# SYLLABUS
# II-Year

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## SPECIAL FUNCTIONS AND COMPLEX VARIABLES

Course Code: GR15A2058 L:2 T:1 P:0 C:3

**Prerequisites:** Co-ordinate Geometry, Calculus, Linear Differential Equations

**Course Objectives:** The objective of this course is to provide the student with
Provide an overview of differential equations which occur in physical and engineering problems?

- Explain solution of certain special types of differential equations like Bessel's differential equations Legendre differential equations and Chebeshev differential equations, and also on study of complex variables.
- Provide an overview of functions of complex variables which helps in solving many complex problems in heat conduction, fluid dynamics and electrostatics?
- Introduce the concepts of complex Integration and Applications of complex integration
- Identify the significant applications of Complex Power Series.

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

- Solve linear differential equations using power –series methods.
- Approximate polynomials in terms of Legendre, Bessel and chebyshev.
- Evaluate Real definite Integrals using Cauchy's Residue Theory.
- Interpret geometrically the Complex functions and their qualitative behavior in the Complex Plane.
- Describe Singularity and Residue Theory.
- Solve potential functions, stream functions and velocity potential.
- Illustrate the concepts of residues in the context of determination of real integrals.

**Unit-I**

**Special Functions-I:** Solution to Cauchy-Euler Problem. Introduction to series solution of differential equations. Legendre polynomials (as solution of second order differential equation) – properties – Rodrigue's formula – recurrence relations – orthogonality.

**Unit-II**

**Special Functions-II:** Bessel Functions – properties – recurrence relations – orthogonality. Chebyshev polynomials (as solution of second order differential equation) – properties – recurrence relations – orthogonality.

**Unit-III**

**Functions of a Complex variable:** Continuity – differentiability – Analyticity – Cauchy-Riemann equations – Maxima-minima principle – Harmonic and conjugate harmonic functions – Milne-Thompson method.

**Elementary functions:** General power Principal value. Logarithmic function.
**Conformal mapping:** Transformations $e^z$, Im z, $Z^2$, $Z^n$ (n is a positive integer), sinz, cosz, z + (a/z). Translation, rotation, inversion and bilinear transformation – fixed point – cross ratio – invariance of circles and cross ratio – determination of bilinear transformation mapping of 3 given points

**Unit-IV**
**Complex integration:** Line integral – evaluation along a path – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula.
Complex power series
**Radius of convergence** : Expansion in Taylor series, Maclaurin's series, Laurent series.

**Unit-V**
**Singular points, Residues and Applications of Complex Integration:** Singular points – isolated singular point – pole of order m – essential singularity. (Distinction between real analyticity and complex analyticity). Residue – Evaluation of residue by formula and by Laurent series – Residue theorem.

Evaluation of real integrals of the types

(a) Improper integrals $\int_{-\infty}^{\infty} f(x)dx.$

(b) $\int_{c}^{c+2\pi} f(\cos\theta, \sin\theta)d\theta.$

(c) $\int_{-\infty}^{\infty} f(x) * \cos(mx)dx.$

(d) Integrals by indentation.

**Teaching methodologies**

1. Tutorial sheets uploaded in website
2. NPTEL video lectures
3. MATLAB exercises for visualization

**Text Books**

1. Advanced Engineering Mathematics: R.K.Jain and S.R.K.Iyengar - Narosa Publishing House
2. Advanced Engineering Mathematics: Erwin Kreyszig-Wiley Publications

**Reference Books**

1. Schaum's Outline series on complex variables.
2. Higher Engineering Mathematics: B.S. Grewal, Khanna Publications

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## COMPUTER ORGANIZATION

Course Code: GR15A2076 L:3 T:1 P:0 C:4

**Prerequisites**: Knowledge of Digital Logic Design.

**Course Objectives:** The Objectives of this course is to provide
- Comprehend operational concepts and understand register organization within a basic computer system
- Analyze the basic computer organization and understand the concepts of Micro programmed control
- Understand the design aspects of Central processing unit organization
- Understand various algorithms for arithmetic operations within a computer system
- Study the different ways of communicating with I/O devices and standard I/O interfaces.
- Study the hierarchical memory system including cache memory and virtual memory.
- Design of Multiprocessor systems using various interconnection structures

**Course Outcomes:** At the end of the course, the student will be able to
- Demonstrate knowledge of register organization of a basic computer system
- Incorporate In-depth understanding of control unit organization and micro programmed control.
- Understand the performance of central processing unit of a basic computer system.
- Apply various algorithms to perform arithmetic operations and propose suitable hardware for them.
- Analyze and emphasize various communication media in the basic computer system
- Develop an ability to analyze and design various memory structures
- Analyze the performance of a Multiprocessor System and various issues associated with its design.

**Unit-I**

**Basic Structure of Computers:** Computer Types, Functional unit, Data Representation, Fixed Point Representation, Floating – Point Representation, Error Detection codes.

**Register Transfer Language and Micro operations:** Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, Logic micro operations, Shift micro operations, Arithmetic logic shift unit.

**Unit-II**

**Basic Computer Organization and Design:** Instruction codes, Computer Registers, Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt, Complete Computer Description.

**Micro Programmed Control:** Control memory, Address sequencing, micro program example, design of control unit, Micro program Sequencer, Hard wired control Vs Micro programmed control.

**Unit-III**

**Central Processing Unit Organization:** General Register Organization, STACK organization, Instruction formats, Addressing modes, DATA Transfer and manipulation, Program control, Reduced Instruction Set Computer.

**Computer Arithmetic:** Addition and subtraction, multiplication Algorithms, Floating – point Arithmetic operations, BCD Adder.

**Unit-IV**

**Input-Output Organization:** Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP).

**Pipeline and Vector Processing:** Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, Dependencies, Vector Processing.

**Unit-V**

**Memory Organisation:** Memory Hierarchy, Main memory- RAM and ROM chips, Memory Address map, Auxiliary memory – Magnetic Disks, Magnetic Tapes, Associative Memory – Hardware Organization, Match Logic, Cache Memory – Associative mapping, Direct mapping, Set associative mapping, Writing into cache and cache initialization, Cache Coherence, Virtual memory – Address Space and Memory Space, Address mapping using pages, Associative Memory page table, Page Replacement.

Multi Processors: Characteristics or Multiprocessors, Interconnection Structures, Cache Coherence, Shared Memory Multiprocessors.

**Teaching Methodologies**

1. Power Point Presentations
2. Tutorial Sheets
3. Assignments

**Text Books**

1. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI
2. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## ELECTRO MAGNETIC FIELDS

Course Code: GR15A2034 L:3 T:1 P:0 C:4

**Prerequisites:** Knowledge of Basic Electrical and Electronics Engineering (BEE), Vector Algebra.

**Course Objectives:** The Objectives of this course is to provide

- Introduce the basic skills required to understand, develop, and design various engineering applications involving electromagnetic fields
- Acquire the knowledge of Electromagnetic field theory that allows the student to have a solid theoretical foundation to be able in the future to design emission, propagation and reception of electro- magnetic wave systems
- Understand the concept of conductors, dielectrics, inductance and capacitance
- Gain knowledge on the nature of magnetic materials.
- identify, formulate and solve fields and electromagnetic waves propagation problems in a multi- disciplinary frame individually or as a member of a group
- Provide the students with a solid foundation in engineering fundamentals required to solve problems and also to pursue higher studies
- Lay the foundations of electromagnetism and its practice in modern communications such as wireless, guided wave principles such as fiber optics and electronic electromagnetic structures.

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

- Solve the problems in different EM fields
- Design a programming to generate EM waves subjected to the conditions
- Find the time average power density of EM Waves in different domains
- Know the Electromagnetic Relation using Maxwell Formulae
- Solve Electro Static and Magnetic to Static circuits using Basic relations.
- Analyze moving charges on Magnetic fields.
- Design circuits using Conductors and Dielectrics

**Unit–I**

**Electrostatics:** Electrostatic Fields Coulomb's Law ,Electric Field Intensity (EFI) EFI due to a line and a surface charge, Work done in moving a point charge in an electro static field, Electric Potential, Properties of potential function, Potential gradient, Guass's law ,Application of Guass's Law, Maxwell's first law, div (D) =ρυ. ,Laplace's and Poison's equations, Solution of Laplace's equation in one variable. Electric dipole, Dipole moment, Potential and EFI due to an electric dipole, Torque on an Electric dipole in an electric field.

**Unit-II**

**Dielectrics &Capacitance:** Behaviour of conductors in an electric field, Conductors and Insulators, Electric field inside a dielectric material, Polarization, Dielectric-Conductor and Dielectric-Dielectric boundary conditions, Capacitance, Capacitance of parallel plates, Spherical, Co-axial capacitors with composite dielectrics, Energy stored and energy density in a static electric field, Current density, Conduction and Convection Current densities, Ohm's law in point form. Equation of continuity.

**Unit-III**

Magneto Statics :Static magnetic fields Biot-Savart's law, Magnetic Field Intensity (MFI),MFI due to a straight current carrying filament, MFI due to circular, square and solenoid current Carrying wire, Relation between magnetic flux and magnetic flux density –Maxwell's second Equation, div(B)=0. Ampere's Law &Applications: Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament–Point form of Ampere's Circuital law. Maxwell's third equation, Curl (H) =Jc.

**Unit-IV**

**Force in Magnetic fields:** Magnetic force Moving charges in a Magnetic field, Lorentz force equation, Force on a current element in a magnetic field, Force on a straight and a long current carrying conductor in a magnetic field, Force between two straight long and parallel current carrying conductors, Magnetic dipole and dipole moment, A differential current loop as a magnetic dipole, Torque on a current loop placed in a magnetic field. Scalar Magnetic potential and its limitations, Vector magnetic potential and its properties, Vector magnetic potential due to simple configurations, Vector Poisson's equations. Self and Mutual inductance, Neumann's formulae, Determination of self- inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane, Energy stored and density in a magnetic field. Introduction to Permanent magnets, their characteristics and applications.

**Unit-V**

**Time Varying Fields:** Time varying fields – Faraday's laws of electromagnetic induction, its integral and point forms, Maxwell's fourth equation, Curl (E) =-dB/dt, statically and dynamically induced EMFs, Simple Problems, Modification of Maxwell's equations for time varying fields, Displacement current.

**Teaching Methodologies**

1. EMF PPTs
2. Assignments uploaded in website
3. Software: MATLAB.

**Text Book**

1. "Engineering Electro Magnetics" by William H. Hayt& John. A. Buck Mc.Graw-Hill Companies, 7thEditon.2009.
2. "Electro Magnetic Fields" by Sadiku, Oxford Publications

**Reference Books**

1. "Introduction to Electro Dynamics" by DJ Griffiths, Prentice-Hall of India Pvt.Ltd. 2ndEdition.
2. "Electro Magnetics" by JP Tewari.
3. "Electro Magnetics" by J.D Kraus McGraw-Hill Inc.4th edition 1992.
4. "Electro magnetism" by Ashutosh Pramanik, PHI Publishers.

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## NETWORK THEORY

Course Code: GR15A2035 L:3 T:1 P:0 C:4

**Prerequisites :** Knowledge of Basic Electrical and Electronics Engineering (BEE).

**Course Objectives:** At the end of the course the student is expected to
- Know three phase voltages and currents relations in star and delta connections.
- Know dc and ac transient analysis.
- Learn tie-set and cut-set methods of solving circuits.
- Learn dot convention, analysis of magnetic circuits.
- Introduce various two-port network parameters for a given circuit.
- Evaluate LPF, HPF, BSF and BPF.
- Evaluate the poles and zeros of a given transfer function.

**Course Outcomes:** At the end of the course, the student will be able to
- Measure Three phase voltages and currents, active, reactive powers.
- Express given Electrical Circuit in terms of A,B,C,D and Z,Y Parameter Model and solve the circuits.
- Solve Circuits using Cut set ,Tie Set Methods.
- Analyse dc and ac transient analysis for given circuit.
- Analyse LP, HP, BS and BP filters.
- Apply dot convention and to find out self and mutual inductance for a given circuit.
- Know poles and zeros of a given transfer function.

**Unit-I**

**Magnetic Circuits and Network Topology Magnetic Circuits:** Faradays laws of electromagnetic induction, concept of self and mutual inductance, dot convention, coefficient of coupling, analysis of series and parallel magnetic circuit, composite magnetic circuit.

**Network Topology** Definitions - graph, tree, co-tree, twig, link, basic cutset and tieset matrices for planar networks, loop and nodal methods of analysis of networks with dependent and independent voltage and current sources, Duality and Dual networks.

**Unit-II**

**Three Phase Circuits** Phase Sequence, Relation between line and phase voltages and currents in Star-Star, Delta-Delta, Star-Delta and Delta-Star balanced connections, analysis of unbalanced three phase circuits, measurement of active and reactive power.

**Unit-III**

**DC and AC Transient Analysis**

**DC Transient Analysis:** Transient response of RL, RC, RLC circuits(series and parallel) for dc excitation by classical approach and Laplace Transform methods, Initial Conditions, Transient response of RL and RC circuits for different inputs such as step, ramp, pulse and impulse using Laplace Transform method.

**AC Transient Analysis** Transient response of RL, RC, RLC circuits for sinusoidal excitation by classical and Laplace Transform methods.

**Unit-IV**

**Network Parameters and Two Port Networks** Driving point and transfer impedance function networks, poles and zeros necessary conditions for driving point function and for transfer function. Two port network parameters- Z, Y, hybrid, inverse hybrid, transmission and inverse transmission parameters, relation between various parameters, condition for symmetry and reciprocity for above parameters, two port network parameters using transformed variables.

**Unit-V**

**Filters** Introduction to filters, constant K - RC, RL low pass, high pass, band pass, band stop filters.

**Teaching Methodologies**

1. NT ppts
2. Assignments uploaded in website
3. Softwares: Multisim.

**Text Book**

1. Fundamentals of Electric Circuits by Charles K.Alexander, Matthew N.O.Sadiku, Tata McGraw Hill Company.
2. Engineering Circuit Analysis by William H.Hayt.Jr, Jack E.Kemmerly and Steven M.Durbin by Tata McGraw Hill Company.
3. Circuits and Networks by T.K.Nagasarkar and M.S.Sukhija, Oxford University Press

**Reference Books**

1. Circuit Theory (Analysis and Synthesis) by A.Chakrabarti – DhanpatRai& Co
2. Network Theory by prof.B.N.Yoganarasimham.
3. Electrical Engineering Fundamentals by Vincent Deltoro
4. Circuit Theory by Sudhakar and ShyamMohan
5. Network Analysis by M.E.VanValkenburg, Prentice Hall of India

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## DC MACHINES AND TRANSFORMERS

Course Code: GR15A2036 L:3 T:1 P:0 C:4

**Prerequisites:** In-depth knowledge of Physics oriented towards dynamics, heat, electricity, magnetism and calculus, analytical co-ordinate geometry and trigonometry.

**Course Objectives:** At the end of the course the student is expected to

- Introduce a strong back ground in different types of electrical DC machines.
- Visualize the students to have the solid foundation in mathematical and technical concepts required to engineering problems related to dc machines.
- Prepare the students to excel in post graduate programs or to succeed in industry.
- Provide a foundation in the construction and operation of dc machines and its applications
- Provide students with background in single phase and three phase transformers.
- Provide a foundation in design & applications of transformers.
- Provide basic knowledge of equivalent circuit of transformers and their phasor diagrams for different loads viz lead, lag & pure resistive loads.

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

- Understand energy conversion principles in DC machines & Transformers.
- Analyse role of Electrical machines in simple & complex applications.
- Articulate importance of extensive research in electrical machines.
- Design real time applications.
- Calculate different magnetic load curves for dc machines of various types.
- Draw armature winding for DC Machines
- conduct test for voltages , currents, torque and speed of given machine.

**Unit-I**

**D.C.Generators** – Principle of operation– Action of commutator– constructional features–armature windings– lap and wave windings– simplex and multiplex windings–use of laminated armature– E.M.F Equation.

**Armature reaction–**Cross magnetizing and de-magnetizing AT/pole– compensating winding–commutation–reactance voltage–methods of improving commutation. Methods of Excitation – separately excited and self excited generators–build-up of E.M.F-critical field resistance and critical speed-causes for failure to self excitation and remedial measures. Load characteristics of shunt, series and compound generators.

**Unit-II**

**D.C Motors**–Principle of operation–Back E.M.F.-Torque equation– Characteristics and application of shunt, series and compound motors–Armature reaction and commutation.
Speed control of D.C. Motors: Armature voltage and field flux control methods. Motor starters (3 point and 4 point starters).

**Unit-III**
**Testing of D.C. machines:** Losses–Constant &Variable losses– calculation ofefficiency–condition for maximum efficiency.
**Methods of Testing** – Direct, indirect and regenerative testing–Brake test– Swinburne's test – Hopkinson's test – Field's test-separation of stray losses in a D.C .motor test.

**Unit-IV**
**Transformers-Single phase transformers-types** - constructional details- minimization of hysteresis and eddy current losses-EMF equation-operation on no load and on load- phasor diagrams Equivalent circuit- losses and efficiency- regulation. All day efficiency- effect of variations of frequency &supply voltage on iron losses.

**Unit-V**
Tests- OC and SC tests - Sumpner's test - predetermination of efficiency and regulation-separation of losses -parallel operation with equal and unequal voltage ratios- Auto transformers- equivalent circuit- comparison with two winding transformers. Poly phase transformers-Poly phase connections-Y/Y, Y/D, D/Y, D/D and open D.

**Teaching Methodologies**
1. EM-Ippts
2. Assignments uploaded in website

**Text Books**
1. Electric Machines by I.J. Nagrath&D.P. Kothari, Tata McGraw–HillPublishers, 3rdedition, 2004.
2. Electromechanics–I (D.C. Machines) S. KamakshaiahHi-Tech Publishers.
3. Electrical Machines by Rajput

**Reference Books**
1. Performance and Design of D.C Machines–by Clayton &Hancock, BPB Publishers
2. Electric Machinary–A.E.Frizgerald, C.Kingsleyand S.Umans, McGraw- Hill Companies, 5thediton
3. Electrical Machines–P.S. Bimbra., Khannapublishers
4. Electrical Machines - Bandhyopadhyaya

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## DC MACHINES LAB

Course Code: GR15A2037 L:0 T:0 P:2 C:2

**Prerequisites:** In –depth knowledge of D.C. Machines.

**Course Objectives:** At the end of the course the student is expected to

- Provide with a strong background in different types of excitation for dc motors and generators.
- Train to have the applied mathematical foundation and there by the relative production of emf with respect to flux.
- Prepare for various lab experiments connected with dc motors.
- Prepare for various lab experiments connected with dc generators and there by achieve the design concepts.
- Train for application of dc motor concepts with respect to the performance characteristics of dc motors.
- Train for application of dc generator concepts with respect to the performance characteristics of dc generators.
- Provide basic knowledge of drive systems for further study at post graduate level.

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

- Have knowledge of various parts of a electrical DC machines.
- Develop knowledge helpful for application of dc machines.
- Conduct speed control of different types of DC Motors.
- Use characteristics of various generators depending on their type of field excitation.
- Understand the concept of different types of windings viz lap and wave for armature.
- Perform test on Motor-Generator Set.
- Know the concept of commutation dc machines for conversion of AC to DC or DC to AC.

**Contents**

1. Speed Control of a D.C Shunt Motor
2. Brake Test on a DC Shunt Motor
3. Brake Test on a DC Compound Motor
4. Open Circuit Characteristics of a DC Shunt Generator
5. Load test on a D.C. Shunt Generator.
6. Load test on a D.C. Series Generator
7. Load test on D.C. Compound Generator
8. Hopkinson Test
9. Fields Test

10. Retardation Test on D.C. Shunt Motor
11. Swinburne's Test
12. Separation of Core Losses

**Students Activity:** Design of machine windings using AUTO- CAD software.

i) Lap winding for 12 slots 4-pole single layer progressive winding.
ii) Lap winding for 12 slots 4-pole single layer retrogressive winding.
iii) Double layer winding for 24 slots 4-pole progressive lap wound machine.
Iv) Double layer winding for 30 slots 4-pole progressive lap wound machine.

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## ELECTRICAL NETWORKS LAB

Course Code: GR15A2038 L:0 T:0 P:2 C:2

**Prerequisites:** In –depth knowledge of Networks.

**Course Objectives:** At the end of the course the student is expected to

- Understand the concept of circuit elements lumped Circuits and various types of sources,V-I relation for various input signals and Kirchhoff's Laws and network reduction techniques.
- Understand the concept of alternating quantities, analysis of R, L, C parameters applied with ac sinusoidal voltage, concept of reactance, impedance, susceptance and admittance and concept of real and reactive powers and power factor.
- Understand network topology a technique used for analyzing and solving electrical networks, loop analysis and nodal analysis method, concept of duality and dual networks, concept of KVL & KCL.
- Understand concept of resonance, bandwidth, measurement of reactive and active power and measurement three phase voltages and currents.
- Learn about Superposition theorem for dc and ac. Excitations, Thevenin's theorem, Norton's theorem Maximum power transfer theorem, Compensation theorem for dc and ac excitations.
- Demonstrate networks thermos using components on breadboard.
- Learn how to simulate an electrical circuit using electrical softwares

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

- Understand the knowledge of mathematics, science and engineering.
- Identify, formulate and solve engineering problems.
- Analyze and design basic lumped circuits.
- Participate and try to succeed in competitive examinations.
- Simulate network circuits.
- Use techniques, skills and modern engineering tools necessary for engineering practice.
- Connect hardware components practically on breadboard.

**Contents**

1. Thevenin's Theorem
2. Norton's Theorem
3. Maximum power Transfer Theorem
4. Superposition Theorem and Reciprocity Theorem
5. Z and Y parameters.

6. Transmission and Hybrid Parameters
7. Compensation and Milliman's Theorems
8. Series Resonance
9. Parallel Resonance
10. Locus of Current Vector in an R-L Circuit
11. Locus of Current Vector in an R-C Circuit
12. Measurement of 3-phase power by two watt meter method for unbalanced loads

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## ELECTRICAL SIMULATION LAB

Course Code: GR15A2039 L:3 T:1 P:0 C:4

**Prerequisites:** Knowledge of Basic Electrical Engineering

**Course Objectives**

- To provide the students with a strong background on MATLAB/LABVIEW software's.
- To train the students how to approach for solving engineering problems.
- To prepare the students to use MATLAB/LABVIEW in their project works.
- To provide a foundation for use of these software's in real time applications.
- To train the students to develop data acquisition, instrument control, data-logging, and measurement analysis applications.
- To provide knowledge about user-defined software and modular hardware that implements custom systems(virtual instruments)
- To provide knowledge about simpler system integration for hardware and their corresponding software

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

- Express programming and simulation for engineering programs.
- Know importance of these software's for lab experimentation.
- Articulate importance of software's in research by simulation work.
- In-depth knowledge of providing virtual instruments on lab view environment.
- Simulate basic electrical circuit in mat lab simulink.
- Solve and execute complex algorithms in real time.
- Integrate hardware and their corresponding software

**MATLAB Contents**

1. The Basics
2. Strings, Logic and Control Flow
3. Polynomials, Integration& Differentiation
4. Introduction to Simu link
5. Diode characteristics
6. MOSFET characteristics
7. IGBT characteristics
8. Transient analysis of linear circuit
9. Single phase Half wave diode rectifier
10. Single phase full wave diode rectifier

11. Single phase diode bridge rectifier with LC filter
12. 5Hp 240V DC motor with resistance starter
13. Three phase half wave diode rectifier

**LABVIEW Contents**

1. Virtual Instruments
2. Editing Techniques, Building VI, Creating the Sub VI
3. Using For loop, While loops and Charts
4. Creating an Array with Auto-Indexing
5. Using the Graph and Analysis VIs
6. Simple amplitude measurement
7. Building arrays using for loop and while loop
8. Random signal generation
9. Waveform minimum & maximum value display
10. Wave at interface
11. Force mass spring damper
12. Matrix fundamentals
13. Simple Pendulum
14. Three phase sine wave generation
15. Signal Modulation

**Sci lab**

1. Single phase half wave diode rectifier
2. Create the vector($X_1^2$, $X_2^2$, $X_3^2$, $X_4^2$) with X=1,2,3,4

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## ENVIRONMENTAL SCIENCE

Course Code: GR15A2001 L:2 T:0 P:0 C:0

**Prerequisites:** Basic knowledge on basic sciences and natural resources

**Course Objectives:** The Objectives of this course is to provide

- Critically evaluate information on human/environmental system
- Integrate human ecology and science of environmental problems.
- Articulate issues of social construction of science
- To develop an understanding of systems and cycles on the earth: of how individual organisms
- Live on the earth
- How different organisms live together in complex communication
- The agricultural use of soil and pesticides
- The description of moving water on and in the earth, and its influence on humans
- The effect of human activities on atmospheric pollution and that effect on us.
- Use of fossil fuels and the effect on climate
- Alternate energy sources
- An understanding of human activities that influence the ocean.

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

- Importance of environment, its purpose, design and perspectives
- Environmental issues related to the exploitation of natural resources and development of the mankind
- Role of professionals in protecting the environment from degradation
- The solutions for environmental problems created by local, national and global Developmental activities.
- Critically evaluate literature on environmental problems;
- Develop relevant research questions for environmental investigation
- Use methods and tools of environmental research, including statistical analysis, GIS, and other techniques;

**Unit-I**

**Introduction to Environment, Ecology and Ecosystems:** Definition, Importance and Scope of Environmental Studies, Public Awareness and Participation. Ecology, Concept of Ecosystem, Classification of Ecosystem, Structure, Components and Function of Ecosystem. Typical Ecosystem, Food Chain, Food Web. Biodiversity- Types and values.

**Unit–II**

**Natural Resources:** Definition, Occurrence, Classification of resources, Important natural resources for human society, Utilization-positive and negative effects of Water resources, Mineral resources, Forest resources, Energy resources, Land resources. Role of individuals in conservation of important natural resources.

**Unit-III**

**Environmental Pollution:** Definition, Classification of Pollution, Types of Pollution and Pollutants. Causes, effects and control of – Air Pollution, Water Pollution, Soil Pollution, Marine Pollution, Noise Pollution, Thermal Pollution and Nuclear Pollution.

**Unit-IV**

**Environmental Problems and Management Policies:** Natural Disasters-Types, causes and effects; Global warming, Climate change-El Nino-La Nina, Ozone layer- location, role and degradation; Deforestation and desertification. Management: Technological solutions, Preventive methods, control techniques; Green Belt development, Rainwater harvesting, Renewable and alternate resources.

**Unit-V**

**National Policy on Environment Protection and Sustainability:** Air (Pollution and prevention) act 1981; Water (Pollution and prevention) Act 1974; Pollution Act 1977; Forest Conservation Act; Wildlife Protection Act; Municipal solid waste management and handling Act; Biomedical waste management and handling Act; Hazardous waste management and handling rules. Role of IT in environment, environmental ethics, environmental economics.

**Sustainable development:** Cause and Threats to sustainability; Strategies for achieving sustainable development; Concept of Green buildings and Clean Development Mechanism (CDM).

**Teaching Methodology**

1. White board and marker
2. OHP and Field visit

**Text Books**

1. Text Book of Environmental Studies, ErachBarucha. University Press
2. Text book of Environmental Science and Technology by M.Anji Reddy 2007

**Reference Books**

1. Biotechnology & Environmental Chemistry. Surinder Jeswal& Anupama Deswal, DhanpatRai & Co Pvt. Ltd.
2. A Text Book of Environmental Science. Aravind Kumar. APH Publishing Corporation.
3. Glimpses of Environment. Dr. KVSG. Murali Krishna. Environmental Protection Society

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Code: GR15A2104 L:2 T:1 P:0 C:3

**Course Objectives:** To provide the student with

- Clear understanding of demand analysis, elasticity of demand and demand forecasting
- Production function and cost analysis necessary to decide the levels of production and cost of production of the products or services
- Different types of markets and competition, different forms of organisation and different methods of pricing
- Capital and capital budgeting
- Fundamentals of accounting and financial analysis.

**Course Outcomes:** After studying this course the engineering students - the prospective technocrats or techno-managers will be in a position to:

- understand the markets and competition;
- forecast the demand;
- plan the operations and the production;
- choose an appropriate form of organisation;
- know the cost and decide the price of the products and/or services produced, and
- understand the financial statements and make financial analysis.

**Unit-I**

**Introduction & Demand Analysis:** Definition and Scope: Definition, Nature and Scope of Managerial Economics.

**Demand Analysis:** Demand Determinants, Law of Demand and its exceptions.

**Elasticity of Demand:** Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

**Unit-II**

**Production & Cost Analysis:** Production Function – Isoquants and Isocosts,
MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. **Cost Analysis:** Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

**Unit-III**

**Markets & New Economic Environment:** Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing: Objectives and Policies of Pricing. Methods of Pricing

**Business:** Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types. New Economic Environment: Changing Business Environment in Post-liberalization scenario.

**Unit-IV**

**Capital Budgeting: Capital:** Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital.

**Capital Budgeting:** features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method and Internal Rate of Return (IRR) (simple problems).

**Unit-V**

**Introduction to Financial Accounting & Financial Analysis:** Accounting Concepts and Conventions - Double-Entry Book Keeping. Accounting Cycle: Journal, Ledger, Trial Balance, Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

**Financial Analysis:** Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital structure Ratios and Profitability ratios. Du Pont Chart.

**Teaching Methodologies**

- Lectures
- Power Point presentations
- Seminars
- Working out problems on black/white boards
- Conducting tutorials
- Giving homework and/or assignments etc.

**Text Books**

1. **Aryasri:** Managerial Economics and Financial Analysis, TMH, 2009.
2. **Atmanand:** Managerial Economics, Excel, 2008.

**Reference Books**

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2009
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 2009
3. Lipsey & Chrystel, Economics, Oxford University Press, 2009

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## POWER GENERATION AND DISTRIBUTION

Course Code: GR15A2040 L:3 T:1 P:0 C:4

**Prerequisites:** Knowledge of Basic Electrical Engineering

**Course Objectives**

- To introduce the concepts and phenomenon of different sources of power generation.
- To give an idea about the fundamental concepts of electric DC power distribution.
- To introduce the concepts of electric AC power distribution.
- To familiarize the students with the tariff methods for electrical energy consumptions in the prospect of optimum utilization of electrical energy.
- To impart the knowledge of different turbines used in the generating stations with the analytical methods.
- To familiarize the students with the classification of substations.
- To give an idea about the economic aspects of power generation.

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

- Articulate power system concepts required to engineering problems.
- Design power system components for a specified system and application
- Analyse various power sources for generation of power merit/Demerits
- Formulate A.C and D.C distribution networks for necessary variable calculation
- Calculate usage of electrical power
- Plot the power/energy demand in the form of graph
- Discuss functions of substations

**Unit-I**

**Thermal Power Stations:** Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, as hand flue gasses. Brief description of TPS components: Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and Cooling towers.

Gas and Nuclear Power Stations: Nuclear Power Stations: Nuclear Fission and Chain reaction, Nuclear fuels. Principle of operation of Nuclear reactor. Reactor Components: Moderators, Control rods, Reflectors and Coolants. Radiation hazards: Shielding and Safety precautions. Types of Nuclear reactors and brief description of PWR, BWR and FBR.

Gas Power Stations: Principle of Operation and Components (Block Diagram Approach Only)

**Unit-II**

**Hydro electric power stations:** Elements of hydro electric power station-types- concept of pumped storage plants-storage requirements, mass curve (explanation only) estimation of power developed from a given catchment area; heads and efficiencies.

**Hydraulic Turbines:** Classification of turbines, Impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, Work done, Efficiencies, Hydraulic design–Draft tube-Theory-Functions and efficiency.

**Unit-III**

**D.C. Distribution Systems:** Classification of Distribution Systems, Comparison of DC vs AC and Under-Ground vs. Over Head Distribution Systems. Requirements and Design features of Distribution Systems.-Voltage Drop Calculations (Numerical Problems) in D.C Distributors for the following cases: Radial D.C Distributor fed one end and at the both the ends (equal/unequal Voltages) And Ring Main Distributor. A.C. Distribution Systems. Voltage Drop Calculations (Numerical Problems) in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and with respect to respective load voltages.

**Unit-IV**

**Substations:** Classification of substations: Air insulated substations- Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment. Bus bar arrangements in the Sub-Stations: Simple arrangements like single bus bar, sectionalized single bus bar, main and transfer bus bar system with relevant diagrams.

Gas insulated substations (GIS) –Advantages of Gas insulated substations, different types of gas insulated substations, single line diagram of gas insulated substations, busbar, construction aspects of GIS, Installation and maintenance of GIS, Comparison of Air insulated substations and Gas insulated substations.

**Unit-V**

**Economic Aspects of Power Generation:** Load curve, load duration and integrated load duration curves-load, demand, diversity, capacity, utilization and plant use factors-Numerical Problems.
Tariff Methods: Costs of Generation and their division into Fixed, Semi-fixed and Running Costs. Desirable Characteristics of a Tariff Method. Tariff Methods: Flat Rate, Block- Rate, two-part, three – part, and power factor tariff methods and Numerical Problems

**Teaching Methodologies**

1. PS-I ppts
2. Assignments uploaded in website

**Text Books**

1. Electrical Power Systems by C. L. Wadhwa New Age International(P) Limited, Publishers1997.
2. A Text Book on Power System Engineering by M. L. Soni, P. V. Gupta, U. S. Bhatnagar and A. Chakraborti, Dhanpat Rai & Co.Pvt.Ltd.,1999.

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## AC MACHINES

Course Code: GR15A2041 L:3 T:1 P:0 C:4

**Prerequisites:** In-depth knowledge of Physics oriented towards dynamics, heat, electricity, magnetism and calculus, analytical co-ordinate geometry and trigonometry, D.C Machines

**Course Objectives**

- To provide with a strong back ground in 3ø Induction Motor, speed control techniques and its characteristics.
- To train to have the solid foundation in technical concepts required to control the speed of 3ø Induction Motor
- To know the applications of 1ø Induction Motor
- To provide a foundation in the theory and applications of above electrical machines.
- To provide with a strong background in AC Armature winding design.
- To provide sufficient background required to conduct the tests on Synchronous generators viz regulation by various methods, load tests and Synchronization for parallel operation.
- To Provide sufficient background in synchronous motor testing of different types of synchronous motor rotors viz salient pole & cylindrical pole machines.

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

- Comprehend electrical machinery pertaining to Synchronous machines, Single phase motors in simple & complex applications.
- Express importance of application of electrical AC machines.
- In-depth knowledge of applying the concepts on real time applications.
- Articulate rotating magnetic field generation
- Calculate machine variables in direct and quadrature axis form for salient pole type
- Demonstrate working of single and three phase AC Machines
- Know the concept of harmonics created in supply systems, need for reduction and design of synchronous machines for reducing them.

**Unit-I**

**Poly-phase Induction Motors:** Poly-phase induction motors-construction details of cage and wound rotor machines-Production of a rotating magnetic field - Principle of operation - Rotor E.M.F and rotor frequency - Rotor reactance, rotor current and P.F at standstill and during operation.

**Unit-II**

**Characteristics of Induction Motors:** Rotor power input, rotor copper loss and mechanical power developed and their inter relation-Torque equation-Deduction from torque equation - Expressions for maximum torque and starting torque - Torque slip characteristic - Equivalent circuit - Phasor diagram - crawling and cogging. No-load Test and Blocked rotor test –Predetermination of performance-Methods of starting and starting current and Torque calculations
Speed Control Methods: Speed control-change of voltage, change of frequency, V/f ; Injection of an E.M.F into rotor circuit (qualitative treatment only)-Induction generator-Principle of operation.

**Unit-III**

**Construction, Principle of operation, Characteristics & Regulation of Synchronous Generator :** Constructional Features of round rotor and salient pole machines – Armature windings – Integral slot and fractional slot windings; Distributed and concentrated windings – Distribution, pitch and winding factors – E.M.F Equation.Harmonics in generated E.M.F. – Suppression of harmonics – Armature reaction - Leakage reactance – Synchronous reactance and impedance – Experimental determination - Phasor diagram – Load characteristics Regulation by synchronous impedance method, M.M.F. method, Z.P.F. method and A.S.A. methods – Salient pole alternators – Two reaction analysis – Experimental determination of Xd and Xq (Slip test) Phasor diagrams – Regulation of salient pole alternators.

**Unit-IV**

**Parallel Operation of Synchronous Generator:** Synchronizing alternators with infinite bus bars – Synchronizing power torque – Parallel operation and load sharing - Effect of change of excitation and mechanical power input.
**Synchronous Motors – Principle of Operation:** Theory of operation – Phasor diagram – Variation of current and power factor with excitation – Synchronous condenser – Mathematical analysis for power developed, Hunting and its suppression – Methods of starting – Synchronous induction motor.

**Unit-V**

**Single Phase Motors & Special Motors:** Single phase Motors: Single phase induction motor – Constructional features- Double revolving field theory – Split-phase motors – Shaded pole motor.

**Teaching Methodologies**

1. EM-II ppts
2. Assignments uploaded in website

**Text Books**

1. Electric Machines –by I. J. Nagrath & D. P. Kothari, Tata Mc Graw Hill, 7th Edition.2009
2. Performance and Design of AC Machines-M. G. Say. BPB Publishers
3. Electrical Machines by Rajput

**Reference Books**

1. Electric machinery - A.E. Fitzgerald, C. Kingsley and S. Umans, McGraw Hill Companies, 5th edition
2. Electrical machines-P.S Bhimbra, Khanna Publishers.
3. Electrical Machines – J.B. Gupta, S.K. Khataria& Son's Publications
4. Electrical Machines - Bandhyopadhyaya
5. Electrical Machines - RK Raj put

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## CONTROL SYSTEMS

Course Code: GR15A2042 L:3 T:1 P:0 C:4

**Prerequisites:** Knowledge of Laplace Transforms, Differential equations and Matrices.

**Course Objectives**

- Introduce the fundamental concepts of control systems
- Analyse block diagram algebra
- Study the mathematical modeling of the system
- Learn time response analysis of second order systems.
- Know stability analysis, root locus technique.
- Know frequency analysis i.e., Bode plots and Nyquist plots.
- Know controllability and observability

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

- Express the basic elements and structures of feedback control systems.
- Represent the mathematical model of a system.
- Apply routh-hurwitz criterion, rootlocus, bode plot and nyquist plot to determine the domain of stability of linear time-invariant system.
- Determine the steady-state response, errors of stable control systems and design compensators to achieve the desired performance.
- Analyse the stability of the system.
- Design lead, lag, lead-lag compensators.
- Express control system models on state space models, to express state transition matrix and calculation of variables.

**Unit-I**

**Concepts of Control Systems and Transfer Function Representation Concepts of Control Systems:** Open loop and closed loop control systems, different examples of control systems, classification of control systems, characteristics and effects of feedback, mathematical models differential equations, impulse response and transfer functions, translational and rotational mechanical systems.

Transfer Function Representation Transfer function of DC and AC Servomotor, Synchro transmitter and receiver, Block diagram representation of systems considering electrical systems as examples, 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** Concept of stability, Routh stability criterion, qualitative and conditional stability. **Root Locus Technique** The root locus concept, construction of root loci, effects of adding poles and zeros to G(s)H(s) on the root locii. Frequency Response Analysis 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.

**Unit-IV**

**Stability analysis in frequency domain** Polar plots, Nyquist plots and applications of Nyquist criterion to find the stability, effects of adding poles and zeros to G(s)H(s) on the shape of the Nyquist diagrams.

**Unit-V**

**State Space Analysis of Continuous Systems** Concepts of state, state variables and state model, derivative of state models from block diagrams, diagonalization - solving the time invariant state equations, state transition matrix and its properties, Controllability and Observability.

**Teaching Methodologies**

1. CS ppts
2. Assignments uploaded in website
3. Software's: MATLAB.

**Text Book**

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

**Reference Books**

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

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## PRINCIPLES OF DIGITAL ELECTRONICS

Course Code: GR15A2105 L:3 T:1 P:0 C:4

**Prerequisites**
- Basics of number systems and Electronic devices and circuitry
- Basics of De-Morgan's Laws

**Course Objectives**
- List the types of number system existing in Digital electronics
- Illustrate the Logic gates and their working function with examples
- Implement the optimization methods of Logic Function
- Examine the difference between types of existing Logic Circuit Design
- Relate the logic functions with real time applications
- Generate the logic function for the logic circuit design
- Construct the Logic Circuits and Counters

**Course Outcomes:** At the end of the course, the student will be able to
- Identify the different types of number systems and their use.
- Explain the principle concepts of Digital Logic Design.
- Implement the logic circuits using Combinational Logic IC's.
- Distinguish between the Sequential and Combinational Logic Circuits.
- Reconstruct the Logic Circuits for real time applications with Combinational Circuits
- Formulate the Digital Logic Circuit function.
- Design the Logic Circuit using Combinational and Sequential Circuits

**Unit-I**

**Number systems and Boolean algebra:** Digital systems, Number - Base Conversions, Octal and Hexa-decimal Numbers, Complements, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and standard Forms, Other Logic Operations

**Unit-II**

**Logic Gates:** Digital Logic Gates, Integrated Circuits, Gate-level Minimization, The Map Method, Four- Variable Map, Five-Variable Map, Product-of-Sums Simplification, Don't-care Conditions, NAND and NOR Implementation, Exclusive-OR Function.

**Unit-III**

**Combinational logic:** Introduction to Combinational circuits, Analysis Procedure, Design Procedure, Code-conversion, Binary Adder - Subtractor, Carry Propagation, Half Subtractor, Full Subtractor, Binary Subtractor, Decimal Adder, BCD adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, and Multiplexers with design examples.

**Unit-IV**

**Sequential Logic:** Flip-Flops, Triggering of Flip Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Flip-Flop Excitation Tables, Design Procedure, Fundamentals of Asynchronous Sequential Logic: Introduction, Analysis procedure, Circuits with Latches, Design Procedure, Hazards.

**Unit-V**

**Registers and Counters:** Registers with parallel load, Shift registers; Serial Transfer, Serial Addition, Universal Shift Register, 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.

**Teaching methodologies**

1. Power Point presentations
2. Tutorial Sheets
3. Assignments
4. Lab experiments with Xlinix software

**Text books**

1. M. Morris Mano and Michael D. Ciletti, Digital Design, Fourth Education, Pearson 5th ed2013.
2. Charles H. Roth JR. Larry L. Kinney, Fundamentals of Logic Design, Cengaue learning 6th edition,2013.

**Reference books**

1. ZviKohavi,SwitchingandFiniteAutomataTheory,2ndEdition,TMH
2. Frederick J. Hill and Gerald R Peterson, Introduction to Switching theory and logic design, 3rdEdition, John Wileyandsons,1981.
3. Switching Theory and Logic Design by A. Anand Kumar, 2nd Edition, PHI Publishers.

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## AC MACHINES LAB

Course Code: GR15A2044 L:0 T:0 P:2 C:2

**Course Objectives:**

- To prepare the students to have a basic knowledge of transformers.
- To prepare the students to have a basic knowledge of induction motors.
- To prepare the students to have a basic knowledge of alternators.
- To design a practical transformer.
- To know about an induction generator.
- To learn the back to back connection of a transformer.
- To learn three phase to two phase conversion by Scott connection.

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

- Have knowledge of various parts of a electrical machine.
- Calculate the parameters of equivalent circuit of single phase induction motor.
- Conduct open circuit/ short circuit test on transformer.
- Conduct experiments on Ac Machines to find the characteristics.
- Draw the various characteristics of three phase induction motor.
- Perform test on synchronous Machine to find Direct and quadrature axis reactance.
- Conduct No Load and Full load tests on transformers/Induction Motor

**Contents**

1. OC, SC and Load tests on single phase transformer.
2. Sumpner's test.
3. V and inverted V curves of a 3-phase synchronous motor.
4. 4.Brake test on slip ring induction motor.
5. No-load and block rotor tests on squirrel cage induction motor.
6. Equivalent circuit of single phase induction motor.
7. Determination of Xd and Xq of a salient pole synchronous machine from slip test.
8. Regulation of alternator by synchronous impedance method and MMF method.
9. Hysteresis loss determination.
10. Scott connection.
11. Induction generator.
12. Heat run test on transformer.

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## CONTROL SYSTEMS LAB

Course Code: GR15A2045 L:0 T:0 P:2 C:2

**Course Objectives**

- Introduce strong knowledge on MATLAB and Lab-View.
- Introduce the basic knowledge on practical control system applications.
- Introduce the knowledge on applications of machines & electronic devices with control systems.
- Understand the basic concepts like Root-Locus, Bode Plot, Lead Lag, PID, etc.
- Learn to calculate transfer function for different systems.
- Apply the concepts in real time applications.
- Develop new experiments of various control concepts in lab.

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

- Have a strong knowledge of MATLAB software
- Do various engineering projects.
- Formulate transfer function for given control system problems.
- Find time response of given control system model.
- Plot Root Locus and Bode plots for given control system model
- Design Lead, Lag, Lead-Lag systems in control systems
- Design PID controllers for given control system model

**Contents**

1. Transfer function from zeros and poles and viceversa
2. Step response of a given transfer function
3. Ramp response of a given transfer function
4. Impulse response of a given transfer function
5. Root Locus from a Transfer function
6. Bode Plot from a Transfer function
7. Nyquist plot from a Transfer function
8. State Model from a Transfer function
9. Zeros and poles from state model.
10. Transfer functio of DC motor/Generator

11. Time Response of second order system.
12. DC Servomotor
13. PID Controller
14. Characteristics ofSynchros
15. Lag & Lead Compensator

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## ANALOG AND DIGITAL ELECTRONICS LAB

Course Code: GR14A2046 L:0 T:0 P:2 C:2

**Course Objectives**

- Define the Operation Amplifier and 555 Timers.
- Classify the Analog I C's and Digital I C's
- Execute the oscillators circuits, amplifiers circuits
- Examine different types of waveform generators, clock pulse generation and digital logic implementation
- Monitor the output waveforms and their functionality
- Design the amplifiers, waveform generators and simple logic circuits
- Create the analog computer and counters

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

- Recall the working operation of Operational Amplifiers, 555 Timer and their applications
- Compare the Digital and Analog IC's
- Practice the amplifiers, waveform generators and oscillator circuits
- Differentiate the integrators and differentiators working operation
- Judge the different waveforms and their applications
- Predict the circuit output waveform and its value.
- Construct the Digital Logic Function and analog circuits.

**Contents**

1. Design of Operational Amplifier as proportional Amplifier
2. Design of Operational Amplifier as integrator
3. Design of Operational Amplifier as differential amplifier
4. Design of Operational Amplifier as summation amplifier
5. Design of Operational Amplifier for multiplying two time varying signals
6. Design of Operational Amplifier for generation of triangle wave
7. Design of Operational Amplifier for generation of Square
8. Design of Operational Amplifier for generation of sin wave
9. 555 timer as basic application of generating train of pulses
10. 555 timer as speed sensor / frequency to Voltage Converter
11. Design of Operational Amplifier as D/A converter
12. Design of Operational Amplifier as V/f to F/v converter
13. All gates using Xilinx software with Verilog code
14. 7800 series & I C's and their applications
15. Combination circuits
16. Multiplexer and De multiplexer
17. Flip Flops implementation using Xilinx Software
18. Introduction to logic gates using Xilinx in Cool runner CPLD board

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## VALUE EDUCATION AND ETHICS

Course Code: GR15A2002 L:2 T:0 P:0 C:0

**Prerequisites:** General awareness on Moral Science

**Course Objectives:** The objective of this course is to provide
- Define and classify values, ethics
- Explain about self analysis, importance of values
- Organise constructive thinking and team work to create mutual happiness and prosperity
- Elaborate on ethics and professional ethics using case studies.
- Importance of continuous learning, choosing right work and career.

**Course Outcomes:** At the end of the course, the student will be able to
- Choose the right value system by self analysis and right understanding
- Make use of positive thinking, dignity of labour for building harmony and peace in self, family and society
- Analysing the importance of personality on effective behavior
- Identify and solve ethical dilemmas by finding value based and sustainable solutions in professional life.
- Find sustainable technological solutions for saving environment
- Compile value and ethical systems for continuous happiness and prosperity
- Take part in effective team work bringing out win-win solutions for complex problems

**Unit-I**

Values and self development –social values and individual attitudes, Work ethics, Indian vision of Moral and non-moral valuation, Standards and principles, Value judgments. 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.

**Unit-II**

Personality and Behavior Development-Soul and scientific attitude, God and scientific attitude, Positive thinking, Integrity and discipline, Punctuality, Love and Kindness, Avoiding fault finding, Free from anger, Dignity of labor, Universal brotherhood and religious tolerance, True friendship, Happiness Vs suffering, love for truth, Aware of self destructive habits, Association and cooperation, Doing best, Saving nature.

**Unit-III**

Character and Competence-Science Vs God, Holy books Vs blind faith, Self management and good health, Equality, Nonviolence, Humanity, Role of women,
All religions and same message, Mind your mind, Self control, Honesty, Studying effectively.

**Unit-IV**

**Professional consciousness Ethics:** Ethical Human conduct, Development of human consciousness, Implications of value based living, Holistic technologies, Production systems, Universal human order, Code of conduct.

**Unit-V**

**Legislative procedures:** Rights and Rules, Human Rights, Valuable groups, Copy rights, IPR, RTI Act, Lokpal, Ombudsman.

**Text Books**

1. Chakraborty,S.K., Values and Ethics for Originations Theory and Practice, Oxford University Press, New Delhi, 2001
2. R R Gaur, R Saugal, G P Bagaria, "A foundation course in Human values and Professional Ethics", Excel books, New Delhi, 2010.

**Reference Books**

1. Frankena, W.K., Ethics, Prentice Hall of India, New Delhi, 1990.
2. Kapoor, S.K., Human rights under International Law and Indian Law, Prentice Hall of India, New Delhi, 2002.

# GOKARAJU RANGARAJU
## INSTITUTE OF ENGINEERING AND TECHNOLOGY

## GENDER SENSITIZATION

Course Code: GR15A2106 L:0 T:0 P:3 C:2

**Course Objectives**

- To develop students sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

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

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

**Unit-I**

**UNDERSTANDING GENDER:** Gender: Why should we study it? (Towards a world of Equals: Unit – 1) Socialization: Making women, making men (Towards a World of Equals: Unit -2) Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities. Just Relationships: Being Together and Equals (Towards a World of Equals: Unit – 12) Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Further Reading: Rosa Parks – The Brave Heart.

**Unit-II**

**GENDER AND BIOLOGY:** Missing Women: Sex Selection and its Consequences (Towards a World of Equals: Unit – 4) Declining Sex Ratio. Demographic Consequences. Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit – 10) Two or Many? Struggles with Discrimination.Additional Reading: Our Bodies, Our Health (Towards a World of Equals: Unit – 13)

**Unit-III**

**GENDER AND LABOUR:** Housework: the Invisible Labour(Towards a World of Equals: Unit – 3) "My Mother doesn`t Work". "Share the Load". Women`s Work: Its Politics and Economics (Towards a World of Equals: Unit – 7) Fact and Fiction. Unrecognized and Unaccounted work. Further Reading: Wages and Conditions of Work.

**Unit-IV**

**ISSUES OF VIOLENCE:** Sexual Harassment: Say No! (Towards a World of Equals: Unit – 6) Sexual Harassment, not Eve – teasing – Coping with Everyday Harassment – Further Reading: "Chupulu" Domestic Violence: Speaking Out (Towards a World of Equals: Unit – 8) Is Home a Safe Place? – When Women Unite [Film]. Rebuilding Lives. Further Reading. New Forums for justice. Thinking about Sexual Violence (Towards a World of Equals: Unit – 11) Blaming the Victim – "! Fought for my Life ……" – Further Reading. The Caste Face of Violence.

**Unit-V**

**GENDER STUDIES:** Knowledge: Through the Lens of Gender (Towards a World of Equals: Unit – 5) Point of View. Gender and the Structure of Knowledge. Further Reading. Unacknowledged Women Artists of Telangana.Whose History? Questions for Historians and Others (Towards a World of Equals: Unit – 9) Reclaiming a Past. Writing other Histories. Fur**,** her Reading. Missing Pages from Telangana History.

**Text Books**

1. Towards a World of Equals: A Bilingual Textbook on Gender" Telugu Akademi, Hyderabad Written by A. Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, GoguShyamala, Deepa Sreenivas and Susie Tharu.

**Reference Books**

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