate DC and AC bridges.
2. Learn about various measurements devices, their characteristics and limitations.
3. Understand the operation of DSO and analyse various signals.
4. Demonstrate the principles of magnetic measurements.
5. Select the right instrument for the given circuit.

LIST OF EXPERIMENTS

1. Calibration of single-phase energy meter with Phantom Loading.
2. Measurement of high resistance and insulation resistance using Megger.
3. Measurement of iron losses using Epstein's square bridge.
4. Measurement of unknown frequency using Lissajous Patterns.
5. Study of Digital Instruments
6. Measurement of bandwidth and sampling rate of a signal using DSO.
7. Usage of DSO to capture transients in RLC circuits.
8. Measurement of unknown resistance using Kelvin's double bridge.
9. Measurement of unknown Inductance using Maxwell's bridge and validating with LCR meter.
10. Measurement of unknown inductance using Anderson's bridge and validating with LCR meter.
11. Measurement of unknown capacitance using Schering bridge and validating with LCR meter.

12. Measurement of strain using strain gauge.
13. Measurement of Displacement using LVDT.
14. Measurement of unknown voltage using D.C Crompton's potentiometer.
15. Study of current transformer and potential transformer.

Note: At least **TEN** experiments should be conducted in the semester.

18EE C01

BASIC ELECTRICAL ENGINEERING

Instruction	3L+1T Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	4

Course Objectives:

1. To understand the behavior of different circuit elements R,L & C, and the basic concepts of electrical circuit analysis
2. To know the concepts of AC circuits, RMS value, Average value, Phasor analysis etc.,
3. To understand the basic principle of operation of Transformer and DC machines
4. To understand the basic principle of operation of DC machines and AC machines
5. To know about different types of electrical wires and cables, domestic and industrial wiring.
6. To understand safety rules and methods of earthing

Course Outcomes: At the end of the course, the student will be able to

1. Acquire the concepts of Kirchhoff's laws and network theorems and able to get the solution of simple dc circuits
2. Obtain the steady state response of RLC circuits and also determine the different powers in AC circuits
3. Acquire the concepts of principle of operation of Transformers and DC machines
4. Acquire the concepts of principle of operation of DC machines and AC machines
5. Acquire the knowledge of electrical wiring and cables and electrical safety precautions
6. Recognize importance of earthing and methods of earthing and electrical installations

UNIT-I:

Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation,

Superposition, Thevenin and Norton Theorems, Time-domain analysis of first-order RL and RC circuits.

UNIT-II:

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel). Three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-III:

Construction, Working principle, EMF Equation, Ideal and Practical transformer, Equivalent circuit of Transformer, OC and SC tests on a transformer, Efficiency and Regulation, Auto transformer.

UNIT-IV:

DC Generators: Construction, Principle of operation, EMF equation, Classification, Characteristics of shunt, series and compound generators.

DC Motors: Classification, Torque equation, Characteristics, Efficiency, Speed Control of Series and Shunt Motors.

Three - Phase Induction Motors: Construction, Principle of operation, Torque equation, torque-slip characteristics, Power stages, speed control of induction motors.

UNIT-V:

Electrical Wiring: Types of wires and cables, Electrical Safety precautions in handling electrical appliances, electric shock, first aid for electric shock, safety rules.

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Earthing, Elementary calculations for energy consumption.

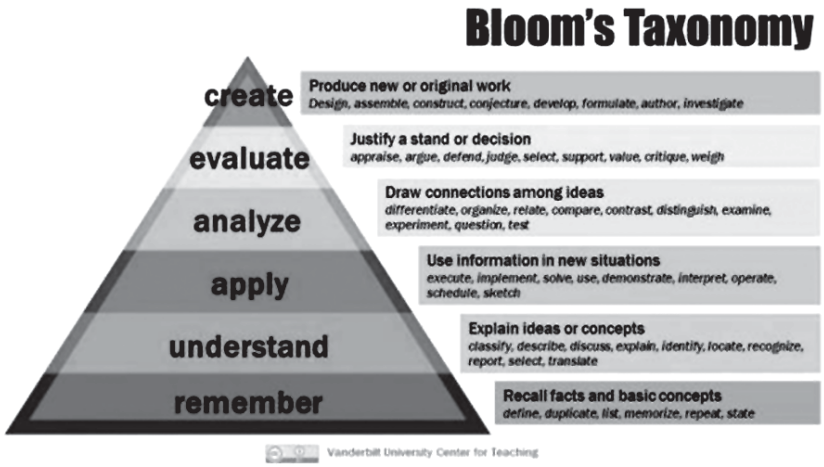
Text books:

1. L. S. Bobrow, Fundamentals of Electrical Engineering, Oxford University Press, 2011.
2. E. Hughes, Electrical and Electronics Technology, Pearson, 2010.

Suggested Reading:

1. D. P. Kothari & I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.

2. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989
3. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill,2009
4. P.V.Prasad, S.sivanagaraju, R.Prasad, "Basic Electrical and Electronics Engineering" Cengage Learning, 1st Edition, 2013.



18EE C02

BASIC ELECTRICAL ENGINEERING LAB

Instruction	2 Hours per week
Duration of Semester End Examination	2 Hours
Semester End Examination	35 Marks
CIE	15 Marks
Credits	1

Course Objectives:

1. To acquire the knowledge of different types of electrical elements.
2. To verify the basic electrical circuit laws and theorems.
3. To determine the parameters and power factor of a coil.
4. To calculate the time and frequency responses of RLC circuits
5. To determine the characteristics of Transformers
6. To determine the characteristics of dc and ac machines

Course Outcomes: At the end of the course, the students are expected to

1. Get an exposure to common electrical components and their ratings
2. Make electrical connections by wires of appropriate ratings
3. Understand the circuit analysis techniques.
4. Determine the parameters of the given coil.
5. Understand the basic characteristics of transformer
6. Understand the basic characteristics of dc and ac machines

List of Laboratory Experiments/Demonstrations:

1. Demonstration of Measuring Instruments and Electrical Lab components
2. Verification of KCL and KVL
3. Time response of RL and RC circuits
4. Calculation of permittivity of a choke or coil by Wattmeter Method
5. Verification of Thevenin's and Norton's theorems
6. Turns ratio /voltage ratio verification of 1-Ph Transformers
7. OC and SC tests on a given 1-Ph Transformer
8. Observation of Excitation Phenomenon in Transformer
9. Measurement of 3-Ph power in a balanced system (By 2- Wattmeter method)
10. Measurement of 3-Ph Energy by an Energy Meter (Demonstration of Principle)
11. Load test of DC Shunt motor
12. Speed control of DC Shunt motor

13. Load test of 3-Ph Induction motor
14. Demonstration of LT Switchgear Equipment/Components
15. Demonstration of cut - out section of Machines like DC Machine, Induction Machine etc.

Note: at least **TEN** experiments should be conducted in the semester

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY(A)
SCHEME OF INSTRUCTION AND EXAMINATION
B.E/B.Tech under AICTE Model Curriculum
B.E. (EEE)

SEMESTER-IV

Sl. No	Course Code	Title of the Course	Scheme of Instruction			Scheme of Examination			
			Hours per week			Duration In Hours	Maximum Marks		Credits
			L	T	P		CIE	SEE	
1.	18CS C05	Basics of Data Structures	2	-	-	3	30	70	2
2.	18EE C09	Digital Electronics	3	-	-	3	30	70	3
3.	18EE C10	Electrical Machines-1	3	1	-	3	30	70	4
4.	18EE C11	Power Systems-I	3	-	-	3	30	70	3
5.	18ME C09	Principles of Management	3	-	-	3	30	70	3
6.	18CE M01	Environmental Science	2	-	-	2	-	50	-
PRACTICALS									
7.	18CS C06	Basics of Data Structures lab	-	-	2	2	15	35	1
8.	18EE C12	Digital Electronics Lab	-	-	2	2	15	35	1
9.	18EE C13	Electrical Machines-1 Lab	-	-	2	2	15	35	1
10.	18EG C03	Soft Skills Lab	-	-	2	2	15	35	1
		Total	16	1	8		210	540	19

L: Lecture T: Tutorial D: Drawing P: Practical
CIE - Continuous Internal Evaluation SEE - Semester End Examination

18CS C05

BASICS OF DATA STRUCTURES
(Common for other Programmes)

Instruction	3 Hours per week
Duration of Semester End Examination	3 Hours
SEE	70 Marks
CIE	30 Marks
Credits	2

Pre-requisites: Basic knowledge of programming language such as C or C++ is preferred (but not mandatory) and some mathematical maturity also will be expected.

Course Objectives:

1. To basic linear and non-linear data structures.
2. To analyzing the performance of operations on data structures.
3. To different sorting and searching techniques and their complexities.

Course Outcomes: After completion of this course, students will be able to:

1. Understand the basic concepts of data structures.
2. Understand the notations used to analyze the performance of algorithms.
3. Choose and apply an appropriate data structure for a specified application.
4. Understand the concepts of recursion and its applications in problem solving.
5. Demonstrate a thorough understanding of searching and sorting algorithms.

UNIT - I

Introduction: Data Types, Data structures, Types of Data Structures, Operations, ADTs, Algorithms, Comparison of Algorithms, Complexity, Time- space tradeoff.
Recursion: Introduction, format of recursive functions, recursion Vs. Iteration, examples.

UNIT - II

Linked Lists: Introduction, Linked lists and types, Representation of linked list, operations on linked list, Comparison of Linked Lists with Arrays and Dynamic Arrays.

UNIT - III

Stacks and Queues: Introduction to stacks, applications of stacks, implementation and comparison of stack implementations. Introduction to queues, applications of queues and implementations, Priority Queues and applications.

UNIT - IV

Trees: Definitions and Concepts, Operations on Binary Trees, Representation of binary tree, Conversion of General Trees to Binary Trees, Representations of Trees, Tree Traversals, Binary search Tree.

UNIT - V

Graphs: Introduction, Applications of graphs, Graph representations, graph traversals, Minimal Spanning Trees.

Searching and Sorting: Linear searching, binary Searching, sorting algorithms-bubble sort, selection sort, quick sort, heap sort.

Text Books:

1. Narasimhaarumanchi, Data Structures and Algorithms Made Easy, CareerMonk Publications, 2017
2. S. Sahni and Susan Anderson-Freed, Fundamentals of Data structures in C,E.Horowitz, Universities Press, 2nd Edition.
3. ReemaThareja, Data Structures using C, Oxford University Press.

Suggested Reading:

1. D.S.Kushwaha and A.K.Misra, Data structures A Programming Approach with C, PHI.
2. Seymour Lipschutz, Data Structures with C, Schaums Outlines, Kindle Edition

18EE C09

DIGITAL ELECTRONICS

Instruction	3 Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	3

Course Objectives:

1. To understand the working of logic families and logic gates
2. To know the design and implementation of combinational and sequential logic circuits.
3. To Understand the process of A/D and D/A conversions and PLD's in implementing the given logical problems.

Course Outcomes: After completion of this course, students will be able to:

1. Understand working of logic families and logic gates.
2. Design and implement combinational digital circuits.
3. Design and implement Sequential logic circuits
4. Understand the process of Analog to Digital conversion and Digital to Analog conversion.
5. Be able to use PLD's to implement the given logical problems.

UNIT –I

Fundamentals of Digital Systems and Logic families: Digital signals, digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, examples of IC gates, number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, one's and two's complements arithmetic, codes, error detecting and correcting codes, characteristics of digital ICs, digital logic families, TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri – state logic.

UNIT –II

Combinational Digital Circuits: Standard representation for logic functions, K-map representation, simplification of logic functions using K-map, minimization of logical functions. Don't care conditions, Multiplexer, De-Multiplexer/Decoders, Adders, Subtractors, BCD arithmetic, carry look ahead adder, serial adder, digital comparator, parity checker/generator, code converters, priority encoders, decoders/Seven segment display device, Q-M method of function realization.

UNIT –III

Sequential circuits and systems: A 1-bit memory, the circuit properties of bi-stable latch, the clocked SR flip flop, J- K-T and D-types flip-flops, applications of flip-flops, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter, sequence generator, ripple(Asynchronous) counters, synchronous counters, counters design using flip flops, applications of counters.

UNIT –IV

A/D and D/A Converters: Digital to analog converters: weighted resistor/ converter, R-2R Ladder D/A converter, specifications for D/A converters, examples of D/A converter ICs, sample and hold circuit, analog to digital converters: quantization and encoding, parallel comparator A/D converter, successive approximation A/D converter, counting A/D converter, dual slope A/D converter, A/D converter using voltage of frequency and voltage to time conversion, specifications of A/D converters, example of A/D converter ICs.

UNIT –V

Semiconductor memories and Programmable logic devices: Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory (RAM), commonly used memory chips, ROM as a PLD, Programmable logic array, Programmable array logic.

Text Books:

1. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.
2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.

Suggested Readings:

1. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.
2. S. Salivahanan " Digital circuits and design", 4th edition, Vikas Publishing house, 2010.

18EE C10

ELECTRICAL MACHINES-I

Instruction	3L + 1T Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	3

Course Objectives:

1. To Inculcate the principles of Electromechanical Energy Conversions.
2. To analyze the performance aspects of DC Machines.
3. To Impart knowledge of poly phase transformer.

Course Outcomes: After completion of this course, students will able to:-

1. To understand the concepts of electromechanical energy conversion.
2. Acquire the knowledge of Construction, operation characteristics of DC generators.
3. Evaluate performance characteristics, testing and applications of DC Motors.
4. Describe operation, regulation and efficiency of single phase transformer.
5. Analyze the three phase transformer connections and cooling methods.

UNIT-I

Electromechanical energy conversion: Forces and torques in magnetic field system, energy balance, singly excited and multiple excited magnetic systems, co energy. MMF, flux, reluctance, series and parallel magnetic circuits, B-H curve of magnetic materials.

UNIT-II

DC Generators: Constructional features of a DC machine, Principle of operation, armature windings diagram (Lap and Wave winding), EMF equation of a DC generator, Armature reaction and its effects, process of commutation, methods of improving commutation, methods of excitation and classification of DC generators, voltage build-up in a shunt generator, critical field resistance and critical speed, generator characteristics, losses and efficiency, parallel operation and applications of DC generators.

UNIT-III

DC Motors: Principle of operation**,** back EMF and significance of back EMF, electromagnetic torque, types of DC motors, characteristics, speed control of DC motors, necessity of starter, three point starter and four point starter, losses and efficiency, applications of DC motors.

Testing of DC machines: Swinburne's test, brake test, Hopkinson's test, fields test, retardation test and separation of losses.

UNIT-IV

Single Phase Transformer : Constructional features, principle of operation, EMF equation, ideal transformer, transformer on NO load and ON load and its phasor diagrams, equivalent circuit, losses in transformer, voltage regulation and efficiency, All day efficiency, parallel operation of transformer.

Testing of transformer: Polarity test, Open circuit and short circuit test, Sumpner's test, separation of losses.

Auto transformer: - Construction, principle, applications and comparison with two winding transformer

UNIT-V

Three Phase Transformers: Construction, types of connection and their comparative features, Scott connection. Tap-changing transformers: No-load and on-load tap-changing of transformers, Three- winding transformers, Cooling of transformers.

Text Books:

1. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.
2. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
3. H.Cotton, Advanced Electrical Technology, Wheeler & Co, CBS publishers, 7th Edition, 2005.
4. J.B Gupta, Theory and performance of electrical machines, S.K. Kataria & Sons, 14th Edition, 2014.

Suggested Readings:

1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
2. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.
3. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
4. Ashfaq Hussain "Electrical Machines" Danapatrai and sons, 3rd Edition 2012.

18EE C11

POWER SYSTEMS - I

Instruction	3 Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	3

Course Objectives:

1. To introduce Generation of energy through conventional sources such as: Thermal, Hydro and Nuclear and renewable energy sources
2. To familiarize mechanical design of transmission lines and cables.
3. To familiarize present practices in tariff calculations and understand the classification and connection schemes of distribution systems

Course Outcomes: After completion of this course, students will be able to:

1. Gain knowledge of construction and operation of conventional and non-conventional sources of energy along with financial management
2. Know the effects sag on transmission lines.
3. Acquire the concepts to study the performance of insulators and cables
4. Understand the concept of Overhead Transmission Lines and Cable
5. Understand the concept of Economics of Power Generation and the concept of AC and DC distribution.

UNIT-I

Basic Concepts : Evolution of Power Systems and Present-Day Scenario. Structure of a power system: Bulk Power Grids and Micro-grids.

Generation: Thermal- Hydro -Power Plants: Principles, Choice of site, layout and various parts of generating stations, Brief description of Hydro Power Plant Dam, Spillways, Head works, Surge tank, Penstocks, Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, ash and flue gasses, Brief description of TPS components: Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and Cooling towers.

Nuclear Station: Schematic Arrangement of Nuclear Power Station, Advantages and disadvantages, Types of Nuclear reactors

UNIT-II

Solar and Wind Sources: Solar cell fundamentals, Solar Cell characteristics, solar cell classification, solar cell, Module, Panel and Array Construction,

Maximizing the solar PV output and load matching, Solar PV Systems
Basic Principles of Wind Energy Conversion, The Nature of the Wind, The Power in the Wind, Forces on the Blades, Wind Energy Conversion, Wind Data and Energy Estimation, Site Selection Considerations.

UNIT-III

Line Parameter Calculations: Inductance & Capacitance calculations of Transmission Line, single-phase and three-phase symmetrical composite conductors, GMD, GMR, Transposition of conductors, Bundled conductors, effect of earth capacitance.

UNIT-IV

Overhead Transmission Lines and Cables: Overhead line materials, supports, types, Ground wires, Sag /Tension calculations, Equal / Unequal supports, Effects of wind, ice / Erection Conditions Stringing charts. Insulators, Types, Material for construction, potential distribution over string of insulators, equalizing of potential, Methods.

Underground Cables: Construction of Cables, Insulating Materials for Cables, Classification of Cables, Insulation Resistance of a Single-Core Cable, Capacitance of a Single-Core Cable, Dielectric Stress in a Single-Core Cable, Most Economical Conductor Size in a Cable, Grading of Cables,Capacitance Grading, Inters heath Grading, Capacitance of 3-Core Cables, Measurements of Ce and Cc.

UNIT-V

Economics of Power Generation: Load curve, Load demand and diversified factors, Base load operation, Types of costs and depreciation calculations; Tariffs, different types of tariffs; Methods of power factor improvement.

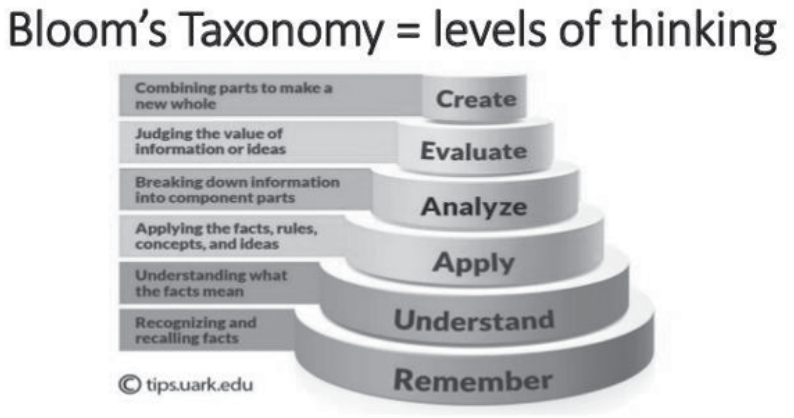
General Aspects of AC and DC Distribution Systems-Types of D.C. & A.C Distributors, Calculations for Distributor fed at one end, distributor fed at both ends.

Text Books:

1. J. Grainger and W. D. Stevenson, “Power System Analysis”, McGraw Hill Education, 1994.
2. C.L.Wadhwa, “Electric Power Systems Theory”, New Academic science Limited, 2012.
3. B.H. Khan, “Non Conventional Energy Resources” Mc Graw Hill Education, 2015.

Suggested Reading:

1. A. R. Bergen and V. Vittal, “Power System Analysis”, Pearson Education Inc., 1999.
2. D. P. Kothari and I. J. Nagrath, “Modern Power System Analysis”, McGraw Hill, 2003.
3. B. M. Weedy, B. J. Cory, N. Jenkins, J. Ekanayake and G. Strbac, “Electric Power Systems”, Wiley, 2012.



18ME C09

PRINCIPLES OF MANAGEMENT

Instruction	3 Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	3

Course Objectives: To make the students to

1. To Understand basic fundamentals and insights of management
2. To Understand the nature and purpose of planning
3. To Gain the knowledge about the frame work of organizing
4. To Understand the essence and significance of directing
5. To Recognize the importance of controlling and its outcomes

Course Outcomes: At the end of this course, student will be able to:

1. Identify and evaluate the principles of management
2. Demonstrate the ability to have an effective and realistic planning
3. Identify the nature and the type of organization
4. Apply the tools and techniques of directing
5. Explain and evaluate the necessity for controlling and further refinement of an organization.

UNIT - I

Management: Definition of management**,** science or art, manager vs entrepreneur; managerial roles and skills;. Evolution of management, Basic management theories by FW Taylor, Henry Fayol, Types of Business Organizations, sole proprietorship, partnership, company, public and private enterprises; Organization culture and environment; Current trends and issues in management

UNIT - II

Planning: Nature and purpose of Planning, types of Planning, objectives, setting objectives, policies, Strategic Management, Planning Tools and Techniques, Planning plant location and layout, Decision making steps & processes.

UNIT - III

Organizing: Nature and purpose of Organizing, formal and informal organization, organization structure, types, line and staff authority, departmentalization, delegation of authority, centralization and decentralization, job design, human

resource management, HR planning, Recruitment selection, Training & Development, Performance Management, Career planning and Management

UNIT - IV

Directing: Individual and group behavior, motivation, motivation theories, motivational techniques, job satisfaction, job enrichment, leadership, types & theories of leadership, effective communication.

UNIT - V

Controlling: system and process of controlling, budgetary and non-budgetary control techniques, use of computers and IT in management control, productivity problems and management, control and performance, direct and preventive control, reporting.

Text Books:

1. S.P. Robins and M. Couiter, "Management", 10/e., Prentice Hall India, 2009.
2. JAF Stoner, RE Freeman and DR Gilbert, "Management", 6/e., Pearson Education, 2004.

Suggested Reading:

1. P.C. Tripathy & P.N. Reddy, "Principles of Management", Tata McGraw Hill, 1999
2. Harold Koontz and Cyril O'Donnell "Principles of Management'', Tata McGraw Hill, 2017

18CE M01

ENVIRONMENTAL SCIENCE

Instruction	2 Hours per week
Duration of Semester End Examination	2 Hours
Semester End Examination	50 Marks
CIE	0 Marks
Credits	0

Course Objectives:

1. To Identify environmental problems arising due to engineering and technological activities and the science behind those problems.
2. To Become aware about the importance of eco system and biodiversity for maintaining ecological balance
3. To identify the importance of interlinking of food chain
4. To Learn about various attributes of pollution management and waste management practices.
5. To make the students contribute for capacity building of nation for arresting and/or managing environmental disasters.

Course Outcomes: At the end of the course, the student should have learnt

1. To define environment, identify the natural resources and ecosystems and contribute for the conservation of bio-diversity.
2. To suggest suitable remedial measure for the problems of environmental pollution and contribute for the framing of legislation for protection of environment.
3. To relate the social issues and the environment and contribute for the sustainable development.
4. To follow the environmental ethics.
5. To contribute for the mitigation and management of environmental disasters.

UNIT – I:

Environmental Studies: Definition, Scope and importance, need for public awareness.

Natural resources: Use and over utilization of Natural Resources - Water resources, Food resources, Forest resources, Mineral resources, Energy resources, Land resources.

UNIT – II:

Ecosystems: Concept of an ecosystem, structure and function of an ecosystem, role of producers, consumers and decomposers, energy flow in an ecosystem,

food chains, food webs, ecological pyramids, Nutrient cycling, Bio-geo chemical cycles, Terrestrial and Aquatic ecosystems.

UNIT – III:

Biodiversity: Genetic, species and ecosystem biodiversity, Bio-geographical classification of India, India as a Mega diversity nation. Values of biodiversity, hot-spots of biodiversity, threats to biodiversity, endangered and endemic species of India, methods of conservation of biodiversity.

UNIT – IV:

Environmental Pollution: Cause, effects and control measures of air pollution, water pollution, marine pollution, soil pollution, noise pollution and Solid waste management, nuclear hazards

Environmental Legislations: Environment protection Act, Air, Water, Forest & Wild life Acts, issues involved in enforcement of environmental legislation, responsibilities of state and central pollution control boards

UNIT – V:

Social issues and the environment: Water conservation methods: Rain water harvesting and watershed management, Environmental ethics, Sustainable development and Climate change: Global warming, Ozone layer depletion, forest fires, and Contemporary issues.

Text Books:

1. Y. Anjaneyulu, *"Introduction to Environmental Science"*, B S Publications, **2004**.
2. Suresh K. Dhameja, *"Environmental Studies"*, S. K. Kataria& Sons, **2009**.

Suggested Reading:

1. C. S. Rao," *Environmental Pollution Control Engineering"*, Wiley, **1991**.
2. S. S. Dara, *"A Text Book of Environmental Chemistry &Pollution Control"*, S. Chand Limited, 2006

18CS C06

BASICS OF DATA STRUCTURES LAB

Instruction	2 Hours per week
Duration of Semester End Examination	2 Hours
SEE	35 Marks
CIEv	15 Marks
Credits	1

Pre-requisites: Any Programming Language(C)

Course Objectives:

1. Design and construct simple programs by using the concepts of Data structures as abstract data type.
2. To have a broad idea about how efficiently pointers can be used in the implement of data structures.
3. To enhance programming skills while improving their practical knowledge in data structures.
4. To strengthen the practical ability to apply suitable data structure for real time applications.

Course Outcomes: The Student will be able to

1. Implement the abstract data type.
2. Implement linear data structures such as stacks, queues using array and linked list.
3. Understand and implement non-linear data structures such as trees, graphs and its traversal techniques.
4. Implement various kinds of searching, sorting techniques.
5. Develop the suitable data structure for real world problem.

List of Experiments

1. Implementation of operations on arrays.
2. Implementation of Stack.
3. Implementation of Queue.
4. Implementation of basic operations on Single Linked List.
5. Implementation of Searching techniques.
6. Implementation of Sorting techniques.
7. Case study like Banking System, Students Marks Management, Canteen Management etc.

Text Books:

1. Brian W Kernighan, Dennis Ritchie, C Programming Language, PH PTR, 2nd Edition.
2. Richard M Reese, Understanding and Using C Pointers,O'Reily , 2013.

Web Links:

https://nptel.ac.in/courses/106102064/

18EE C12

DIGITAL ELECTRONICS LAB

Instruction	2 Hours per week
Duration of Semester End Examination	2 Hours
Semester End Examination	35 Marks
CIE	15 Marks
Credits	1

Course Objectives:

1. To verify Demorgan's Theorem, SOP, POS forms
2. To design and implement Full/Parallel Adders, Subtractors and Magnitude Comparators, multiplexers, de-multiplexers and decoders using logic gates
3. To construct various flip-flops, shift registers and design different counters.

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

1. Demonstrate the truth table of various expressions and combinational circuits using logic gates.
2. Design, test and evaluate various combinational circuits such as adders, subtractors, comparators, multiplexers and demultiplexers.
3. Construct flips-flops,
4. Design synchronous and asynchronous counters
5. Apply shift registers in various circuits.

LIST OF EXPERIMENTS

1. Verify
   (a) Demorgan's Theorem for 2 variables.
   (b) The sum-of product and product-of-sum expressions using gates.
2. Design and implement
   (a) Full Adder using basic logic gates.
   (b) Full subtractor using basic logic gates
3. Design and implement 4-bit Parallel Adder/ subtractor using IC 7483.
4. Design and Implementation of 4-bit Magnitude Comparator using IC 7485.
5. Realize
   (a) 4:1 Multiplexer using gates.
   (b) 3-variable function using IC 74151(8:1MUX).
6. Realize 1:8 Demux and 3:8 Decoder using IC74138.

7. Realize the following flip-flops using NAND Gates.
   (a) Clocked SR Flip-Flop
   (b) JK Flip-Flop
8. Realize the following shift registers using IC7474
   (a) SISO (b) SIPO (c) PISO (d) PIPO.
9. Realize the Ring Counter and Johnson Counter using IC7476.
10. Realize the Mod-N Counter using IC7490.
11. Synchronous counters.
12. Asynchronous counters.

Note: At least **TEN** experiments should be conducted in the Semester

18EE C13

ELECTRICAL MACHINES-I LAB

Instruction	2 Hours per week
Duration of Semester End Examination	2 Hours
Semester End Examination	35 Marks
CIE	15 Marks
Credits	1

Course objectives:

1. To understand the practical connections of the machines.
2. To draw the characteristics of different types of generators.
3. To test the DC machines and single phase transformer under different loading conditions for their performance.

Course Outcomes: After completion of this course, students will be able to:

1. Make the connections for DC machines and single phase transformer for their applications.
2. Design the meter ratings for various applications of DC machines and single phase transformer.
3. Control the speed of the DC motor by different methods.
4. Determine the efficiency of the given DC machine and single phase transformer.
5. Test the DC machine and single phase transformer for their performance.

LIST OF EXPERIMENTS

1. OCC and Load characteristics of separately excited DC generator.
2. OCC and load characteristics of DC shunt generator.
3. Load characteristics of DC compound generator.
4. Speed control of DC shunt motor by field control and armature control
5. Swinburne's test on DC shunt machine to predetermine the efficiency of DC shunt machine at any given load
6. Load test on DC shunt motor.
7. Load test on DC series motor.
8. Hopkinson's test on DC shunt machines.
9. Separation of stray losses of DC shunt machine.
10. OC and SC test on single phase transformer.
11. Load test on single phase transformers.
12. Sumpners test on two identical transformers.

Note: At least **TEN** experiments should be conducted in the semester.

18 EG C03

SOFT SKILLS LAB

Instruction	2 Hours per week
Duration of Semester End Examination	2 Hours
Semester End Examination	35 Marks
CIE	15 Marks
Credits	1

Course Objectives: The course will introduce the students to:

1. Imbibe an impressive personality, etiquette, professional ethics & values, effective time management & goal setting.
2. Understand the elements of professional update & upgrade through industry exposure in a mini-live project. Understand confidence building strategies and thereby to make effective presentations through PPTs.
3. Learn what constitutes proper grooming and etiquette in a professional environment. Acquire the necessary skills to make a smooth transition from campus to corporate.

Course Outcomes: After successful completion of the course the students will be able to :

1. Be assertive and set short term and long term goals. Also learn to manage time effectively and deal with stress.
2. Win in professional communication situations and participate in group discussions with confidence. Write abstracts.
3. Write effective resumes. Plan, prepare and face interviews confidently.
4. Adapt to corporate culture by being sensitive - personally and sensible - professionally. Draft an SOP.
5. Apply the soft skills learnt in the mini-live project, by collecting and analyzing data and making oral and written presentations on the same.

Exercise 1

Main Topics: Thinking Skills, Personality Development – Effective Time Management, setting realistic goals, self confidence and assertiveness, stress management, moral values.

Flipped Sessions: Personal Sensitivity & Professional Sensibility (Reading & Discussion)

Writing Input: Writing to Express - Drafting & Delivering a Speech (Free Writing Exercise)

Exercise 2

Main Topics: Advanced Group Discussion with Case studies : Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.

Flipped Sessions: Importance of Professional Updating & Upgrading (Reading & Discussions)
Writing Input: Writing with Precision - Writing Abstracts.

Exercise 3
Main Topics: Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, mock interviews. Resume' writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skills.
Flipped Sessions: Mock Interviews (Video Sessions & Practice)
Writing Input: Writing to Reflect - Resume Writing.

Exercise 4
Main Topic: Corporate Culture – Grooming and etiquette, communication media, academic ethics and integrity
Flipped Sessions: Corporate Culture, Etiquette & Grooming (Video Sessions & Practice through Role-play)
Writing Input: Writing to Define - Writing an effective SOP.

Exercise 5
Main Topic: Mini Project – General/Technical. Research, developing a questionnaire, data collection, analysis, written report and project seminar. Elements & Structure of effective presentation. Presentation tools – Body language, Eye-contact, Props & PPT.
Flipped Sessions: Effective Presentations (Video & Writing Sessions, Practice through Emulation)
Writing Input: Writing to Record - Writing minutes of meeting.

Suggested Reading:

1. Madhavi Apte , "**A Course in English communication**", Prentice-Hall of India, 2007
2. Dr. Shalini Verma, **"Body Language- Your Success Mantra**", S Chand, 2006
3. Ramesh, Gopalswamy, and Mahadevan Ramesh, "**The ACE of Soft Skills",** New Delhi: Pearson, 2010
4. Van Emden, Joan, and Lucinda Becker, "**Presentation Skills for Students**", New York: Palgrave Macmillan, 2004

* Flipped Class-room: Students explore the concept first and then trainer explains it, students work on their own.

Web Resources:

1. https://www.goskills.com/Soft-Skills
2. https://www.trainerbubble.com
3. https://www.skillsconverged.com