GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTATIONAL MATHEMATICS FOR ENGINEERS

Code: GR22A2009 **L/T/P/C: 3/0/0/3**

II Year I Semester

Course Objectives

1. Distinguish between analytical and numerical solutions arising in mathematics
2. Learn methods that provide solutions to problems not possessing an analytical solution
3. Acquire skills to estimate derivatives and integrals numerically
4. Understand the usefulness of the principle of least squares
5. Understand the principles of numerical techniques require to solve ODE and PDE

Course Outcomes

1. Apply well known techniques to find real roots of an equation and linear algebraic systems by iterative methods
2. Apply interpolation and numerical differentiation techniques for univariate data
3. Solve problems related to numerical integration and least squares approximations of a function
4. Choose appropriate numerical techniques to solve IVP and BVP in ODE
5. Distinguish between various numerical methods to solve PDE arising in the context of heat conduction

UNIT I

Root finding and Numerical solution of linear algebraic systems

Finding the real root of algebraic and transcendental equations by Regula-Falsi and Newton Raphson methods -Gauss Jacobi and Gauss Seidel iterative methods to solve a linear algebraic system with error analysis

UNIT II

Interpolation - Cubic spline- Differentiation

Interpolation with non-uniform data: Newton divided differences formula, operational calculus, Interpolation with uniform data- Newton and Gauss formulas, Fitting natural cubic spline to data
Numerical differentiation for uniform and non-uniform data

UNIT III

Numerical integration and Curve approximations

Numerical integration by Trapezoidal rule, Simpson's 1/3rd and $3/8^{th}$ rules – The Principle of least squares, Fitting a straight line, parabola, exponential and power curve, Simple and Multiple linear regression with 2 independent variables

UNIT IV

Numerical solution of initial and boundary value problems in ODE

Taylor's series method, Picard's method, Euler method, Modified Euler method and R-K fourth order methods to solve initial value problems in ODE - Finite differences method to solve boundary value problems in ODE

UNIT V

Numerical solution initial and boundary value problems in PDE

Solution of Laplace's equation by Jacobi, Gauss-Seidel method and Successive over relaxation (SOR)

methods, Solution of Heat equation by the finite difference method.

Text Books

1. M.K.Jain, S.R.K. Iyengar, R.K.Jain-.Numerical methods for scientific and engineering computation-New Age International publishers-Fourth edition-2—3
2. Robert J.Schilling and Sandra L.Harries- Applied numerical methods for engineers using MATLAB and C-Thomson Brooks/Cole-2002

Reference Books

1. S.S.Sastry- Introductory methods of numerical analysis- Prentice Hall (India)- Fourth edition- 2010

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ELECTRICAL CIRCUIT ANALYSIS

Course Code: GR22A2024 **L/T/P/C:2/1/0/3**
II Year I Semester

Course Objectives

1. Describe the various properties of Fourier series and Fourier transforms.
2. Evaluate the three phase circuits and dot convention of a coupled circuit.
3. Apply the Laplace Transforms to electrical circuits.
4. Solve the network parameters of two port networks.
5. Simplify theorems & transient state analysis of a circuit.

Course Outcomes

1. Summarize the concept of Fourier Series and Fourier transforms.
2. Analyze three-phase and mutually coupled circuits.
3. Solve electrical circuits using Laplace and Inverse Laplace transform.
4. Simplify network by two port parameters.
5. Apply the network theorems & transient response of given AC circuits.

UNIT I
THREE PHASE CIRCUITS AND COUPLED CIRCUITS
Three-phase circuits: analysis of balanced and unbalanced circuits, measurement of power by three- and two-wattmeters, measurement of reactive power by single wattmeter.

UNIT II
SOLUTION OF FIRST AND SECOND ORDER NETWORKS
Solution of first and second order differential equations for Series and parallel RL, RC, RLC circuits, initial and final conditions in network elements, time constants, steady state and transient response Concept of Duality and Dual Networks.

UNIT III
ELECTRICAL CIRCUIT ANALYSIS USING LAPLACE TRANSFORMS
Introduction to 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.

UNIT IV
TWO PORT NETWORKS
Two Port Networks, terminal pairs, relationship of two port variables, impedance, admittance, hybrid and transmission parameters, condition for symmetry and reciprocity, interrelation ship between various parameters, interconnections of two port networks (series, parallel and cascade)

UNIT V
FOURIER SERIES AND FOURIER TRANSFORM
Representation of continuous-time periodic signals by Fourier series; Dirichlet's conditions; Properties of Fourier series, Trigonometric and Exponential Fourier series.

Fourier transform: Fourier transform of periodic signals, Properties of Fourier transforms, Fourier transforms involving impulse function.

Textbooks

1. W.H.Hayt and J.E.Kemmerly, "Engineering Circuit Analysis", McGraw Hill Education,2013.
2. C.K.Alexander and M.N.O.Sadiku,"Fundamentals of Electric Circuits",McGraw Hill Education,2004.
3. Sreenivasulu N "Electrical Circuits", Reem Publications, 2009.

Reference Books

1. A.Chakrabarti – Dhanpat Rai & Co "Circuit Theory"(Analysis and Synthesis).
2. N.C.Jagan and C.Lakshmi narayana "Network Theory", BS Publications.
3. K.V.V.Murthy and M.S.Kamath,"Basic Circuit Analysis",JaicoPublishers,1999.
4. D.RoyChoudhury,"Networks and Systems",NewAgeInternationalPublications,1998.
5. M.E.Van Valkenburg, "Network Analysis", Prentice Hall, 2006.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PRINCIPLES OF ANALOG ELECTRONICS

Course Code: GR22A2025 **L/T/P/C: 3/0/0/3**
II Year I Semester

Course Objectives
1. Understand the diode principle, to analyze applications.
2. Comprehend the principle and characteristics of BJT, MOSFET circuits.
3. Emphasis the working of Operational Amplifiers.
4. Study the linear & non-linear applications of Op-Amps.
5. Study the functioning of Op-Amp based Digital to analog and Analog to digital converters.

Course Outcomes
1. Analyze the diode principle, rectifier, clipping and clamping circuits.
2. Understand the characteristics of BJT, MOSFET transistors.
3. Illustrate Op-Amp circuits in different applications.
4. Demonstrate the principle and operation of Waveform generators and Multivibrator circuits.
5. Identify Op-Amp based Digital to analog and Analog to digital converters.

UNIT I
DIODE CIRCUITS
P-N junction diode, biasing, V-I characteristics of a diode, diode equivalent circuits, static resistance, dynamic resistance, Zener breakdown, & Avalanche breakdown. Working of Half-wave and full-wave rectifiers, Clipping, types of clipping circuits, series. Clipper, Shunt Clipper, Clamping, types of clamping circuits.

UNIT II
BJT AND JFET CIRCUITS
BJT Structure, Principle and Operation of BJT, Types NPN, PNP, Common Emitter, Common Base and Common Collector Configurations, Input characteristics and Output Characteristics of a BJT; BJT as a switch, and amplifier, Operating point, DC Load line & AC load line.
Bipolar Junction Transistor small signal Hybrid parameter model, Common-emitter, common-base and common collector amplifiers, JFET Structure, principle, Types N-Channel, P-Channel , drain current - characteristics. UJT construction and principle.

UNIT III
OPERATIONAL AMPLIFIERS
Introduction to Operational Amplifier, block diagram of operational amplifier, ideal characteristics of op-amp, practical op-amp, idealized analysis of op-amp circuits. Inverting, non-inverting amplifier and Voltage Follower Circuit.
DC characteristics of op-amp: input bias current, input offset current, Input Offset Voltage, thermal drift, slew rate.

UNIT IV
LINEAR & NONLINEAR APPLICATIONS OF OP-AMP
Inverting summing amplifier, Non-Inverting Summing amplifier, Subtractor circuit, differential amplifier, instrumentation amplifier, integrator, differentiator.

UNIT V

OSCILLATORS

Basic principle of an Oscillator, RC Phase shift and Wein bridge Oscillators, Schmitt Trigger Circuit, Zero Crossing Detector, Square-wave (Astable Multivibrator), Precision rectifier, peak detector, Monostable Multivibrator.

Text/References Books

1. S. Sedra and K. C. Smith, ―Microelectronic Circuits‖, New York, Oxford University Press,1998.
2. D Roy Choudhury, Shail B Jain, ―Linear Integrated Circuits‖, New Age International Pvt. Ltd., Fourth Edition.
3. J. V. Wait, L. P. Huelsman and G. A. Korn, ―Introduction to Operational Amplifier theory and applications‖, McGraw Hill U. S.,1992.
4. P. R. Gray, R. G. Meyer and S. Lewis, ―Analysis and Design of Analog Integrated Circuits, John Wiley& Sons,2001.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DC MACHINES AND TRANSFORMERS

Course code:GR22A2026 **L/T/P/C : 3/0/0/3**
II Year I Semester

Course Objectives

1. Knowledge on the concepts of principals of DC machines.
2. Study the operation of dc machines.
3. Analyze different types of dc machine.
4. Understanding the testing methods of single-phase Transformers.
5. Analyze single phase and three phase transformers circuits.

Course Outcomes

1. Interpret the magnetic field in Dc Machine.
2. Summarize concepts of generators and its applications.
3. Select the appropriate DC motors for a given applications and materials for transformers.
4. Analyze the performance of Transformers.
5. Outline the performance of Three-phase transformer.

UNIT I
DC MACHINES

Basic construction of a DC machine, magnetic structure - stator yoke, stator poles, pole-faces or shoes, air gap and armature core, Armature windings- lap and wave windings, visualization of magnetic field produced by the field winding excitation with armature winding open, air gap flux density distribution, flux per pole, induced EMF in an armature coil. Principle Electro-mechanical energy conversion.

UNIT II
DC GENERATORS

Principle-Simple Loop generator, commutator action, construction, EMF equation, and commutation – Elementary armature coil and commutator, lap and wave windings, construction of commutator, linear commutation. Types of field excitations – separately excited, self-excited. Open circuit characteristic of separately excited DC generator, back EMF with armature reaction, voltage build-up in a shunt generator, critical field resistance and critical speed. Characteristics of all generators, Applications.

UNIT III
DC MOTORS

Working principle of motor, construction, types of motors, and its applications Derivation of back EMF equation, armature MMF wave, derivation of torque equation, armature reaction, air gap flux density distribution with armature reaction. Armature circuit equation for motoring and generation, Significance of back EMF, V-I characteristics and torque-speed characteristics self-excited. Speed control methods, Losses, load testing and testing of DC machines.

UNIT IV
SINGLE-PHASE TRANSFORMERS

Construction and operation of single-phase transformers, types of transformers, equivalent circuit, phasor diagram of Transformer No-load and ON-load.

Voltage regulation, losses and efficiency –Maximum Efficiency-Testing - open circuit and short circuit tests, polarity test, back-to-back test, separation of hysteresis and eddy current losses- effect of frequency and supply voltage. Autotransformers - construction, principle, applications and comparison with two winding transformer, Magnetizing current, effect of nonlinear B-H curve of magnetic core material, harmonics in magnetization current. All-day efficiency, KVA rating.

UNITV

THREE-PHASE TRANSFORMERS

Three-phase transformer - construction, types of connection and their comparative features, Parallel operation of and three-phase transformers, Phase conversion - Scott connection, three-phase to six-phase conversion, Tap-changing transformers. Testing of three phase transformers.

Text Books

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2012.

Reference Books

1. A.E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.
2. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ELECTROMAGNETIC FIELDS

Course Code: GR22A2027 **L/T/P/C: 3/0/0/3**
II Year I Semester

Course Objectives

1. Apply vector Calculus and different coordinates systems for Electro and Magnetic systems.
2. Understand the knowledge of Electro field theory for Point, Line, Surface Charges.
3. Understand the concept of conductors, dielectrics, inductance, capacitance.
4. Ability to do Calculations of MFI for Line, Surface Conductors with different Shapes.
5. Ability of mathematical representation and analysis of EM waves at media interfaces.

Course Outcomes

1. Illustrate the Electric Field Intensity with respect to free space.
2. Summarize the Electric Field Intensity with respect to materials space.
3. Evaluate Magnetic Field Intensity and Force in Magnetic Fields.
4. Analyze the Maxwell's Equations in Time Varying Fields, Displacement current.
5. Apply Electro-Magnetic theory on different applications.

UNIT I
STATIC ELECTRIC FIELD

Coulomb's law- Electric Field Intensity-Electrical Field due to Point charge, Line, Surface and Volume Charge distributions. Gauss Law and its Applications-Maxwell's First Law-Work done in moving a point charge in an electrostatic field, Electric potential- Properties of potential function, potential gradient-Electric Dipole-Potential and EFI due to an Electric Dipole-Electrostatic Energy density.

UNIT II
CONDUCTORS & INSULATORS

Behavior of conductors in an electric field-Current density-Conduction and Convection current densities-Ohms Law in Point form- Continuity equation of current-Electric field inside a dielectric material-Polarization and Permittivity-Boundary conditions-Boundary conditions for two perfect dielectric materials. Capacitance-Capacitance of parallel plates, co-axial cable, spherical capacitors- Poisson's equation-Laplace's equation.

UNIT III
STATIC MAGNETIC FIELDS

Biot-Savart's Law-Magnetic Field Intensity-MFI due to a straight current carrying conductor, MFI due to circular conductor- Maxwell's Second Equation-Ampere's Law and its Applications viz MFI due to infinitely long straight conductor only-Maxwell's Third Equation-Scalar and Vector Magnetic Potentials.

FORCE IN MAGNETIC FIELDS

Force on a moving point charge-Lorentz force equation- Force on a differential current element- Force between differential current elements-Magnetic Dipole and Magnetic Dipole Moment--Classification of magnetic materials- Magnetization and Permeability-Magnetic Circuits- Inductance-Self and Mutual Inductances-Neuman's Formula only.

UNIT IV

TIME VARYING FIELDS

Faraday's laws of Electromagnetic induction-it's integral and point forms-Maxwell's Fourth Equation-statically and dynamically induced EMFs-simple problems-Modification of Maxwell's equations for time varying fields-Displacement current.

UNIT V

ELECTROMAGNETIC WAVE PROPAGATION

Waves in general- wave propagation in lossy dielectrics-Plane waves in lossless dielectrics,free space, Good conductors-power and the poynting vector, Reflection of a plane wave at normal incidence, oblique incidence.

Text Books

1. Matthew N.O.Sadiku, "Principles of Electromagnetics", Oxford University Publication, Fourth Edition, 2014.
2. W.Hayt, John A.Buck "Engineering Electromagnetics", McGraw Hill Education, 2012.

Reference Books

1. Pramanik, "Electromagnetism-Problems with solution", Prentice Hall India, 2012.
2. G. W. Carter, "The electromagnetic field in its engineering aspects", Longmans, 1954.
3. Pramanik, "Electromagnetism - Theory and applications", PHI Learning Pvt. Ltd, New Delhi, 2009.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATABASE FOR ENGINEERS

Course Code:GR22A2007 **L/T/P/C: 2/0/0/2**
II Year I Semester

Course Objectives:
1. To examine different issues involved in the design and implementation of a database system.
2. To construct Structured Query Language for creating and working on tables.
3. To compose query retrieval for accessing data from databases.
4. To identify the problems of redundancy and perform decomposition.
4. To interpret the concepts of Transaction Management.

Course Outcomes:
1. To design ER Diagrams for an application and translate to logical model.
2. To develop database with the creation of tables and populating them with data.
3. To compose queries for retrieving data from the database.
4. To analyze the necessity for normal forms and other database objects in the database.
5. To interpret the need of atomicity, consistency, isolation and durability for a transaction.

UNIT I
Introduction to DBMS, Database System Applications, Database System vs. File System, Instances and Schema, ER Diagrams – Attributes and Entity Sets, Relationships and Relationship sets, Extended ER Features, Conceptual Design with ER Model, Logical Database Design, Construction of Tables using Basic DDL Commands.
To Practice:
1) Practicing ER Diagram for Hostel Management System, Airlines Reservation System.
2) Practicing DDL commands: Creating tables for various relations (in SQL).

UNIT II
Relational Model: Introduction To The Relational Model–Basic Structure, Database Schema, Integrity Constraints over relations, Keys, Construction of tables with integrity constraints using DDL and DML commands, Form of Basic SQL Query (SELECT) , SQL Operators, Use of DISTINCT keyword, Order by Clause.
To Practice:
1) Practicing DDL and DML commands: Creating tables with integrity constraints specified.
2) Practicing DQL command: Queries for above discussed commands.

UNIT III
Exploration of SELECT statement: SQL functions, Aggregate Operators, Group by and Having clauses, Joins, Types of Joins, Nested Queries, Correlated Nested Queries, Set Operators.
To Practice:
1) Practicing DQL/ DRL command: Using Select statement for various purposes as discussed in the chapter

UNIT IV
Other Database Objects: Introduction to Views, Types of Views, Dropping views, Introduction to Sequence, Index and Synonym.
Problems with Redundancy, Decomposition and its properties, Functional Dependencies, Normalization,

Types of Normal Forms - 1NF, 2NF, 3NF, BCNF, 4NF.

To Practice:

1) Practicing queries to create view and retrieve data through views.
2) Practicing queries to create an index, sequence and synonym.

UNIT V

Transaction Management - Definition, Properties of Transaction, states of Transaction, Concurrent executions, Serializability, Lock based protocols, and Log based recovery.

Granting privileges to users (DCL) and Transaction Control Language (TCL) Commands

To Practice:

1) Practicing DCL commands - Grant, Revoke, Roles
2) Practicing TCL commands - Commit, Rollback, Savepoint.

Text Books

1. "Database Management Systems", Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill, 3rd Edition.

Reference Books

1. "Database System Concepts", Silberschatz, Korth, McGraw hill, V edition.
2. "Introduction to Database Systems", C.J. Date, Pearson Education.
3. "Database Systems design, Implementation, and Management", Rob &Coronel, 5th Edition.
4. "Database Management Systems", P. Radha Krishna, HI-TECH Publications, 2005.
5. "Database Management System", Elmasri Navate, Pearson Education.
6. "Database Management System", Mathew Leon, Leo.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PRINCIPLES OF ANALOG ELECTRONICS LAB

Course Code:GR22A2028 **L/T/P/C: 0/0/3/1.5**
II Year I Semester

Course Objectives

1. Classify the types of active components.
2. Describe the operations of Diode and BJT
3. Analyze different Configuration types of Operational Amplifier.
4. Implement the mathematical operation on signals.
5. Make conversant with Oscillator principle.

Course Outcomes

1. Recall types of active components.
2. Illustrate the characteristics of Diode and BJT
3. Design Operational Amplifiers as inverting and non-inverting amplifier
4. Apply mathematical operation on signals using Operational Amplifier
5. Design Oscillator circuit

List of Experiments

TASK 1
Plot the Diode Characteristics experimentally

TASK 2
Obtain the output voltage waveform Half Wave Rectifier Using Diode

TASK 3
Shape the sine waveform through different Clipping Circuits experimentally

TASK 4
Shape the sine waveform through different Clamping Circuits experimentally

TASK 5
Obtain Input and Output characteristics for CB, CE configurations of BJT.

TASK 6
Obtain Input and Output characteristics for CC configurations of BJT.

TASK 7
Obtain drain current characteristics of JFET

TASK 8
Implement Inverting & Non-Inverting Amplifier using Operational Amplifier

TASK 9
Implement Subtractor Circuit/Differential Amplifier using Operational Amplifier

TASK 10

Implement Integrator Circuit using Operational Amplifier

TASK 11

Implement Differentiator Circuit using Operational Amplifier

TASK 12

Design RC Phase Shift Oscillator Circuit

Text/References Books

1. S. Sedra and K. C. Smith, ―Microelectronic Circuits‖, New York, Oxford University Press,1998.
2. D Roy Choudhury, Shail B Jain, ―Linear Integrated Circuits‖, New Age International Pvt. Ltd., Fourth Edition.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DC MACHINES AND TRANSFORMERS LAB

Course Code: GR22A2029 **L/T/P/C: 0/0/3/1.5**
II Year I Semester

Course Objectives

1. Strong background in different types of DC generators, Motors and Transformers, their construction, operation and applications
2. Understanding the various lab experiments connected with dc generators and there by achieve the design concepts.
3. Knowledge on application of dc motor concepts with respect to the performance characteristics of dc motors.
4. Knowledge on application of dc generator concepts with respect to the performance characteristics of dc generators.
5. Concept of back-to-back connection of a transformer and three phase to two phase conversion by Scott connection.

Course Outcomes

1. Identify various parts of electrical DC machines and Transformers.
2. Develop knowledge helpful for application of DC machines and Transformers.
3. Demonstrate control of different DC Machines.
4. Illustrate the performance of dc machines using different testing methods.
5. Determine the parameters of equivalent circuit of single phase transformer and performance.

TASK-1
Swinburne's test and Load Test of a D.C Shunt Motor

TASK-2:
Brake Test on a DC Shunt Motor

TASK-3
Brake Test on a DC Compound Motor

TASK-4:
Open Circuit Characteristics of a DC Shunt Generator

TASK-5
Load test on a D.C. Shunt Generator.

TASK-6
Load test on a D.C. Series Generator

TASK-7
Load test on D.C. Compound Generator

TASK-8
Hopkinson Test

TASK-9
Fields Test

TASK-10:
Separation of Core Losses of DC machine

TASK-11
OC, SC and Load tests on single phase transformer.

TASK-12
Sumpner's test.

TASK-13
Scott connection.

In addition to the above experiments, at least any two of the following experiments are required to be conducted from the following list

TASK-14
Heat run test on transformer.

TASK-15
Separation of core losses of a single phase transformer

TASK-16
Hysteresis loss determination.

TASK-17
Test on Auto Transformer.

TASK-18
Transient Analysis of DC Machine.

Text Books

1. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.
2. I.J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2012.

Reference Books

1. A.E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

CONSTITUTION OF INDIA

Course Code : GR22A2003 **L/T/P/C: 2/0/0/0**

II Year I Semester

Course Objectives

1. To create an awareness about the Constitution of India, Fundamental Rights and Duties, Directive Principles
2. To Learn the role of Prime Minister, President and the Council of Ministers and the State Legislature
3. To learn the divisions of executive, legislative and judiciary and so on.
4. To know how a municipal office, panchayat office etc. works
5. To understand the importance and role of Election Commission Functions.

Course Outcomes

1. Students will be able to know the importance of Constitution and Government
2. Students will be able to become Good Citizens and know their fundamental rights, duties and principles.
3. Students will learn about the role of PM, President, Council of Ministers etc and it will help students learn about Local Administration.
4. The students understand the importance of Election Commission and the Students will become aware of how a Country and State are run in Democracy.
5. They will know about Secularism, Federalism, Democracy, Liberty, Freedom of Expression, Special Status of States etc.,

UNIT I

Introduction: Constitution' meaning of the term, Indian Constitution: Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy

UNIT II

Union Government and its Administration: Structure of the Indian Union: Federalism, Centre - State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha

UNIT III

State Government and its Administration: Governor: Role and Position, CM and Council of ministers, State Secretariat: Organization, Structure and Functions

UNIT IV

Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayati raj: Introduction, PRI: Zila Pachayat, Elected officials and their roles, CEO Zila Pachayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials.

UNIT V

Composition of Judiciary and Election Commission: Composition of Indian Judiciary, Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ST/OBC.

Books Recommended:

1. 'Indian Polity' by Laxmikanth 5th Edition, McGraw Hill Edition.
2. Indian Constitution by Subhash C. Kashyap, Vision Books Publisher
3. 'Introduction to Indian Constitution' by D.D. Basu, 21st Edition, LexisNexis Publisher
4. *'Indian Administration by Avasthi* and Avasthi-by lakshminarainagarwal publication

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

VALUE ETHICS AND GENDER CULTURE

Code: GR22A2002 **L/T/P/C: 2/0/0/0**

II Year I Semester

Course Objectives

1. To understand about the importance of ethical values
2. To understand the significance of human conduct and self-development
3. To enable students to imbibe and internalize the value and Ethical behaviour in personal and professional lives.
4. To provide a critical perspective on the socialization of men and women.
5. To create an awareness on gender violence and condemn it.

Course Outcomes

1. To enable the student to understand the core values that shapes the ethical behaviour. And Student will be able to realize the significance of ethical human conduct and self-development
2. Students will be able to inculcate positive thinking, dignity of labour and religious tolerance.
3. The students will learn the rights and responsibilities as an employee and a team member.
4. Students will attain a finger grasp of how gender discrimination works in our society and how to counter it.
5. Students will develop a better understanding on issues related to gender and Empowering students to understand and respond to gender violence.

UNIT I

Values and Self-Development –social values and individual attitudes, Importance of cultivation of values, Sense of duty, Devotion, Self-reliance, Confidence, Concentration, Truthfulness, Cleanliness, Honesty, Humanity, Power of faith, National unity, Patriotism, Love for nature, Discipline.

- A Case study on values and self-development

UNIT II

Personality and Behaviour Development-positive thinking, punctuality, avoiding fault finding, Free from anger, Dignity of labour, religious tolerance, Aware of self-destructive habits.

- A Case study on Personality

UNIT III

Introduction to Professional Ethics: Basic Concepts, Governing Ethics, Personal & Professional Ethics, Ethical Dilemmas, Life Skills, Emotional Intelligence, Thoughts of Ethics, Value Education, Dimensions of Ethics, Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.

- A Case study on professional ethics

UNIT IV

Introduction to Gender - Definition of Gender, Basic Gender Concepts and Terminology, Attitudes towards Gender, Social Construction of Gender.

- A Case study/ video discussion on attitudes towards gender

UNIT V

Gender-based Violence -The concept of violence, Types of Gender-based violence, the relationship between gender, development and violence, Gender-based violence from a human rights perspective.

- ❖ A Case study/ video discussion on gender-based violence in view of human rights

Textbooks

1. Professional Ethics Includes Human Values (2nd Edition) By R Subramanian, Oxford University Press, 2017.
2. Ethics in Engineering Practice & Research, Caroline Whit beck, 2e, Cambridge University Press 2015.
3. A Bilingual Textbook on Gender" written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by Telugu Akademi, Hyderabad,Telangana State in the year 2015.

Reference Books

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2. Abdulali Sohaila. "I Fought For My Life…and Won."Available online at: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/
3. Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S Pritchard, Michael J Rabins, 4e , Cengage learning, 2015.
4. Business Ethics concepts & Cases: Manuel G Velasquez, 6e, PHI, 2008

II YEAR
II SEMESTER

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

POWER GENERATION AND TRANSMISSION

Course Code: GR22A2030 **L/T/P/C: 3/0/0/3**
II Year II Semester

Course Objectives

1. Illustration on Power Generation resources
2. Elaboration of economics of power generation
3. Analyzation of various power transmission lines, models and their performance
4. Articulate the mechanical design of Power Transmission lines and concept of Corona
5. Describe the overhead line insulators and cables

Course Outcomes

1. Illustrate the basic concepts of Power Generation.
2. Solve the economics of power generation.
3. Demonstrate various power system components, line models and its performance.
4. Analyze the different concepts related to mechanical design of transmission lines and corona
5. Categorize over head line insulators and cables for real time applications

UNIT I
GENERATION OF ELECTRIC POWER

Conventional Sources (Qualitative): Hydro station, Steam Power Plant, Nuclear Power Plant and Gas Turbine Plant. Non-Conventional Sources (Qualitative): Ocean Energy, Tidal Energy, Wave Energy, wind Energy, Fuel Cells, and Solar Energy, Cogeneration and energy conservation and storage.

UNIT II
ECONOMICS OF POWER GENERATION

Introduction, definitions of connected load, maximum demand, demand factor, load factor, diversity factor, Load duration curve, number and size of generator units. Base load and peak load plants. Cost of electrical energy-fixed cost, running cost, Tariff on charge to customer.

UNIT III
TRANSMISSION LINE PARAMETERS AND PERFORMANCE

Line conductors, inductance and capacitance of single phase and three phase lines with symmetrical and unsymmetrical spacing, Composite conductors-transposition, bundled conductors, and effect of earth on capacitance. Representation of lines, short transmission lines, medium length lines, nominal T and PI-representations, long transmission lines. The equivalent circuit representation of a long Line, A, B, C, D constants, Ferranti Effect. Sending end and receiving end power circle diagrams.

UNIT IV
MECHANICAL DESIGN OF OVERHEAD TRANSMISSION LINES AND CORONA

Tension and sag calculations, Factors affecting Sag, Sag template, Stringing charts, vibrations and vibration damper.

Corona: Introduction, disruptive critical voltage, corona loss, Factors affecting corona loss and methods of reducing corona loss, Disadvantages of corona, interference between power and Communication lines.

UNIT V

OVERHEAD LINE INSULATORS & INSULATED CABLES

Introduction, types of insulators, Potential distribution over a string of suspension insulators, Methods of equalizing the potential, testing of insulators. Introduction, insulation, insulating materials.

Under-Ground Cables: Types of Cables, grading of cables, insulation resistance of a cable. Capacitance of a single core and three core cables. Overhead lines versus underground cables, types of cables**.**

Text Books

1. A Chakrabarti, M L Soni, P V Gupta & U S Bhatnagar, "A Text Book on Power Systems Engineering", Dhanpat Rai &CoPvt.Ltd.
2. C.L. Wadhwa "Generation, Distribution and Utilization of Electrical Energy", Second Edition, New AgeInternational,2009.
3. C.L.Wadhwa "Electrical Power systems" New age Publishers 7th Edition 2017.

Reference Books

1. H.Cotton & H. Barber-The Transmission and Distribution of Electrical Energy, Third Edition, ELBS,B.I.Pub.,1985.
2. Paul Breeze "Power generation technologies", Third Edition, Elsevier Publishers 2019.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

AC MACHINES

Course Code:GR22A2031 **L/T/P/C: 2/1/0/3**
II Year II Semester

Course Objectives

1. Know the applications of single phase induction motor.
2. Provide a foundation in the theory and application of AC machines.
3. Train to have the solid foundation in technical concepts required to control the speed of 3-phase IM.
4. Provide with a strong back ground in 3-phase induction motor, speed control techniques and its Characteristics.
5. Provide sufficient background in synchronous motor, testing of different types of rotors viz salient Pole & cylindrical pole machines

Course Outcomes

1. Understand the concepts of rotating magnetic fields.
2. Interpret the need for electrical Induction Machines.
3. Demonstrate working of single and three phase AC machines.
4. Evaluate Machine Variables in direct and quadrature axis form for salient pole type.
5. Summarize the concept of harmonic created in supply system, need for reduction and design of synchronous machines for reducing them

UNIT I
FUNDAMENTALS OF AC MACHINE WINDINGS

Physical arrangement of windings in stator and cylindrical rotor; slots for windings; single turn coil - active portion and overhang; full-pitch coils, concentrated winding, distributed winding, winding axis, Air-gap MMF distribution with fixed current through winding concentrated and distributed, sinusoidal distributed winding, winding distribution factor. Introduction to revolving magnetic field in 3-phase and 1-phase machines.

UNIT II
INDUCTION MACHINES

Construction, Types (squirrel cage and slip-ring), Torque Slip Characteristics, Starting and Maximum Torque. Equivalent circuit. Phasor Diagram, Losses and Efficiency. Effect of parameter variation on torque speed characteristics (variation of rotor and stator resistances, stator voltage, frequency). Methods of starting, braking and speed control for induction motors. Generator Operation. Self-Excitation. Doubly-Fed Induction Machines.

UNIT III
SYNCHRONOUS GENERATORS

Synchronous Generator: Basic principle of operation, construction of salient & non-salient pole synchronous machines, generated EMF, effect of distribution and chording of winding, harmonics causes,reductionandelimination.Armaturereaction,synchronousreactance,leakage reactance, Phasor diagram of non-salient type alternator. Voltage regulation-EMF, MMF, ZPF and ASA Methods. Two reaction theory-direct and quadrature axis reactance, Phasor diagram, slip test, synchronizing to infinite bus bars and parallel operation, steady state power-angle characteristics.

UNIT IV
SYNCHRONOUS MOTORS

Synchronous Motor: Principle of operation, Phasor diagrams, torque and torque angle, effect of change in load, effect of change in excitation, V and inverted V curves. Synchronous condenser, hunting and damping. Methods of starting of synchronous motors. Testing of Synchronous motors.

UNIT V
SINGLE-PHASE INDUCTION MOTORS

Constructional features-double revolving field theory, equivalent circuit, determination of parameters. Types of 1-phase induction motors, Split-phase starting methods and applications

Text/References Books:

1. A.E.Fitzgerald and C.Kingsley,"Electric Machinery",McGraw Hill Education,2013.
2. M.G.Say,"PerformanceanddesignofACmachines",CBSPublishers,2002.
3. P.S.Bimbhra,"ElectricalMachinery",KhannaPublishers,2011.
4. I.J.Nagrath and D.P. Kothari,"Electric Machines", McGraw Hill Education,2010.
5. A.S.Langsdorf, "Alternating Current Machines", McGraw Hill Education,1984.
6. P.C.Sen,"PrinciplesofElectricMachinesandPowerElectronics",JohnWiley&Sons,2007.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

CONTROL SYSTEMS

Course Code:GR22A2032 **L/T/P/C: 3/0/0/3**
II Year II Semester

Course Objectives

1. Outline of the fundamental concepts of Control Systems and block diagram algebra.
2. Analyze time response of second order systems.
3. Interpret the stability of a system by Root locus technique.
4. Develop Nyquist and Bode plots for the stability of a system.
5. Apply the concepts of Controllability and Observability.

Course Outcomes

1. Summarize the basic elements and structures of feedback control systems.
2. Analyze the concept of time response, steady state response, errors.
3. Formulate Routh-Hurwitz table, root locus for the linear time-invariant systems.
4. Outline the stability of the system using Nyquist and Bode plots.
5. Develop control system models for state space models, to express state transition matrix and calculation of variables.

UNIT I
CONCEPTS OF CONTROL SYSTEMS AND TRANSFER FUNCTION REPRESENTATION

Open loop and closed loop control systems, different examples of control systems, classification of control systems, characteristics and effects of feedback, impulse response and transfer functions, translational and rotational mechanical systems, Transfer function of DC and AC Servomotor, Synchro transmitter and receiver, Block diagram reduction techniques, signal flow graphs, reduction using Mason's gain formula.

UNIT II
TIME RESPONSE ANALYSIS

Standard test signals, time response of first order systems, characteristic equation of feedback control systems, transient response of second order systems-time domain specifications, steady state response-steady state errors and error constants, effects of proportional derivative, proportional integral systems.

UNIT III
STABILITY ANALYSIS &ROOT LOCUS TECHNIQUE

Concept of stability, Routh stability criterion, Routh Hurwitz stability criterion Root locus concept, construction of root loci, effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT IV
STABILITY ANALYSIS IN FREQUENCY DOMAIN

Frequency domain specifications, Bode diagrams, Determination of frequency domain specifications and transfer function from the Bode diagram- Phase and Gain margin, stability analysis from Bode plots. Polar plots, Nyquist plots and applications of Nyquist criterion to find the stability.

UNIT V

STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS

Concepts of state, state variables and state vector, derivative of state model from transfer function, derivative of transfer function from state model, diagonalization, Solution of State Equation, state transition matrix and its properties, Controllability and Observability.

Text Books

1. A. Anand Kumar "Control Systems", 2nd edition, PHI Learning Private Limited
2. B.C.Kuo "Automatic Control Systems", 8th edition, 2003, John Wiley and Son's

References

1. I. J. Nagrath and M. Gopal "Control Systems Engineering", New Age International (P) Limited Publishers, 2nd edition
2. John Wiley "Control Systems Engineering", by NISE 3rd Edition.
3. Katsuhiko Ogata "Modern Control Engineering", Prentice Hall of India Pvt Ltd, 3rd edition,1998.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PRINCIPLES OF DIGITAL ELECTRONICS

Course Code:GR22A2033 **L/T/P/C: 3/0/0/3**
II Year II Semester

Course Objectives
1. Express the function of logic gates through diodes and transistors and their classifications.
2. Design of arithmetic and logic operations using Boolean postulates and K-Maps
3. Classify the types of Flip-Flops and steps involved in designing registers
4. Design of Synchronous, Asynchronous Counters including State diagram
5. Describe the classification of Finite State Machines and PLDs.

Course Outcomes
1. Summarize the working of logic gates with applications, design of logic gates with diodes and transistors.
2. Design the application using Combinational logic circuits by minimizing the function using K-Map.
3. Analyze the types of Flip Flops and design procedure of synchronous and asynchronous sequential circuits.
4. Make use of different types of counters for applications.
5. Discuss the types of Finite State Machine and uses of PLDs.

UNIT I
NUMBER SYSTEMS AND LOGIC FAMILIES
Logic gates, Boolean algebra, Boolean Postulates, realization of Boolean functions with logic gates, number systems, one's and two's complements arithmetic, Binary codes: BCD, Weighted codes: -2421,8421, Gray code, error detecting and correcting codes, Hamming code.

UNIT II
MINIMIZATION TECHNIQUES
Standard and Canonical form representation for logic functions, minimization of logical functions using Boolean Postulates and Theorems, K-map representation, and simplification of logic functions using K-Map, don't care terms.

Combinational Logic Circuits: Multiplexer, De-Multiplexer/Decoders, Adders, Subtractors, carry look ahead adder, digital comparator, parity checker/generator, priority encoders.

UNIT III
SEQUENTIAL CIRCUITS:
SR Latch, the clocked SR flip flop, J- K, T and D types flip-flops, Triggering of Flip Flops, Analysis of Clocked Sequential Circuits, Flip-Flop Excitation Tables, Conversion from one Flip-Flop to other.

Registers: Analysis procedure, design procedure, Registers with parallel load, Shift registers; Serial Transfer, Serial Addition. Ripple Counters; Binary Ripple Counter, BCD Ripple Counter, Synchronous Counters; Binary Counter, Up-Down Counter, BCD Counter, Binary Counter with Parallel Load, Counter with Unused States, Ring Counter, Johnson Counter,

UNIT IV

FINITE STATE MACHINE

State diagram, State Assignment, Capabilities and Limitation, Mealy and Moore models.

Programmable Logic Devices: ROM as a Programmable Logic Device, Programmable Array Logic and Programmable Logic Array, example problems based on digital designing.

UNIT V

DIGITAL TO ANALOG AND ANALOG TO DIGITAL CONVERTERS

Digital to Analog converters: Weighted resistor D/A converter, R-2R Ladder D/A Converter, Specifications for D/A converters. Analog to Digital converters: Sample and hold circuit, Flash type A/D converter, Successive approximation type A/D converter, Counter Type A/D converter, Specifications of A/D converters.

Text/Reference 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.
3. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.
4. Charles H. Roth, Jr and Lizy Kurian John‘s, ―Digital Systems Design Using VHDL‖, Cengage Learning

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MICROPROCESSORS AND MICROCONTROLLERS

Course Code: GR22A2034 **L/T/P/C:2/0/0/2**
II Year II Semester

Course Objectives

1. To familiarize the architecture of 8086 Microprocessors.
2. To describe the 8051 Microcontroller architecture.
3. To familiarize in programming the Microprocessors and Microcontrollers.
4. To understand Memory and I/O interfacing of 8086 and 8051.
5. To interface and program various devices with 8051.

Course Outcomes

1. Understands the internal architecture of 8086 Microprocessor.
2. Understand the internal architecture, organization of 8051.
3. Analyze the assembly language Programming of Microprocessor and Microcontrollers.
4. Do interfacing design of peripherals like Memory, I/O, A/D, D/A, timer etc.
5. Understand the real time applications of timers and serial communication of 8051.

UNIT I

8086 ARCHITECTURE

8086Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical Memory Organization, Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Macros.

UNIT II

ASSEMBLY LANGUAGE PROGRAMMING OF 8086 AND INTERFACING

Simple Programs involving Logical, Branch and Call Instructions, Sorting, Evaluating Arithmetic Expressions, String manipulations, Signal Descriptions of 8086, Common Function Signals, Minimum and Maximum Mode Signals.

Memory and I/O Interfacing: Memory Interfacing of 8086,8255 PPI, Various Modes of Operation, and Interfacing to 8086, Interfacing keyboard, Display, Stepper Motor Interfacing, D/A and A/D Converter.

UNIT III

THE 8051 ARCHITECTURE

Introduction to Microcontrollers: Overview of 8051 Microcontroller, Architecture, I/O Ports, Memory Organization.

8051 Real Time Control: Programming Timer Interrupts, Programming External Hardware Interrupts, Programming the Serial Communication Interrupts, Programming 8051 Timers and Counters

UNIT IV

INSTRUCTION SET AND PROGRAMMING

Addressing modes: Introduction, Instruction syntax, Data types, Subroutines Immediate addressing, Register addressing, Direct addressing, Indirect addressing, Relative addressing, indexed addressing, Bit inherent addressing, bit direct addressing.

8051 Instruction set: Data transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Subroutine instructions, Bit manipulation instruction. Assembly language programs, C language programs.

UNIT V

EXTERNAL COMMUNICATION INTERFACE

Serial Communication Standards, Serial Data Transfer Scheme, On board Communication Interfaces-I2C Bus, SPI Bus, UART; External Communication Interfaces-RS232, USB.

Applications:

LED, LCD, and keyboard interfacing. Stepper motor interfacing, DC Motor interfacing, sensor interfacing.

Textbooks

1. Advanced Microprocessors and Peripherals, A. K. Ray and K. M. Bhurchandani, 2nd Edition, Tata McGraw-Hill, 2006.
2. Microprocessors and Interfacing, D.V. Hall, 2nd Edition, Tata McGraw-Hill, 2006.
3. The 8051 Microcontroller, Kenneth J. Ayala, 3rd Edition, Cengage Learning, 2010.

References

1. "The 8051 Microcontroller and Embedded Systems using Assembly and C" – Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. McKinlay, 2nd Edition, Pearson Education, 2008.
2. Microcontrollers: Theory and Applications, Ajay V. Deshmukh, Tata McGraw-Hill Education, 2005.

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PRINCIPLES OF DIGITAL ELECTRONICS LAB

Course Code: GR22A2035 **L/T/P/C : 0/0/4/2**
II Year II Semester

Course Objectives

1. Understand the types of logic gates and their families.
2. Design the arithmetic and logic operations using digital IC's.
3. Discuss, how the memory is created using sequential circuits.
4. Classify the types of Flip-Flops and their applications.
5. Discuss the importance of arithmetic circuits.

Course Outcomes

1. Outline the advantages of function realization using logic gates through K-Map.
2. Design Combinational logic circuits.
3. Analyze the types of Flip-Flops used in designing the registers.
4. Discuss the types of Memories and their advantages and application
5. Design Sequential logic circuits

LIST OF EXPERIMENTS

TASK-1
Design and verification of basic logic gates.

TASK-2
Simplify the given Boolean expression realize them using universal gates.

TASK-3
Design and implementation of half/full adder

TASK-4
Design and implementation of half subtractor/full subtractor

TASK-5
Design and implementation of parallel adder

TASK-6
Design and implementation of subtractor

TASK-7
Design and implementation of multiplexer

TASK-8
Design and implementation of Decoder

TASK-9
Design and implementation of one bit magnitude comparator.

TASK-10

Design and implementation of two bit magnitude comparators

TASK-11

Implementation and verification of truth table for R-S, J-K, D and T flip-flops.

TASK-12

Implementation and verification of truth table for J-K flip-flop, Master-slave.

Text/Reference 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.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

AC MACHINES LAB

Course Code: GR22A2036 **L/T/P/C: 0/0/4/2**
II Year II Semester

Course Objectives

1. Explain the operation of Transformers.
2. Demonstrate various parts of induction motors.
3. Interpret various parts of an alternator.
4. Test for induction generator.
5. Design any electrical machine.

Course Outcomes

1. Relate the performance of different machines using different testing methods.
2. Determine the parameters of equivalent circuit of single phase induction motor.
3. Summarize the various methods to find regulation of an Alternator.
4. Apply various characteristics of three phase induction motor.
5. Experiment with synchronous machine to find direct and quadrature axis reactance.

LIST OF EXPERIMENTS

TASK-1
Sumpner's test.

TASK-2:
Heat run test on transformer

TASK-3
Hysteresis loss determination

TASK-4
Brake Test on Slip Ring Induction Motor.

TASK-5:
No load and Blocked Rotor Tests on Squirrel Cage Induction Motor, Slip Torque Test.

TASK-6
Equivalent Circuit of a Single Phase Induction Motor.

TASK-7
Regulation of Alternator by Synchronous Impedance Method and MMF Method,Portier Triangle Method.

TASK-8
Determination of X_d and $X_q$of a Salient Pole Synchronous Machine from Slip Test.

TASK-9
V and inverted V curves of a 3-Phase Synchronous Motor.

TASK-10
Induction Generator.

TASK-11
Rotor-resistance starter for Slip Ring Induction Motor.

TASK-12
Star-delta starter for Squirrel Cage Induction Motor

Text/References Books:

1. A.E.Fitzgerald and C.Kingsley,"Electric Machinery",McGraw Hill Education,2013.
2. M.G.Say,"PerformanceanddesignofACmachines",CBSPublishers,2002.
3. P.S.Bimbhra,"ElectricalMachinery",KhannaPublishers,2011.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

CONTROL SYSTEMS LAB

Course Code: GR22A2037 **L/T/P/C: 0/0/4/2**
II Year II Semester

Course Objectives

1. Develop hands-on experience in analyzing, designing and carrying out experiments in control systems.
2. Familiarize the stability analysis techniques and their applications in control systems.
3. Analyze and simulate different transfer functions with variety of inputs.
4. Describe the principle of PID controller.
5. Conduct experiments with dc servomotor and synchros.

Course Outcomes

1. Make use of simulation packages for simple control system programs.
2. Illustrate the characteristics of synchros.
3. Analyze the root locus and bode plots.
4. Determine the transfer function of DC motor/generator.
5. Design the lead and lag compensators and Discuss the performance of servomotor and PID controller.

LIST OF EXPERIMENTS

TASK-1
Transfer function from zeros and poles and vice versa.

TASK-2
Step response, Ramp response and Impulse response of a given transfer function.

TASK-3
Root Locus from a Transfer function.

TASK-4
Bode Plot and Nyquist Plot from a Transfer function.

TASK-5
State Model from a Transfer function.

TASK-6
Zeros and poles from state model.

TASK-7
Transfer function of DC motor/Generator.

TASK-8
Time Response of second order system.

TASK-9
DC Servomotor.

TASK-10
PID Controller.

TASK-11
Characteristics of Synchros.

TASK-12
Lag& Lead Compensator.

Text Books

1. A. Anand Kumar "Control Systems", 2nd edition, PHI Learning Private Limited
2. B.C.Kuo "Automatic Control Systems", 8th edition, 2003, John Wiley and Son's

References

1. I. J. Nagrath and M. Gopal "Control Systems Engineering", New Age International (P) Limited Publishers, 2nd edition
2. John Wiley "Control Systems Engineering", by NISE 3rd Edition.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING & TECHNOLOGY

ENVIRONMENTAL SCIENCE

Course Code: GR22A2001 **L/T/P/C:2/0/0/0**
II Year II Semester

Course Pre-Requisites: Basic knowledge of environmental issues

Course Objectives

1. To recognize the impacts of human interventions towards environment
2. To understand how science and scientific method work to address environmental problems
3. To list out the benefits in creating a sustainable environment
4. To sketch out various activities in achieving a cleaner environment
5. To emphasize the role of an individual for a better planet to live

Course Outcomes

1. Gain a variety of experiences & acquire a basic knowledge about the environment & its allied
2. problems
3. Interpret the key components in safe guarding the environment
4. Evolve an individual vision of harmonious interaction with natural world.
5. Appraise the quality of environment in order to create a healthy atmosphere
6. Familiarize with the individual responsibilities towards green revolution

UNIT I
INTRODUCTION AND AWARENESS ACTIVITIES
Environmental Science: Introduction, Definition, scope and importance.
AWARENESS ACTIVITIES
Small group meetings about:

- Water management
- Waste water treatment
- Projects Vs Environment
- Zero waste management
- Circular economy
- Impact of Science & Technology on Environment
- E-waste management
- Biodiversity loss
- Renewable Energy

UNIT II
SLOGAN AND POSTER MAKING EVENT

- Food waste management
- Rain water harvesting
- Climate change
- Green Power
- Water conservation

- Green at work
- Role of IT in environment and human health
- Sustainable development

UNIT III
EXPERT LECTURES ON ENVIRONMENTAL SCIENCE

- Environmental Impact Assessment
- Industrial waste treatment
- Regenerative farming/Organic farming/Vertical gardens/Hydroponics
- Circular Economy

UNIT IV
CLEANLINESS DRIVE

- Indoor air pollution
- Vehicular pollution
- Visual pollution
- Waste management at home
- Composting
- Plastic recycling

UNIT V
CASE STUDIES

- HPCL and LG Polymers disasters in Vizag
- Oleum gas leak in Delhi
- Mathura Refinery & Taj Mahal
- Conservation of Hussain Sagar lake
- The Cleanliest city of India-Surat
- Green Buildings in India
- KBR park in Hyderabad (Environmental protection Vs Development)
- Fluorosis and remediation
- Evaluation of STP or ETP operation in Hyderabad
- Ecotourism & its impacts
- Positive Impact on Environment due to Lockdown Forced by Corona Pandemic

Text Books

1. Environmental Studies for UG Courses, Erach Bharucha, UGC Publications, Delhi, 2004.
2. Textbook of Environmental Studies, Deeksha Dave, S. S. Katewa, Cengage Delmar Learning India Pvt., 2012.

References

1. Introduction to Environmental Science, Y. Anjaneyulu, BS Publications, 2004.
2. Environmental Studies, Anubha Kaushik & C. P. Kaushik, 4th Edition, New Age International Publishers

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

JAVA PROGRAMMING FOR ENGINEERS

Course Code: GR22A2008 **L/T/P/C: 2/0/0/0**
II Year II Semester

Course Objectives:

1. The Java programming language: its syntax, idioms, patterns, and styles.
2. Object oriented concepts in Java and apply for solving the problems.
3. How exception handling and multithreading makes Java robust
4. Explore java Standard API library such as io, util, applet, awt
5. Building of applications using Applets and Swings

Course Outcomes:

1. Identify the model of Object-Oriented Programming: Abstract data types, Encapsulation, Inheritance and Polymorphism
2. Summarize the fundamental features like Interfaces, Exceptions and Collections
3. List the advantages of Multi-threading.
4. Design interactive programs using Applets, AWT and Swings
5. Develop real time applications using the features of Java

UNIT I
INTRODUCTION TO OOP
Introduction, Need of object-oriented programming, principles of object-oriented languages, Applications of OOP, history of JAVA, Java Virtual Machine, Java features, Program structures, Installation of JDK.

UNIT II
PROGRAMMING CONSTRUCTS
Variables, Primitive data types, Identifiers- Naming Conventions, Keywords, Literals, Operators- Binary, Unary and Ternary, Expressions, Primitive Type conversion and casting, flow of control- branching, conditional, loops.
Classes and Objects- Classes, Objects, Creating objects, methods, constructors- constructor overloading, cleaning up unused objects- Garbage collector, class variable and methods- static keyword, this keyword, arrays, Command line arguments.

UNIT III
INHERITANCE
Types of Inheritance, Deriving classes using extends keyword, method overloading, super keyword, final keyword, abstract class.
Interfaces: Interface, Extending interface, interface Vs Abstract classes.

UNIT IV
PACKAGES
Creating Packages, using Packages, Access protection, java I/O package. Exploring java.io and String classes.

Exceptions - Introduction, Exception handling techniques - try, catch, throw, throws, finally block, user defined Exception.

UNIT V
MULTITHREADING
Java.lang. Thread, the main Thread, creation of new Threads, Thread priority, multi Threading- using isalive() and join(), Synchronization, suspending and resuming Threads, Communication between Threads.

Text Books

1. Java: The Complete Reference, 10thedition, Herbert Schildt, Mc Graw Hill.
2. Java Fundamentals: A Comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.
3. Java for Programming, P.J.Dietel Pearson Education

Reference Books

1. Object Oriented Programming through Java, P.Radha Krishna, UniversitiesPress.
2. Thinking in Java, Bruce Eckel, Pearson Education.
3. Programming in Java, S.Malhotra and S.Choudhary, Oxford University Press.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

EFFECTIVE TECHNICAL COMMUNICATION

Course Code: GR22A2108 **L/T/P/C:2/0/0/0**

II Year II Semester

Course Objectives:

1. Develop proficient written communication skills specific to technical and engineering domains.
2. Familiarize students with various forms of technical discourse, such as technical reports, manuals, and research papers.
3. Empower students with self-assessment tools and strategies for continuous improvement.
4. Enhance communication abilities through effective public speaking and presentation techniques confidently and persuasively.
5. Promote intercultural and ethical awareness in technical communication.

Course Outcomes:

1. Demonstrate proficiency in producing well-structured technical documents adhering to standard writing conventions and industry-specific guidelines.
2. Develop critical analysis skills to assess and evaluate technical documents.
3. Develop a habit of lifelong learning in technical communication, recognizing its importance in their personal and professional growth.
4. Exhibit effective oral communication skills by delivering technical presentations with clarity, coherence, and appropriate use of visual aids.
5. Exemplify intercultural competence in technical communication.

UNIT- I

Information Design and Development- Different kinds of technical documents, Information development life cycle, Organization structures, Factors affecting information and document design, Strategies for organization, Information design and writing for print and for online media, Artificial Intelligence - Voice of the future, Everyday life, Communicating with Machines.

UNIT-II

Technical Writing, Grammar, and Editing- Abstract Writing, Technical writing process, forms of discourse, Collaborative writing, creating indexes, technical writing style and language, Basics of grammar, and study of advanced grammar, Introduction to Digital Humanities, Managing technical communication projects, Time estimation, Single sourcing, Localization.

UNIT-III

Self-Development and Assessment- SWOT, Self-assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, Career planning, Self-esteem, Managing Time, Personal memory, Taking notes, Complex problem-solving, Stress Management, Working with Rhythm and Balance, Emotional Intelligence, Six Hats of Thinking.

UNIT-IV

Communication and Technical Writing- Group discussion, Oral presentation, Resume writing, Interview skills, Graphic presentation, Personality Development, Technical articles, Official notes, Memos, and Minutes of meetings.

UNIT-V

Ethics- Business ethics- Corporate Social Responsibility-importance, need, stories, Engineering Ethics, Role and responsibility of engineer, Work culture in jobs.

Textbooks:

M Ashraf Rizvi, Effective Technical Communication, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2018.

Reference Books:

1. Raman Sharma, Technical Communication, Oxford Publication, London, 2013.
2. Meenakshi Raman, Shalini Upadhyay, SOFT SKILLS Key to Success in Workplace and Life, Cengage Learning India Pvt. Ltd., Delhi, 2018.
3. Ron Cowan, The teacher's Grammar of English, CAMBRIDGE UNIVERSITY PRESS,New Delhi,2008.
4. Shiv Khera, You Can Win, Macmillian Books, New York, 2003.
5. Arthur D. Rosenberg, David Hizer, The Resume Handbook, Adams Media, an F+W Publications Company, 57 Littlefield Street,Avon, MA02322,USA.
6. M. Kay DuPont, Business Etiquette & Professionalism, Viva Books private Limited, Hyd.,2005
7. David F. Beer and David McMurrey, Guide to Writing as an Engineer, John Willey, New York, 2004