IV YEAR I SEMESTER

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

POWER SEMICONDUCTOR DRIVES

Course Code:GR20A4014 **L/T/P/C:2/1/0/3**

IV year I semester

COURSE OBJECTIVES

1. To know the characteristics of various motors and loads.
2. Analyze most of the widely used converters for DC motors
3. Understand performance of converter fed DC motors, its speed torque characteristics and various control methods.
4. Gain the knowledge about operation of DC motor speed control using converters and choppers
5. To acquire the knowledge of different speed control methods in AC motors using thyristors-based control schemes.

COURSE OUTCOMES

1. Analyse 1Φ & 3Φ converters fed DC motors and categorize the electric drive system based On the applications.
2. Understand the various mode of operations of electrical drives
3. Evaluate the performance characteristics of converter fed and chopper fed DC motor drives
4. Propose a speed control scheme of an induction motor drive for real life applications
5. Compare Separate control and self-control of synchronous motors drive.

UNIT I
PHASE CONTROLLED CONVERTER FED DC MOTOR

Introduction to Thyristor controlled Drives, single phase semi and full controlled converters connected to d.c. separately excited and d.c. series motors – continuous current operation – output voltage and current waveforms – speed and torque expressions – speed-torque – characteristics – problems on converter fed d.c. motors . Three phase semi and fully controlled connected to d.c. separately excited and d.c series motors - output voltage and current waveforms – speed and torque expressions – speed –torque characteristics – problems.

UNIT II
FOUR QUADRANT OPERATION OF DC DRIVES

Introduction to four quadrant operation – motoring operations, electric braking – plugging, dynamic and regenerative braking operations. Four quadrant operation of D.C. motors by dual converters – Closed loop control of DC motor (block diagram only)

UNIT III
CONTROL OF DC MOTORS BY CHOPPERS

Single quadrant, two quadrant and four quadrant chopper fed dc separately excited and series motors – continuous current operation – voltage and current waveforms – speed torque expressions and characteristics – problems – closed loop operation (block diagram only)

UNIT IV
CONTROL OF INDUCTION MOTOR

Variable voltage characteristics – control of induction motor by Ac voltage controllers – waveforms – speed torque characteristics. Variable frequency characteristics – variable frequency control of induction motor by voltage source and current source inverter and cyclo converters – PWM control of VSI and CSI – comparison of VSI and CSI operations - speed

torque characteristics – problems on induction motor drives - closed loop operation of induction motor drives (block diagram only). Static rotor resistance control – slip power recovery – static scherbius drive – static Kramer drive – their performance and speed torque characteristics – advantages -applications – problems.

UNIT V

CONTROL OF SYNCHRONOUS MOTOR

Separate control &self control of synchronous motors – operations of self controlled synchronous motors by VSI and CSI, Cycloconverters. Load commutated CSI fed synchronous motor – operation – waveforms – speed torque characteristics – applications- advantages and problems- Closed loop control operation of synchronous motor drives (block diagram only)

TEXT BOOKS

1. B. K. Bose, "Modern Power Electronics and AC Drives", Pearson Education, Asia, 2003.
2. Dubey G. K. "Power semiconductor control drives" Prentice Hall, Englewood Cliffs, New Jersey, 1989.
3. R. Krishnan, "Electric Motor Drives: Modeling, Analysis and Control", Prentice Hall, 2001.

REFERENCES

1. G. K. Dubey, "Fundamentals of Electrical Drives", CRC Press, 2002.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
WIDE BAND GAP POWER DEVICES
(Professional Elective –III)

Course Code:GR20A4015 **L/T/P/C:3/0/0/3**
IV year I semester

COURSE OBJECTIVES
1. Learn the characteristics of Power electronic devices
2. Study the GAN device fundamentals
3. Lean the SIC devices fundamentals
4. To understand the GAN device applications in Power Electronics
5. To understand the SIC device applications in Power Electronics

COURSE OUTCOMES
1. Comparison of SI based devices with wideband gap power devices
2. Demonstration of GAN characteristics
3. Illustrate the SIC Characteristics
4. Design of GAN based power electronics circuits.
5. Design of SIC based power electronics circuits

UNIT – I
INTRODUCTION OF DEVICES
MOSFET - structure and characteristics, MOSFET drain current, MOSFET transconductance and output conductance, MOSFET on-state resistance. The insulated gate bipolar transistor (IGBT) IGBT structure and characteristics - IGBT at turn-off and turn on, IGBT latch-up. Introduction of Wind band gap devices SiC, GaN, C(Diamond), necessity of wind band Gap, advantage of wide band gap semiconductors.

UNIT – II
GAN DEVICES
Fabrication of GaN Devices, Characterization and modelling GaN devices, Switching Characteristics, Advantages of GaN over si power semiconductors.

UNIT – III
SIC DEVICES
Fabrication of SiC Devices, Characterization and modelling SiC devices, Switching Characteristics, Advantages of SiC over silicon power semiconductors.

UNIT–IV
GAN APPLICATIONS
Consumer applications, Industrial applications, energy converters, e-mobility devices.

UNIT –V
SIC APPLICATIONS
High efficiency inverters for solar and wind power, power converters for electric and hybrid vehicles, power inverters for Industrial equipment’s, high voltage switches for X-ray generators.

TEXT BOOKS

1. Mohan, Undeland and Robbins, "Power Electronics: Converters, Applications and Design", John's Wiley and Sons.
2. B. W. Williams, Power Electronics: Devices, Drivers, Applications, and Passive Components, TMH
3. B Jayant Balija, Fundamentals Power Electronic Devices, Springer

REFERENCES

1. B Jayant Balija, SIC Devices, world Scientific Publishing, 2005.
2. Fei (Fred) Wang, Zheyu Zhang, and Edward A. Jones, Characterization of Wide Bandgap Power Semiconductor Devices, IET ENERGY ENGINEERING

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
HIGH VOLTAGE ENGINEERING
(Professional Elective –III)

Course Code:GR20A4016 **L/T/P/C:3/0/0/3**
IV year I semester

COURSE OBJECTIVES

1. Know the importance of high voltage engineering.
2. State the different dielectric materials and their break down mechanisms.
3. Acquire the knowledge of generation & measurement of high voltages and currents.
4. Impart the knowledge of insulation co-ordination.
5. Acquire the information on testing of electrical apparatus.

COURSE OUTCOMES

1. Recall the basic physics related to various breakdown processes in solid, liquid and gaseous insulating materials.
2. Classify the different methods of breakdown mechanisms that occur on application of high voltages.
3. Explain the methods of generation of high voltages.
4. State the procedures for the measurement of D. C., A.C., & Impulse voltages.
5. Describe the various tests on H. V. equipment and on insulating materials.

UNIT -I
BREAKDOWN IN GASES
Ionization processes and de-ionization processes, Types of Discharge, Gases as insulating materials, Breakdown in Uniform gap, non-uniform gaps, Townsend's theory, Streamer mechanism, Corona discharge.

UNIT – II
BREAKDOWN IN LIQUID AND SOLID INSULATING MATERIALS
Breakdown in pure and commercial liquids, Solid dielectrics and composite dielectrics, intrinsic breakdown, electromechanical breakdown and thermal breakdown, Partial discharge, applications of insulating materials.

UNIT – III
GENERATION OF HIGH VOLTAGES
Generation of high voltages, generation of high D. C. and A.C. voltages, generation of impulse voltages, generation of impulse currents, tripping and control of impulse generators.

UNIT-IV
MEASUREMENTS OF HIGH VOLTAGES AND CURRENTS
Peak voltage, impulse voltage and high direct current measurement method, cathode ray oscillographs for impulse voltage and current measurement, measurement of dielectric constant and loss factor, partial discharge measurements.

UNIT-V

HIGH VOLTAGE TESTING OF ELECTRICAL APPARATUS AND HIGH VOLTAGE LABORATORIES

Various standards for HV Testing of electrical apparatus, IS, IEC standards, Testing of insulators and bushings, testing of isolators and circuit breakers, testing of cables, power transformers and some high voltage equipment, High voltage laboratory layout, indoor and outdoor laboratories, testing facility requirements, safety precautions in H. V. Labs.

TEXT BOOKS

1. M. S. Naidu and V. Kamaraju, "High Voltage Engineering", McGraw Hill Education, 2015.

REFERENCES

1. C. L. Wadhwa, "High Voltage Engineering", New Age International Publishers, 2007.
2. E. Kuffel, W. S. Zaengl and J. Kuffel, "High Voltage Engineering Fundamentals", Newnes Publication, 2000.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DIGITAL CONTROL SYSTEMS
(Professional Elective –III)

Course Code: GR20A4017 **L/T/P/C:3/0/0/3**

IV year I semester

COURSE OBJECTIVES

1. Understand the fundamentals of digital control systems, z-transforms
2. Explain Discrete System Analysis and Stability of Discrete Time System
3. Study the State Space Approach for discrete time systems
4. Design the Discrete compensator
5. Summarize discrete output feedback control

COURSE OUTCOMES

1. Demonstrate discrete representation of LTI systems.
2. Interpret the stability of open loop and closed loop discrete-time systems.
3. Analyze the State Space Approach for discrete time systems
4. Design of different digital controllers.
5. Model state feedback and output feedback controllers.

UNIT I
DISCRETE REPRESENTATION OF CONTINUOUS SYSTEMS

Basics of Digital Control Systems. Discrete representation of continuous systems. Sample and hold circuit. Mathematical Modelling of sample and hold circuit. Effects of Sampling and Quantization. Choice of sampling frequency. ZOH equivalent. Z-Transform and Inverse Z Transforms.

UNIT II
DISCRETE SYSTEM ANALYSIS AND STABILITY OF DISCRETE TIME SYSTEM

Pulse Transfer function. Pulse transfer function of closed loop systems. Mapping from s-plane to z plane. Solution of Discrete time systems. Time response of discrete time system. Stability analysis by Jury test. Stability analysis using bilinear transformation. Design of digital control system with dead beat response. Practical issues with dead beat response design.

UNIT III
STATE SPACE APPROACH FOR DISCRETE TIME SYSTEMS

State space models of discrete systems, State space analysis. Lyapunov Stability. Controllability, reach-ability, Reconstructibility and observability analysis. Effect of pole zero cancellation on the controllability & observability.

UNITIV
DESIGN OF DIGITAL CONTROL SYSTEM

Design of Discrete PID Controller, Design of discrete state feedback controller. Design of set point tracker. Design of Discrete Observer for LTI System. Design of Discrete compensator.

UNIT V

DISCRETE OUTPUT FEEDBACK CONTROL

Design of discrete output feedback control. Fast output sampling (FOS) and periodic output feedback controller design for discrete time systems

TEXT BOOKS

1. K. Ogata, “Digital Control Engineering”, Prentice Hall, Englewood Cliffs, 1995.
2. M. Gopal, “Digital Control Engineering”, Wiley Eastern, 1988.

REFERENCES

1. G. F. Franklin, J. D. Powell and M. L. Workman, “Digital Control of Dynamic Systems”, Addison-Wesley, 1998.
2. B.C. Kuo, “Digital Control System”, Holt, Rinehart and Winston, 1980.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
FUNDAMENTALS OF DIGITAL SIGNAL PROCESSING
(Professional Elective –III)

Course Code:GR20A4018 **L/T/P/C:3/0/0/3**
IV year I semester

COURSE OBJECTIVES

1. Distinguish the basic concepts and techniques for processing signals.
2. Analyze discrete time signal processing and characterization of random signals
3. Demonstrate the important methods in DSP, including digital filter design.
4. Evaluate the transform-domain processing and importance of Signal Processors.
5. Apply engineering problem solving strategies for DSP applications.

COURSE OUTCOMES

1. Represent signals mathematically in continuous and discrete-time, and in the frequency domain.
2. Analyse discrete-time systems using z-transform.
3. Explain the Discrete-Fourier Transform (DFT) and the FFT algorithms.
4. Design digital filters for various applications.
5. Solve problems in digital signal processing for the analysis of real-life signals.

UNIT I
DISCRETE-TIME SIGNALS AND SYSTEMS

Discrete time signals and systems: Sequences; representation of signals on orthogonal basis; Representation of discrete systems using difference equations, Sampling and reconstruction of signals- aliasing; Sampling theorem and Nyquist rate.

UNIT II
Z-TRANSFORM

z-Transform, Analysis of Linear Shift Invariant systems using z-transform, Properties of z-transform for causal signals, Interpretation of stability in z-domain, Inverse z-transforms.

UNIT III
DISCRETE FOURIER TRANSFORM

Frequency Domain Analysis, Discrete Fourier Transform (DFT), Properties of DFT, Convolution of signals, Fast Fourier Transform Algorithm, Parseval's Identity, Implementation of Discrete Time Systems.

UNIT IV
DESIGN OF DIGITAL FILTERS

Design of FIR Digital filters: Window method, Park-McClellan's method. Design of IIR Digital Filters: Butterworth, Chebyshev and Elliptic Approximations; Low-pass, Band-Pass, Band-Stop and High Pass Filters.

UNIT V

APPLICATIONS OF DIGITAL SIGNAL PROCESSING

Correlation Functions and Power Spectra, Stationary Processes, Optimal filtering using ARMA Model, Linear Mean-Square Estimation, Wiener Filter.

TEXT BOOKS

1. S. K. Mitra, "Digital Signal Processing: A computer based approach", McGraw Hill, 2011.
2. A.V. Oppenheim and R. W. Schafer, "Discrete Time Signal Processing", Prentice Hall, 1989.
3. J. G. Proakis and D.G. Manolakis, "Digital Signal Processing: Principles, Algorithms And Applications",Prentice Hall, 1997.
4. L. R. Rabiner and B. Gold, "Theory and Application of Digital Signal Processing", Prentice Hall, 1992.

REFERENCES

1. J. R. Johnson, "Introduction to Digital Signal Processing", Prentice Hall, 1992.
2.D. J. DeFatta, J. G. Lucas andW. S. Hodgkiss, "Digital Signal Processing", John Wiley & Sons, 1988.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

POWER QUALITY and FACTS
(Professional Elective –IV)

Course Code:GR20A4019 **L/T/P/C:3/0/0/3**

IV year I semester

COURSE OBJECTIVES

1. Analyse the transmission interconnections and relative importance of FACTS controllers.
2. Determine the operating characteristics of Shunt compensators.
3. Understand the working principles of Series compensators.
4. Analyse the basic concepts of Power Quality.
5. Understand the working principle of DVR, DSTATCOM.

COURSE OUTCOMES

1. Analyse the characteristics of ac transmission and know basic types of FACTS controllers.
2. Adapt FACTS devices for power-flow control, and Discuss the working principles of Shunt compensators and their operating characteristics.
3. Discuss the working principles of Series compensators.
4. Interpret the basic concepts of power quality.
5. Determine the working principles of devices DVR and DSTATCOM, to improve power quality.

UNIT I
FACTS CONCEPTS
Transmission Interconnections, Power Flow and Dynamic Stability Considerations of a Transmission Interconnection, Basic Types of FACTS Controllers-Shunt Connected Controllers, Series Connected Controllers, Combined Shunt and Series Connected controllers.

UNIT II
SHUNT COMPENSATORS
Objectives of shunt compensation, Midpoint voltage regulation, Improvement of Transient stability, power oscillation damping, Principle of operation of FC-TCR(SVC) compensator, characteristic of FC-TCR and control diagram, Basic concept of voltage source converter, principle of operation of STATCOM, characteristic of STATCOM, control diagram.

UNIT III
SERIES COMPENSATORS
Objectives of series compensation, Improvement of Transient stability, power oscillation damping, Principle of operation of Thyristor controlled series compensator (TCSC), operating characteristics, TCSC control diagram, Principle of operation voltage source converter type series compensator (SSSC). Basic principle of operation of UPFC, transmission control capabilities of UPFC.

UNIT IV
POWER QUALITY MEASUREMENTS
Power Quality problems in distribution systems: Transient and Steady state variations in

voltage and frequency. Unbalance, Sags, Swells, Interruptions, Wave-form Distortions: harmonics, noise. Tolerance of Equipment: CBEMA curve.

UNIT V

WORKING PRINCIPLE OF DVR, DSTATCOM

Principle of operation of DSTATCOM, Control in UPF mode of operation and zero voltage regulation mode, Full bridge single phase DVR and Three phase three wire DVR topology description, Principle of operation of active series compensator (DVR).

TEXT BOOKS

1. N. G. Hingorani and L. Gyugyi, "Understanding FACTS: Concepts and Technology of FACTS Systems" , Wiley-IEEE Press, 1999.
2. K. R. Padiyar, "FACTS Controllers in Power Transmission and Distribution", New Age International (P) Ltd. 2007.

REFERENCES

1. Bhim singh, Ambrish chandra and Kamal AL-Haddad, "Power Quality Problems and Mitigation Techniques" John wiley and sons Ltd 2015.

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ELECTRICAL ENERGY AUDIT
(Professional Elective –IV)

Course Code:GR20A4020 **L/T/P/C:3/0/0/3**

IV year I semester

COURSE OBJECTIVES
1. Know about current scenario and importance of energy conservation.
2. Evaluate the concepts of Energy and its various forms
3. Outline Energy Management & Audit-Definition
4. Observe improving of energy efficiency in different electrical systems.
5. Know how assessment of cooling towers can be done

COURSE OUTCOMES
1. Interpret the current energy scenario and energy need of growing economy.
2. Identify the Energy and its various forms and Electricity tariffs.
3. Analyze types of energy audit, energy costs, bench marking, energy performance.
4. Estimate Electricity billing, electrical load management and maximum demand control.
5. Discuss various types of air compressors, compressor efficiency and Compressed air system components.

Syllabus

UNIT – I
ENERGY SCENARIO
Commercial and Non-commercial energy, primary energy resources, commercial energy production, final energy consumption, energy needs of growing economy, long term energy scenario, energy pricing, energy sector reforms, energy and environment, energy security, energy conservation and its importance, restructuring of the energy supply sector, energy strategy for the future, air pollution, climate change.

UNIT – II
BASICS OF ENERGY AND ITS VARIOUS FORMS
Electricity tariff, load management and maximum demand control, power factor improvement, selection & location of capacitors, Thermal Basics-fuels, thermal energy contents of fuel, temperature & pressure, heat capacity, sensible and latent heat, evaporation, condensation, steam, moist air and humidity & heat transfer, units and conversion.

UNIT – III
ENERGY MANAGEMENT & AUDIT
Definition: energy audit, need, types of energy audit. Energy management (audit) approach understanding energy costs, bench marking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel & energy substitution, energy audit instruments.

UNIT–IV

ENERGY EFFICIENCY IN ELECTRICAL SYSTEMS

Electricity billing, electrical load management and maximum demand control, power factor improvement and its benefit, selection and location of capacitors, performance assessment of PF capacitors, distribution and transformer losses.

UNIT –V

ENERGY EFFICIENCY IN INDUSTRIAL SYSTEMS

Compressed Air System: Types of air compressors, compressor efficiency, efficient compressor operation, Compressed air system components, capacity assessment, leakage test. Fans and blowers: Types, performance evaluation, efficient system operation, flow control strategies and energy conservation opportunities. Pumps and Pumping System: Types, performance evaluation, efficient system operation, flow control strategies and energy conservation opportunities, Cooling Tower: Types and performance evaluation, efficient system operation, flow control strategies and energy saving opportunities, assessment of cooling towers..

TEXT BOOKS

1. S. C. Tripathy, "Utilization of Electrical Energy and Conservation", McGraw Hill, 1991.

REFERENCES

1. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-1, General Aspects (available online)

2. Guide books for National Certification Examination for Energy Manager / Energy Auditors Book-3, Electrical Utilities (available online).

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SPECIAL ELECTRICAL MACHINES
(Professional Elective –IV)

Course Code: GR20A4021 **L/T/P/C:3/0/0/3**

IV year I semester

COURSE OBJECTIVES

1. Develop knowledge on Construction, principle of operation and performance of synchronous reluctance motors.
2. Understand the concepts of sine wave motor.
3. Develop Construction, principle of operation, control and performance of switched reluctance motors.
4.Explain principle of operation, control and performance of permanent magnet brushless D.C motors.
5.Principle of operation and performance of permanent magnet synchronous motors.

COURSE OUTCOMES

1. Summarize Various Special Electrical Machines
2. Explain Permanent magnet brushless D.C Motors .
3. Identify Various Power Controllers.
4.Analyze the Variable Reluctanceandhybridmotors.
5. Interpret the Different Switched Reluctancemotors

UNIT-I
INTRODUCTION OF SPECIAL MACHINES.

Construction and principle of operation - Emf equation of BLPM sine wave motor- Flux density distribution.

UNIT-II
PERMANENTMAGNETBRUSHLESS D.C.MOTORS

Permanent Magnet materials– Magnetic Characteristics –Permeance coefficient-Principle of operation–Types–Magnetic circuit analysis–EMF and torque equations –CommutationPower controllers–Motor characteristics and control.

UNIT-III
PERMANENTMAGNET SYNCHRONOUSMOTORS

Principle of operation–Ideal PMSM –EMF and Torque equations–Armature reaction MMF– Synchronous Reactance – Sine wave motor with practical windings - Phasor diagram – Torque/speed characteristics- Power controllers- Converter Volt-ampere requirements.

UNIT-IV
SYNCHRONOUS RELUCTANCEMOTORS

Constructionalfeatures–Types–AxialandRadialfluxmotors–Operatingprinciples–Variable ReluctanceandHybridMotors–SYNRELMotors–VoltageandTorqueEquations- Phasor diagram - Characteristics.

UNIT-V

SWITCHED RELUCTANCEMOTORS

Constructional features–Rotary and Linear SRMs-Principle of operation–Torque production–Steady state performance prediction-Analytical method-Power Converters and their controllers – Methods of Rotor position sensing – Sensor less operation – Closed loop control of SRM - Characteristics.

TEXT BOOKS

1. T.J.E.Miller,_Brushless Permanent Magnet and Reluctance Motor Drives‘, Clarendon Press, Oxford, 1989.

2. T.Kenjo,_Stepping Motors andTheir Microprocessor Controls‘, Clarendon Press London, 1984.

REFERENCES

1.R.Krishnan,_SwitchedReluctanceMotor Drives–Modeling,Simulation,Analysis,Designand Application‘,CRCPress,NewYork,2001.

2.P.P.Aearnley,_SteppingMotors–AGuidetoMotorTheoryandPractice‘,PeterPerengrinus London, 1982.

3.T.KenjoandS.Nagamori,_PermanentMagnetandBrushlessDCMotors‘,ClarendonPress, London, 1988

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

VLSI DESIGN
(Professional Elective –IV)

Course Code:GR20A3108 **L/T/P/C:3/0/0/3**
IV year I semester

COURSEOBJECTIVES

1. To learn the fundamentals of MOS transistors and IC fabricationtechnologies
2. To analyze and design CMOS subsystems
3. To understand the flow of VLSI design and to draw stick diagrams and layouts for CMOS circuits
4. To implement the VLSI designs using programmable logic devices
5. To understand the need of testing and the methods oftesting ICs

COURSE OUTCOMES

1. The student able to visualize the fabrication process of ICtechnology.
2. The student able to analyze and design CMOS subsystems
3. The student able to draw stick diagrams and layouts for CMOS circuits using design rules
4. The student able to implement the VLSI design using programmable logic devices
5. The student able to understand various testingschemes

UNIT I

Introduction: Introduction to IC Technology–MOS transistors, NMOS, CMOS & BiCMOS fabrication processes, Integrated Resistors and Capacitors

UNIT II

Basic Electrical Properties: Basic Electrical Properties of MOS and BiCMOS Circuits: Ids-Vds relationships, MOS transistor threshold Voltage Vt, gm, gds, Figure of merit ωo; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter-analysis and design, BiCMOS Inverters, Power Dissipation

UNIT III

VLSI Circuit Design Processes, Gate Level Design: VLSI Design Flow, Stick Diagrams, Layout, Lambda based Design rules for wires, contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Design using Pass transistors and transmission gates, Dynamic CMOS Logic and Domino CMOS Logic

UNIT IV

Data path Subsystems, Array Subsystems: Subsystem Design, Shifters, Adders- Ripple Carry,

CLA CSA, ALUs, Multipliers –Array Type, Booth,Wallace tree, Parity generators, Comparators, Zero/One Detectors, SRAM, DRAM, ROM

UNIT V

Semicustom Integrated Circuit Design, IC Testing: PLAs, Programmable Array Logic, FPGAs, CPLDs, Standard cells design approach, Need for Testing, Test Principles, Design Strategies for Test, Chip Level Test Techniques, System-Level Test Techniques.

TEXTBOOKS

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Douglas A.Pucknell, Sholeh Eshraghian,PHI,2011.
2. CMOS VLSI Design–A circuits and systems perspective, Neil H.E Weste, David Harris, Fourth Edition, Addison Wesley,2011.
3. VLSI Design, K. Lal Kishore and V. S. V. Prabhakar, 1st Edition, I.K. International,2009.

REFERENCES

1. CMOS logic circuit Design- John. P. Uyemura, Springer,2013.
2. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rdEdition,1997.
3. VLSI Design–A. Albert Raj, Latha, PHI,2008
4. Introduction to VLSI–Mead & Convey, BS Publications, 2010

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
FUNDAMENTALS OF MANAGEMENT AND ENTREPRENEURSHIP

Course Code:GR20A3140 **L/T/P/C:3/0/0/3**

IV year I semester

COURSE OBJECTIVES

1. To provide engineering and science students with an accelerated introduction to the basics of management.
2. The course provides a framework that will enhance a person's effectiveness in the business world and make familiarize management language.
3. To understand the management concepts and applications of concepts in practical aspects of business and development of managerial skills.
4. To provide the student with a clear understanding of Entrepreneurship.
5. To give hands on experience on how to generate ideas, evaluate business model.

COURSE OUTCOMES

1. The students understand the significance of Management in their Profession.
2. The various Management Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course.
3. The students can explore the Management Practices in their domain area and understand, adopt motivational theories and leadership styles and apply controlling techniques at right time for better decision making.
4. The student will be exposed to the basic concepts of entrepreneurship and its development process.
5. The student will be able to evaluate business ideas and attain hands on experience in designing value proposition and he will acquire the ability of developing a business plan / model.

UNIT–I

INTRODUCTION TO MANAGEMENT

Definition, Nature and Scope, Functions, Managerial Roles, Levels of Management, Managerial Skills; **Evolution of Management Thought**- Classical Approach- Scientific and

Administrative Management; The Behavioural approach; The Systems Approach; Contingency Approach.

UNIT– II

PLANNING AND ORGANIZING

Planning – Planning Process, Types of Plans, Decision making and Steps in Decision Making; Principles of Organization: Span of control, organizational Design & Organizational Structures; Departmentalization, Delegation; Centralization, Decentralization.

UNIT–III

LEADING, MOTIVATION AND CONTROLLING

Leadership, Power and Authority, Leadership Styles; Behavioral Leadership, Situational Leadership, Leadership Skills. Motivation – Types; Motivational Theories – Needs Hierarchy Theory, Two Factor Theory, Theory X and Theory Y. **- controlling** – basic control process – control techniques.

UNIT–IV

NATURE OF ENTREPRENEURSHIP

Characteristics and skills of an entrepreneur, Entrepreneur scenario in India and abroad. Types of entrepreneur, types of ownership, Small business in Indian economy. Risk Reduction strategies. Strategies for growth. Financial aspects: sources of rising capital, schemes of Department of Industries (DIC), KVIC, SIDBI, NABARD, NSIC, IFCI and IDBI.

UNIT–V

CREATING AND STARTING THE VENTURE

Creativity and the business idea (Self-discovery, Opportunity discovery); Developing the business plan (Business model – Lean canvas by Alexander Osterwalder); Marketing plan (Customer & Solution- Value proposition, Marketing & Sales); Financial plan (Validation, money), Human Resource Plan (Team).

TEXT BOOKS

1. Management Fundamentals, Robert N Lussier, 5e, Cengage Learning, 2013.
2. Fundamentals of Management, Stephen P. Robbins, Pearson Education, 2009.
3. Principles and Practice of Management, L. M. Prasad, Sultan Chand & Sons, 2012
4. Entrepreneurship- Robert D Hisrich, Michael P Peters, Dean A Shepherd, TMH.2009

REFERENCES

1. Essentials of Management, Koontz Kleihrich, Tata Mc – Graw Hill.
2. Management Essentials, Andrew DuBrin, 9e, Cengage Learning, 2012.
3. Entrepreneurship- Rajeev Roy, Oxford, 2011
4. Intellectual Property- Deborah E.Bouchoux, Cengage, 2012

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ARTIFICAL INTELLIGENCE TECHNIQUES
(Open Elective –III)

Course Code:GR20A4022 **L/T/P/C:3/0/0/3**
IV year I semester

COURSE OBJECTIVES

1. Classify the difference between Biological Neuron and Artificial Neuron.

2. Articulate about Back propagation networks

3. Illustrate the concepts of Fuzzy logic systems

4. Identify the Systems which are designed using Fuzzy Membership Rules

5. Describe the importance of the Genetic Algorithm and its applications.

COURSE OUTCOMES

1. Outline importance of BNN, ANN and its learning techniques and architectures.

2. Summarize the concept of Back propagation networks

3. Interpret the concept of Fuzzy logic System

4. Design of Fuzzy membership Function and rules for Applications

5. Analyze the parameters of Genetic Algorithm.

UNIT I

NEURAL NETWORKS –I (Introduction & Architecture)

Neuron, Nerve structure and synapse, Biological Neural network , Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks. Various learning techniques.

UNIT II

NEURAL NETWORKS –II (Back Propagation Networks)

Architecture: perceptron model, solution, single layer artificial neural network, multilayer perception model; back propagation learning methods, effect of learning rule co-efficient; back propagation algorithm, factors affecting back propagation training, applications.

UNIT III

FUZZY LOGIC –I (Introduction)

Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations,

Properties of fuzzy sets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion.

UNIT IV

FUZZY LOGIC –II (Fuzzy Membership, Rules)

Membership functions, interference in fuzzy logic, fuzzy if-then rules, Fuzzy implications and Fuzzy algorithms, Fuzzyfications & Defuzzificataions, Fuzzy Controller, Industrial applications.

UNIT V

GENETIC ALGORITHMS (GA)

Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations, (encoding) Initialization and selection, Genetic operators, Mutation, Generational Cycle, applications.

TEXTBOOKS

1. J M Zurada , "An Introduction to ANN",Jaico Publishing House

2. Neural Networks, Fuzzy Logic, And Genetic Algorithms : Synthesis And Applications - by S. RAJASEKARAN, G. A. VIJAYALAKSHMI PAI, PHI publishers.

3. Timothy J Ross, "Fuzzy Logic with Engg.Applications", McGraw. Hill

REFERENCES

1. Hung T. Nguyen, Nadipuram R. Prasad, Carol L. Walker and Elbert A. Walker, "A First Course in Fuzzy and Neural Control" Chapman & Hall, CRC.

2. Driankov, Dimitra, "An Introduction to Fuzzy Control", Narosa Publication

3. Golding, "Genetic Algorithms", Addison-Wesley Publishing Com

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PROGRAMMABLE LOGIC CONTROLLERS LAB

Course Code:GR20A4023 **L/T/P/C:0/0/4/2**
IV year I semester

COURSE OBJECTIVES

1. Know the different Programming Languages of PLC.
2. Execute Logic Gates in Ladder Logic of PLC.
3. Examine various experiments of PLC in FBD.
4. Apply Timer and Counter for different industrial applications.
5. Design various application of PLC like Traffic Light Control, Water Level Control, etc.

COURSE OUTCOMES

1. Ability to learn different programming languages of PLC.
2. Implement all the Logic Gates in Ladder Logic.
3. Perform different FBD programming experiments of PLC.
4. Ability to use PLC timers and counters for the various applications.
5. Design and implementation of different applications of PLC like Traffic Light Control, Water Level Control, etc

List of Experiments

Task-1: Experiments on Ladder Programming

- Logic Gates.
- Latching and Unlatching
- Interlocking
- Forward and Reverse direction control of Motors.

Task-2: Experiments on FBD Programming

- Different applications of Push buttons.
- Working of different types of Timers.
- Working of different types of Counters.
- Sequential operation of ON/OFF a set of lights.
- Latching and Unlatching of a Motor.

Task-3: Applications of PLC

- Water Level Controller.
- Traffic Light Control
- Lift Control System

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
POWER SEMICONDUCTOR DRIVES LAB

Course Code:GR20A4024 **L/T/P/C:0/0/4/2**
IV year I semester

COURSE OBJECTIVES

1. To match a foundation in the theory and applications of electrical machinery and their different types with respect to their control.
2. To recall control theory concepts in electric drive control systems.
3. To Knowledge on different power converters for AC and DC drives.
4. To Information on modeling and different control strategies for synchronous motor drives, PMSM and BLDC.
5. To Evaluation of Closed loop speed and torque control of switched reluctance motor drives.

COURSE OUTCOMES

1. Explain the operation of power electronic converters and their control strategies.
2. Construct control DC Motor by Three Phase Converters.
3. Develop Three Phase Inverter for Induction motor drives..
4. Solve four quadrant Operation of DC drives.
5. Classify speed and torque control in BLDC, PMSM & SRM.

List of Experiments

1. Firing angle control of thyristor based DC drive connected to DC motor.

2. Closed loop speed control of DC motor using PI,PID, PD controllers.

3. Step, ramp, parabolic response of second order DC motor system.

4. Indirect speed control of DC motor using armature voltage control with PI,PID controllers.

5. V/F control of AC drive connected to AC motor.

6. Closed loop speed control of AC motor with step, ramp, parabolic inputs and PI,PID controllers.

7. Closed loop speed control of AC motor- DC generator set with load using PI,PID controllers.

8. Speed Control of SRM (Switched Reluctance Motor) in Forward Motoring and Reverse Motoring Mode.

9. Speed Control of PMBLDC Motor in Forward Motoring, Reverse Motoring and Forward Breaking Mode.

10. Speed Control of PMSM in Forward Motoring Mode.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
PROJECT WORK - PHASE I

Course Code: GR20A4129 **L/T/P/C: 0/0/12/6**
IV Year I Semester

Course Objectives:

1. Demonstrate a wide range of skills learned to deliver a project.
2. Encourage multidisciplinary research through the integration learned.
3. Develop problem solving, analysis, synthesis and evaluation skills.
4. Encourage teamwork.
5. Improve communication and presentation skills during project work.

Course Outcomes:

1. Formulate hypothesis for the problem statement with sound technical knowledge from selected project domain.
2. Design Engineering Solution to the problem statementwith systematic approach.
3. Analyse and develop an efficient solution for implementation of the project.
4. Apply the theoretical concepts while providing solution to the problem statement with teamwork and multidisciplinary approach.
5. Demonstrate professionalism with ethics while preparing and presenting the project work.

IV YEAR II SEMESTER

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

POWER SYSTEM MONITORING AND CONTROL

Course Code:GR20A4092 **L/T/P/C:2/1/0/3**

IV year II semester

COURSE OBJECTIVES

1. Outline the concept of Economic operation of power system and Unit commitment
2. Explain about the operation and control the voltage, frequency
3. Monitoring and control of a power system.
4. Basics of power system economics
5. Basics of Demand Side-management

COURSE OUTCOMES

1. Analyze the concept of Economic operation of power system and Unit commitment
2. List methods to control the voltage, frequency and power flow
3. Compose monitoring and control of a power system.
4. Recall the basics of power system economics.
5. Write about Demand Side-management

UNIT I
ECONOMIC OPERATION OF POWER SYSTEMS AND UNIT COMMITMENT

Optimal operation of Generators in Thermal Power Stations, - heat rate Curve – Cost Curve – Incremental fuel and Production costs, input-output characteristics, Optimum generation allocation with line losses neglected.Optimum generation allocation including the effect of transmission line losses – Loss Coefficients, General transmission line loss formula. Numerical problems.

Constraints in Unit Commitment, UC solution methods: Priority- list methods, forward dynamic programming approach.

UNIT II
CONTROL OF FREQUENCY AND VOLTAGE

Turbines and Speed-Governors, Load frequency control of single area and Two area system: Steady state analysis, Dynamic Response, Droop Control and Power Sharing, Automatic Generation Control, Excitation Systems

UNIT III
MONITORING AND CONTROL

Overview of Energy Control Centre Functions: SCADA systems. Phasor Measurement Units and Wide-Area Measurement Systems, State-estimation: Maximum likelihood weighted least squares estimation. Factors effecting power System Security, Introduction of Contingency analysis, Preventive Control and Emergency Control.

UNIT IV
POWER SYSTEM ECONOMICS

Basic Pricing Principles: Generator Cost Curves, Utility Functions, Power Exchanges, Spot

Pricing. Electricity Market Models (Vertically Integrated, Purchasing Agency, Whole-sale competition, Retail Competition),

UNIT V
POWER MANAGEMENT
Demand Side-management, Transmission and Distributions charges, Ancillary Services. Regulatory framework.

TEXT BOOKS
1. J. Grainger and W. D. Stevenson, "Power System Analysis", McGraw Hill Education,1994.
2. P.Kundur, "Power System Stability and Control" McGraw Hill Education, 1994
3. O. I. Elgerd, "Electric Energy Systems Theory", McGraw Hill Education, 1995.
4. A. R. Bergen and V. Vittal, "Power System Analysis", Pearson Education Inc., 1999.
5. D. P. Kothari and I. J. Nagrath, "Modern Power System Analysis", McGraw Hill Education,2003.

REFERENCES
1. B. M. Weedy, B. J. Cory, N. Jenkins, J. Ekanayake and G. Strbac, "Electric Power Systems",Wiley, 2012.

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED ELECTRIC DRIVES
(Professional Elective –V)

Course Code:GR20A4093 **L/T/P/C:3/0/0/3**

IV year II semester

COURSE OBJECTIVES

1. To Knowledge on different power converters for AC drives
2. To Focus on modeling and different control strategies for Induction motor drives
3. To Information on modeling and different control strategies for synchronous motor drives, PMSM and BLDC.
4. To Evaluation of Closed loop speed and torque control of switched reluctance motor drives.
5. To Analysis of DSP based motion control.

COURSE OUTCOMES

1. Explain the operation of power electronic converters and their control strategies.
2. Apply vector control strategies for Induction motor drives
3. Design different control strategies for Synchronous motor drives and PM AC Machines
4. Demonstrate the operation of switched reluctance motor drives.
5. Interpret the implementation of DSP based motion control.

UNIT I
POWER CONVERTERS FOR AC DRIVES
PWM control of inverter, selected harmonic elimination, space vector modulation, current control of VSI, three level inverter, Different topologies, SVM for 3 level inverter, Diode rectifier with boost chopper, PWM converter as line side rectifier, current fed inverters with self-commutated devices. Control of CSI, H bridge as a 4-Q drive.

UNIT II
INDUCTION MOTOR DRIVES
Different transformations and reference frame theory, modeling of induction machines, voltage fed inverter control-v/f control, vector control, direct torque and flux control(DTC).

UNIT III
SYNCHRONOUS MOTOR DRIVES
Modeling of synchronous machines, open loop v/f control, vector control, direct torque control, CSI fed synchronous motor drives.
PERMANENT MAGNET MOTOR DRIVES
Introduction to various PM motors, BLDC and PMSM drive configuration, comparison, block diagrams, Speed and torque control in BLDC and PMSM.

UNIT IV

SWITCHED RELUCTANCE MOTOR DRIVES

Evolution of switched reluctance motors, various topologies for SRM drives, comparison, Closed loop speed and torque control of SRM.

UNIT V

DSP BASED MOTION CONTROL

Use of DSPs in motion control, various DSPs available, realization of some basic blocks in DSP for implementation of DSP based motion control.

TEXT BOOKS

1. B. K. Bose, "Modern Power Electronics and AC Drives", Pearson Education, Asia, 2003.
2. P. C. Krause, O. Wasynczuk and S. D. Sudhoff, "Analysis of Electric Machinery and Drive Systems", John Wiley & Sons, 2013.
3. H. A. Taliyat and S. G. Campbell, "DSP based Electromechanical Motion Control", CRC press, 2003.

REFERENCES

1. R. Krishnan, "Permanent Magnet Synchronous and Brushless DC motor Drives", CRC Press, 2009.

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

BIG DATA APPLICATIONS IN POWER SYSTEMS
(Professional Elective –V)

Course Code:GR20A4094 **L/T/P/C:3/0/0/3**

IV year II semester

COURSE OBJECTIVES

1. Basic concepts of data analytics that are used to realize the benefits of smart grid
2. Introduce goals of data modeling as well as the benefits and challenges of creating useful models
3. Available and desired data sources for big data analytics
4. The difficulties in the existing approaches for database integration and storage efforts, and adapting to distributed approaches that are more cost-effective
5. Techniques and algorithms used to extract and visualize the value from utility data

COURSE OUTCOMES

1. Debate on the challenges of creating a highly scalable, easily managed, secure foundation for data management
2. Create useful analytical models specific to the utility enterprise.
3. Understand the available and desired data sources as well as the business value of that data
4. Identify the difficulties in adapting to the needs of high-volume and varied data types
5. Extract value from utility data and visualize the utility.

UNIT I
BUILDING THE FOUNDATION FOR DATA ANALYTICS

What Are Data Analytics? Building the Analytical Architecture, The Art of Data Management, Managing Big Data Is a Big Problem, The Truth Won't Set You Free, One Size Doesn't Fit All, Solving the "Situation-Specific" Dilemma, The Build-Versus-Buy War Rages On, When the Cloud Makes Sense, Change Is Danger and Opportunity.

UNIT II
APPLYING ANALYTICAL MODELS IN THE UTILITY

Understanding Analytical, What Exactly Are Models? Using Descriptive Models for Analytics, Using Diagnostic Models for Analytics, How Diagnostic Tools Help Utilities, Predictive, Prescriptive Analytics, An Optimization Model for the Utility, Toward Situational Intelligence Moving Beyond Business Intelligence, Energy Forecasting, Asset Management, Demand Response and Energy Analytics, Dynamic-Pricing Analytics, Revenue-Protection Analytics

UNIT III
SOURCING DATA

Smart Meters, Sensors, Control Devices, Intelligent Electronic Devices, Distributed Energy Resources, Consumer Devices, Historical Data, Third-Party Data, Working with a Variety of Data Sources, Data Fusion.

UNIT IV

BIG DATA INTEGRATION, FRAMEWORKS AND DATABASES

This Is Going to Cost, Storage Modalities, Hyperscale, Network-Attached Storage, Object Storage, Data Integration, The Costs of Low-Risk Approaches, Let the Data Flow, Hadoop, MapReduce, Hadoop Distributed File System, How Does This Help Utilities? Other Big Data Databases, NoSQL 166, In-Memory or Main Memory Databases, Object-Oriented Database, Management Systems, Time Series Database Servers, Spatial and GIS Databases, The Curse of Abundance.

UNIT V

EXTRACTING VALUE & ENVISIONING THE UTILITY

Mining Data for Information and Knowledge, The Process of Data Extraction, Hadoop: A Single-Purpose, Batch-Data Platform? Stream Processing, Complex Event Processing, Process Historians

Big Data Comprehension, Why Humans Need Visualization? The Role of Human Perception: Preattentive Processing, The Utility Visualized, Advancing Business Intelligence, High-Impact Operations, Improving Customer Value, Making Sense of It All

TEXT BOOKS

1. “Big Data Analytics Strategies for the Smart Grid” Carol L. Stimmel, CRC Press, Taylor & Francis Group.
2. “Big Data Application in PowerSystems”Reza Arghandeh &Yuxun Zhou, Elsevier publications.
3. “Big Data Analytics in Future Power Systems”Ahmed F. Zobaa and Trevor J. BihlCRC Press, Taylor & Francis Group.

REFERENCES

1. “Advanced Data Analytics for Power Systems”, Ali Tajer, Samir M. Perlaza, H. Vincent Poor, Cambridge University Press.
2. “Data Fusion and Data Mining for Power System Monitoring”, Arturo Román Messina,CRC Press, Taylor & Francis Group.

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MODERN CONTROL THEORY
(Professional Elective –V)

Course Code:GR20A4095 **L/T/P/C:3/0/0/3**
IV year II semester

COURSE OBJECTIVES

1. Outline of fundamental state feedback.
2. Analyze the full and reduced order observer.
3. Understand the robust control system
4. Apply the concepts state regulator and Riccati equation.
5. Understand the concept of variable - structure controller

COURSE OUTCOMES

1. Determine state feedback gain and its effect.
2. Design of full order and reduced order state observers.
3. Design robust controller for tracking and disturbance rejection
4. Analyze continuous and discrete time linear state regulator
5. Design of sliding mode controller and reduce chattering problem..

UNIT I
STATE FEEDBACK

Non uniqueness of state model, Similarity transformation, Invariance of system properties. Controllability – necessary and sufficient condition - Pole assignment using State feedback – Ackerman's formula for feedback gain determination, Observability. Duality. Effect of state feedback on controllability and observability. Controllable subspace – decomposition of state into controllable and uncontrollable components

UNIT II
DESIGN OF FULL AND REDUCED ORDER OBSERVERS

Design of full order observer – Bass Gura algorithm. The separation principle - Combined observer – controller compensator. Design of reduced order observer. Unobservable subspace – decomposition of state into observable and unobservable components – Canonical decomposition theorem.

UNIT III
DESIGN OF ROBUST CONTROL SYSTEM

Reducibility – realization of transfer function matrices. Model decomposition and decoupling by state feedback. Design of robust control system for asymptotic tracking and disturbance rejection using State variable equations. Transfer function interpretations – transfer function form of observer and state estimate feedback. State space interpretation of internal model principle.

UNIT IV
STATE REGULATOR

Discrete time linear state regulator – Algorithm for the solution, Use of observer in

implementing the control law. Continuous time linear state regulator – Matrix Riccati equation. Time invariant linear state regulator – the reduced matrix Riccati equation - An iterative method to solve the reduced matrix Riccati equation. Suboptimal linear regulator.

UNIT V

VARIABLE - STRUCTURE CONTROLLER

Concept of variable - structure controller and sliding control, reaching condition, and reaching mode, implementation of switching control laws. Reduction of chattering in sliding and steady state mode.

TEXT BOOKS

1. Modern Control Engineering, Katsuhiko Ogata, 5th Edition, Prentice Hall India, 1997
2. Modern Control System Theory, M. Gopal, Revised 2nd Edition, New Age International Publishers, 2005.

REFERENCES

1. Linear Systems, Thomas Kailath, Perntice Hall, 1980.
2. Control System Design, Graham C. Goodwin, StefanF. Graebe and Mario E. Salgado, Pearson Education, 2000.
3. Linear System Theory and Design, Chi-Tsong Chen, OXFORD University Press.
4. Richard C. Dorf and Robert H. Bishop, Modern Control Systems, 11th Edition, Pearson Edu India, 2009.
5. M. Vidyasagar, Nonlinear Systems Analysis, Prentice - Hall International editions,1993.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

INDUSTRIAL IoT
(Professional Elective –V)

Course Code:GR20A4096 **L/T/P/C:3/0/0/3**
IV year II semester

COURSE OBJECTIVES

1. Summarize the Story of IoT
2. List the processes involved in Industrial I-IoT
3. Illustrate about the data flow in I-IoT
4. Acquire Knowledge on strategy and Architecture development in I-IoT
5. Explore the latents of cloud-based Industrial IoT platforms, analytics, and protocols

COURSE OUTCOMES

1. Summarize about I-IoT Stories with its key technologies and terminologies
2. Demonstrate the concept of Industrial process and devices used in IoT
3. Illustrate how to generate data and flow in industry and its protocols.
4. Analyze the strategy, implementation and the developing architecture in I-IoT
5. Implement the Solutions for Cloud I-IoT applications

UNIT I
THE IOT STORY AND ITS INTRODUCTION

What is IoT, IoT key technologies, IoT Potentials, IoT Architecture and core IoT modules; Sensors, End points and Power Systems: Sensor devices, SMART IoT End points; Sensor Fusion; Communication and information theory.

Some Definitions: Industry 4.0, M2M.IoT versus I-IoT, bigdata, blockchain, Cloud computing.

UNIT II
UNDERSTANDING THE INDUSTRIAL PROCESS AND DEVICES

Technical requirements, The industrial process, Automation in the industrial process; Control and measurement systems; Types of industrial processes; Continuous processes, Batch processes, Semi-continuous processes, Discrete processes

UNIT III
THE I-IOT DATA FLOW

The Industrial IoT data flow in a factory; The edge device; The Industrial IoT data flow in the cloud; Measurements and the actuator chain; Controllers;
Designing Industrial Internet Systems.

Industrial Protocols:I-IoT WAN Technologies and Protocols

UNIT IV
IIOT STRATEGY AND IMPLEMENTATION

IIoT Strategy Planning IIoT Implementation Methodology Challenges in Adopting IIoT Managing Data Factors Need To Be Invested Primarily to Implement IIoT

Developing Industrial IoT and Architecture: Introduction to the I-IoT platform and architectures; Understanding the time-series technologies; Data-processing and the analytics platform; Advanced analytics; Big data analytics

UNIT V

IMPLEMENTING A CLOUD INDUSTRIAL IOT SOLUTION

A brief overview on-I-IoT analytics;Implementing a Custom Industrial IoT Platform-Mosquitto as MQTT connector-Working with an MQTT client

TEXT BOOKS

1. Hands-On Industrial Internet of Things: Create a powerful Industrial IoT By Giacomo Veneri, Antonio Capasso Packt Publishing Ltd.
2. Internet of Things for Architects: by Perry LeaPackt Publishing Ltd.
3. Smart Automation to Smart Manufacturing Industrial Internet of Things-UthayanElangovan

REFERENES

1. Industry 4.0 The Industrial Internet of Things by Alasdair Gilchrist Apress

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
APPLICATIONS OF AI AND ML IN POWER ELECTRONICS
(Professional Elective –VI)

Course Code:GR20A4097 **L/T/P/C:3/0/0/3**
IV year II semester

COURSE OBJECTIVES

1. Understand basis in designing with Intelligent Systems
2. Concept of learning Support Vector Machines
3. Understand Neural Networks & their learning rules
4. Comprehend Fuzzy Inference Systems.
5. Analyse power electronic systems which are designed using Fuzzy and Neural Networks.

COURSE OUTCOMES

1. Describe the importance of designing the System with AI and Machine Learning.
2. Learn Support Vector Machines and its Regression.
3. Distinguish the various Neural Networks Architectures.
4. Categorize Fuzzy rule base and neuro-fuzzy systems.
5. Analyze various power electronic systems using neural & fuzzy systems.

UNIT-1
INTRODUCTION
Towards Intelligent Machines, Well-Posed Machine Learning Problems, Examples of Applications-Machine Vision, Biometric Recognition & Handwriting recognition, load forecasting and Control & Automation. Time Series Forecasting, Datasets for Unreastically Simple and Realistic Problems, Domain Knowledge for Productive use of Machine Learning, Diversity of Data: Structured/Unstructured. Forms of Learning, Machine Learning and Data Mining, Basic Linear Algebra in Machine Learning Techniques.

UNIT-II
SUPPORT VECTOR MACHINES
Learning with Support Vector Machines, Perceptron Algorithm, Linear Soft Margin Classifier for Overlapping Classes, Nonlinear Classifier, Regression by Support Vector Machines, Variants of Basic SVM Techniques.

UNIT-III
NEURAL NETWORKS
Towards Cognitive Machine, Neuron Models, Network Architectures, Perceptrons, Linear Neuron and the Widrow-Hoff Learning Rule, Error-Correction Delta Rule, Multi-Layer Perceptron Networks, Radial Basis Functions Networks.

UNIT-IV
FUZZY INFERENCE SYSTEMS
Cognitive Uncertainty and Fuzzy Rule-Base, Fuzzy Quantification of Knowledge, Fuzzy Rule-Base and Approximate Reasoning, Takagi-Sugeno Fuzzy Mode, Neuro-Fuzzy Inference Systems.

UNIT-V

APPLICATIONS

Neural Network Topologies for space vector pulse width modulation of three level inverter, Neural Network based feedback signal estimator performance – Torque & Rotor Flux, Neural Network topology for stator flux estimator, Neuro-fuzzy based efficiency optimization control, Neuro-Fuzzy Controller based Direct Torque Control

TEXTBOOKS

1. Applied Machine Learning – M. Gopal, Mc Graw Hill
2. Power Electronics & Motor Drives – Advances & Trends, Bimal K Bose, 2nd Edition, Academic Press

REFERENCES

1.J M Zurada , "An Introduction to ANN",Jaico Publishing House.

2. Simon Haykins, "Neural Networks", Prentice Hall.

3. Timothy Ross, "Fuzzy Logic with Engg.Applications", McGraw. Hill.

4. Driankov, Dimitra, "An Introduction to Fuzzy Control", Narosa Publication.

5. Golding, "Genetic Algorithms", Addison-Wesley Publishing Com.

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
ELECTRIC SMART GRID
(Professional Elective –VI)

Course Code:GR20A4098 **L/T/P/C:3/0/0/3**
IV year II semester

COURSE OBJECTIVES

1. Understand the concepts and design of Smart grid
2. Acquire knowledge about various communication and measurement technologies in smart grid
3. Analyze smart grid under steady state.
4. Evaluate the stability of smart grid.
5. Utilize renewable energy resources and storage facilities for the sustenance of smart grid

COURSE OUTCOMES

1. Understand the concepts and design of smart grid
2. Illustrate suitable communications and measurement technology for smart grid
3. Make use of various performance analysis tools for smart grid design
4. Perform stability analysis for smart grid
5. Identify sustainable energy options for the smart grid

UNIT I
SMART GRID ARCHITECTURAL DESIGNS

Introduction – Comparison of Power grid with Smart grid – power system enhancement – communication and standards - General View of the Smart Grid Market Drivers - Stakeholder Roles and Function - Measures -Representative Architecture - Functions of Smart Grid Components Wholesale energy market in smart grid-smart vehicles in smart grid.

UNIT II
SMART GRID COMMUNICATIONS AND MEASUREMENT TECHNOLOGY

Communication and Measurement - Monitoring, Phasor Measurement Unit(PMU), Smart Meters, Wide area monitoring systems (WAMS) – Advanced metering infrastructure- GIS and Google Mapping Tools.

UNIT III
PERFORMANCE ANALYSIS TOOLS FOR SMART GRID DESIGN

Introduction to Load Flow Studies - Challenges to Load Flow in Smart Grid and Weaknesses of the Present Load Flow Methods - Load Flow State of the Art: Classical, Extended Formulations, and Algorithms –Load flow for smartgrid design-Contingencies studies for smart grid.

UNIT IV

STABILITY ANALYSIS TOOLS FOR SMART GRID

Voltage Stability Analysis Tools-Voltage Stability Assessment Techniques Voltage Stability Indexing-Application and Implementation Plan of Voltage Stability in smart grid-Angle stability assessment in smart grid-Approach of smart grid to State Estimation-Energy management in smart grid.

UNIT V

RENEWABLE ENERGY AND STORAGE

Renewable Energy Resources-Sustainable Energy Options for the Smart Grid-Penetration and Variability Issues Associated with Sustainable Energy Technology-Demand Response Issues-Electric Vehicles and Plug-in Hybrids PHEV Technology-Environmental Implications-Storage Technologies-Grid integration issues of renewable energy sources.

TEXT BOOKS

1. James Momoh, "Smart Grid: Fundamentals of design and analysis",John Wiley & sons Inc, IEEE press 2012.
2. JanakaEkanayake, Nick Jenkins, KithsiriLiyanage, JianzhongWu,Akihiko Yokoyama, "Smart Grid: Technology and Applications", JohnWiley& sons inc, 2012.
3. Fereidoon P. Sioshansi, "Smart Grid: Integrating Renewable,Distributed& Efficient Energy", Academic Press, 2012.

REFERENCES

1. Clark W.Gellings, "The smart grid: Enabling energy efficiency anddemand response", Fairmont Press Inc, 2009.
2. Krzysztof Iniewski, "Smart Grid Infrastructure & Networking". McGraw Hill Education Pvt. Ltd., 2014.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
EMBEDDED SYSTEMS
(Professional Elective –VI)

Course Code:GR20A4099 **L/T/P/C:3/0/0/3**
IV year II semester

COURSE OBJECTIVES

1. To comprehend the different issues related to embedded systems and their design.
2. To train the students with a foundation in architecture of embedded processor.
3. To impart the knowledge of I/O devices used for embedded systems.
4. To provide the knowledge about various concepts related to real time operating systems.
5. To impart the basic knowledge of system design techniques.

COURSE OUTCOMES

1. Understand various I/O devices and their communication.
2. Define the unique design problems and challenges of real-time systems Program an embedded system
3. Identify the unique characteristics of real-time operating systems and evaluate the need for real-time operating system
4. Explain the general structure of a real-time system and how to use RTOS to build an embedded real-time system.
5. Gain knowledge and skills necessary to design and develop embedded applications based on real-time operating systems.

UNIT I

INTRODUCTION TO EMBEDDED SYSTEMS

Embedded Systems, Processor Embedded to a system, Embedded hardware units and devices in a system, Embedded software in a system, Examples of Embedded systems, Soc(System on chip) and use of VLSI circuit design technology, complex system design and processors, Design process in Embedded system, formalization of system design, design process and design examples, classification of embedded systems, skills required for embed system design.

UNIT II

DEVICES AND BUSES FOR DEVICES NETWORK

I/O Devices:- Types and Examples of I/O devices, Synchronous, Iso-synchronous and Asynchronous Communications from Serial Devices - Examples of Internal Serial-Communication Devices:- SPI, UART, Parallel Port Devices - Timer and Counting Devices – Serial Communication using: ‘I2C’, ‘USB’, ‘CAN’- Advanced I/O Serial high speed buses: ISA, PCI, PCI- X, cPCI and advanced buses

UNIT III

REAL TIME OPERATING SYSTEMS

Definitions of process, tasks and threads–Inter Process Communication, Shared data problem, Use of Semaphore(s), Priority Inversion Problem and Deadlock Situations, Message Queues, Mail boxes, Pipes, Virtual (Logical) Sockets, Remote Procedure Calls (RPCs).

UNIT IV

OPERATING SYSTEM SERVICES

Goals, Structures, Kernel, Process Management, Memory Management, Device Management- Real Time Operating System-RTOS Task scheduling models- Co-operative Round Robin Scheduling, Cyclic Scheduling with Time Slicing.

UNIT V

SYSTEM DESIGN TECHNIQUES

Design Methodologies, Requirement Analysis, Specification, System Analysis and Architecture Design. Design Examples: Telephone PBX-System Architecture, Inkjet printer-Hardware Design and Software Design, Personal Digital Assistants, Set-top Boxes.

TEXT BOOKS

1. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw-Hill, First reprint Oct.2003

REFERENCES

1.Steve Heath, Embedded Systems Design, Second Edition-2003,Newnes,

2.David E. Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.

3. FrankVahidandTonyGivargis, Embedded Systems Design–Aunified Hardware/Software Introduction, John Wiley,2002.

4. Wayne Wolf, Computers as Components: Principles of Embedded Computing System Design – Harcourt India, Morgan Kaufman Publishers, First Indian Reprint 2001.

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

BIG DATA ANALYTICS
(Professional Elective –VI)

Course Code:GR20A3131 **L/T/P/C:3/0/0/3**

IV year II semester

COURSE OBJECTIVES

1. Describe Big Data and its use cases from selected business domains.
2. Provide an overview of HDFS Architecture and its daemon services.
3. Perform Map Reduce analytics with YARN using Hadoop.
4. Understand the working of data ingestion tools and PIG Latin.
5. Use Hadoop related tools such as Hive and HBase for big data analytics.

COURSE OUTCOMES

1. Understand the concepts of Big Data and navigation of the Hadoop Ecosystem.
2. Illustrate the HDFS Architecture and the coordination service of Hadoop.
3. Implement distributed processing Map Reduce Paradigm with YARN.
4. Analyze importing and exporting data from Hadoop using Sqoop, Flume and working with PIG.
5. Examine the data stores - Hive and HBase on Hadoop.

UNIT I
INTRODUCTION TO BIG DATA AND HADOOP

Challenges of Traditional Decision Making, Solution with Big Data Analytics, Classification of Digital Data, Definition of Big Data, Characteristics of Big Data, Definition of Big Data Analytics, Features of Hadoop, History of Hadoop, RDBMS Vs. Hadoop, Hadoop Distributors, Ecosystems of Hadoop.

UNIT II
HDFS AND ZOO KEEPER

HDFS: Concepts – Blocks, HDFS Components, Block Caching, Characteristics of HDFS, HDFS High Availability Architecture and its types, HDFS Command Line, Data Flow – Anatomy of File read and File write operations.
Zoo Keeper: Characteristics of Zoo Keeper, Zoo keeper Services, Zoo keeper Data Model.

UNIT III
MAP REDUCE AND YARN

YARN: Elements of YARN Architecture, Map Reduce: Characteristics of Map Reduce, Phases of Map Reduce with an Example, Anatomy of MR Job Run with YARN, Handling Failures, Task Execution, Map Reduce Input and Output Formats, Shuffle and Sort, Built - in Counters of MR, Joins in MR,

UNIT IV

DATA INGESTION TOOLS AND PIG

Data Ingestion Tools: Data Ingestion, Big Data Ingestion Tools, SQOOP - Benefits of SQOOP, SQOOP Connectors, Importing and Exporting to and from Hadoop using SQOOP, Limitations of SQOOP, FLUME – Apache Flume, Data Sources for FLUME, Components of FLUME Architecture.

PIG: Introduction to PIG, Components of PIG, Data Types in PIG – Simple and Complex, PIG Execution Modes, PIG Interactive Modes, Comparison of PIG with databases, Data Processing Operators.

UNIT V

HIVE AND HBASE

HIVE: Features of HIVE, HIVE Architecture, HIVE Meta store, Data types in HIVE, HIVEQL, Tables, File Format Types – Text, Sequence, AVRO, Parquet, Querying Data.

HBASE: NOSQL Database, Types of NOSQL Database, Characteristics of HBASE, Architecture, HBase Vs. RDBMS, HBASE Shell Commands.

TEXT BOOKS

1. Tom White “Hadoop: The Definitive Guide” 4thedition, O’reily Media,2012.
2. SeemaAcharya, SubhasiniChellappan, "Big Data Analytics" Wiley2015.

REFERENCES

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis”, Springer,2007.
2. Jay Liebowitz, “Big Data and Business Analytics” Auerbach Publications, CRC press(2013)
3. Tom Plunkett, Mark Hornick, “Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop”, McGraw-Hill/Osborne Media (2013), Oracle press.
4. AnandRajaraman and Jefrey David Ulman, “Mining of Massive Datasets”,Cambridge University Press, 2012.
5. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons,2012.
6. Glen J. Myat, “Making Sense of Data”, John Wiley & Sons,2007
7. Pete Warden, “Big Data Glossary”, O’Reily,2011.
8. Michael Mineli, Michele Chambers, AmbigaDhiraj, "Big Data, Big Analytics:Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley Publications, 2013.
9. ArvindSathi, “BigDataAnalytics: Disruptive Technologies for Changing the Game”,MC Press,2012
10. Paul Zikopoulos ,Dirk DeRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles, David Corigan , "Harness the Power of Big Data The IBM Big Data Platform ", Tata McGraw Hill Publications,2012.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PROJECT WORK - PHASE II

Course Code:GR20A4130 **L/T/P/C: 0/0/12/6**

IV Year II Semester

Course Objectives:

1. Demonstrate a wide range of skills learned to deliver a project.
2. Encourage multidisciplinary research through the integration learned.
3. Develop problem solving, analysis, synthesis and evaluation skills.
4. Encourage teamwork.
5. Improve communication and presentation skills during project work.

Course Outcomes:

1. Formulate hypothesis for the problem statement with sound technical knowledge from selected project domain.
2. Design Engineering Solution to the problem statementwith systematic approach.
3. Analyse and develop an efficient solution for implementation of the project.
4. Apply the theoretical concepts while providing solution to the problem statement with teamwork and multidisciplinary approach.
5. Demonstrate professionalism with ethics while preparing and presenting the project work.

GOKARAJURANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOFT SKILLS AND INTERPERSONAL SKILLS
(Open Elective)

Course code:GR20A3136 **L/T/P/C:3/0/0/3**

COURSE OBJECTIVES:

1. To know the importance of soft skills.
2. To identify good leadership skills /qualities.
3. To recognize the importance of interpersonal skills.
4. To demonstrate the significance of confidence building.
5. To define and differentiate between a report and a proposal.

COURSE OUTCOMES:

1. Develop soft skills communication skills, leadership skills etc.
2. Implement goal setting techniques to build a promising career.
3. Design formal report and proposals with appropriate formal expressions.
4. Create healthy workplace environment by treating others with respect and dignity.
5. Evaluate the power of confidence building and self-esteem with examples.

UNIT I
SOFT SKILLS

- Introduction to soft skills, Definition of Soft skills, Importance of soft skills
- Communication skills, Usage of English in Business/Corporate scenario
- Nonverbal communication - Proxemics
- Presentation skills

UNIT II
TEAM BUILDING & LEADERSHIP QUALITIES

- Qualities of a good leader
- Problem solving and Decision Making
- Strategic management
- Crisis management

UNIT III
PERSONALITY DEVELOPMENT

- Motivation

- Goal setting
- Self-esteem
- Team skills

UNIT IV
DEVELOPING REPORTS AND PROPOSALS

- Understanding reports and proposals
- Planning reports and proposals
- Writing beginning, body and ending
- Formats of reports and proposals

UNITV
INTERPERSONAL SKILLS

- Understanding professional relationships
- Networking professionally
- Showing basic office courtesies
- Interview skills

TEXT BOOKS

1. Soft Skills-Key to success in workplace and life
   Meenakshi Raman, Raman Upadhyay, CENAGE

REFERENCE BOOKS

1. Soft skills for Everyone - Jeff Butterfield, CENAGE Learning

2.Soft skills for Interpersonal Communication - S.Balasubramaniam
(ORIENT BLACKSWAN)

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

HUMAN RESOURCE DEVELOPMENT AND ORGANIZATIONAL BEHAVIOR
(Open Elective)

Code: GR20A3137 **L/T/P/C:3/0/0/3**

COURSE OBJECTIVES

1. OB provides perspectives and skills that enhance understanding of our own behaviour and our ability to influence the behaviour of others in organizational settings
2. OB and HRM together can instill sustainability deep within an organizations' culture.
3. To equip them with behavioural skills in managing people at work.
4. To make student aware of the concepts, techniques and practices of human resource development.
5. This course is intended to make students capable of applying the principles and techniques as professionals for developing human resources in an organization.

COURSE OUTCOMES

1. To acquaint the student with the determinants of intra -individual, inter-personnel and inter-group behaviour in organisational setting.
2. To Understand individual behavior in organizations, including diversity, attitudes, job satisfaction, emotions, moods, personality, values, perception, decision making, and motivational theories and apply in the organizational context.
3. To assess the group behavior in organizations, including communication, leadership, power and politics, conflict, and negotiations in the framework of organization and to familiarize the concepts, techniques and practices of human resource development in the current organizational view.
4. To impart and apprise the capable of applying the principles and techniques as professionals for developing human resources in an organization.
5. To report the current trends and applications in HRD and Balanced Scorecard to measures the performance and to develop, implement, and evaluate organizational human resource

development strategies aimed at promoting organizational effectiveness in different organizational environments.

UNIT I

INTRODUCTION TO OB

Organisational Behaviour- Concept and Emergence of OB Concept; Nature and Theoretical frameworks; Models of Organisational Behaviour, Challenges and Opportunities for Organisational Behavior;

UNIT II

INDIVIDUAL BEHAVIOUR

Individual Behaviour: Personality, Learning, Values and Attitudes, Perception, Stress at work. Management's assumptions about people- McGregor's Theory X and Theory Y. Motivation - Maslow's Need Hierarchy, Herzberg's Two Factors Theory, Vroom's Expectancy Theory.

UNIT III

INTER-PERSONAL AND GROUP BEHAVIOUR

Interpersonal communication and Feedback; Transactional Analysis (TA); Johari Window. Group Behaviour: Group Dynamics, Cohesiveness and Productivity; Management of Dysfunctional groups; Group Decision Making. Leadership- Concept and Styles.

UNIT IV

INTRODUCTION TO HUMAN RESOURCE DEVELOPMENT

Concept; Relationship between human resource management and human resource development; HRD mechanisms, processes and outcomes; HRD matrix; Roles and competencies of HRD professionals; Challenges in HRD, steps in HRD Process.

UNIT V

HRD APPLICATIONS AND TRENDS

Coaching and mentoring; Career management and development; Competency mapping; Balanced Score Card. HRD in Organisations: Selected cases covering HRD practices in government

organisations, manufacturing and service industries and MNCs.

TEXT BOOKS

1. Robbins, Stephen P. and Timothy A. Judge, Organisational Behaviour, Prentice -Hall, New Delhi.
2. Werner J. M., DeSimone, R.L., Human resource development, South Western.

REFERENCES

1. Luthans, Fred, Organizational Behaviour, McGraw-Hill, New York.
2. Gregory, Moorhead and Ricky W. Griffin, Managing Organizational Behaviour, Thomson South Western Publication.
3. Pareek, Udai and V. Sisodia, "HRD in the New Millennium, Tata McGraw - Hill Publishing Co. Ltd., New Delhi, 1999.
4. Haldar, U. K., Human resource development, Oxford University Press India.
5. Rao, T.V., Future of HRD, Macmillan Publishers India.
6. Rao, T.V., HRD Score Card 2500: Based on HRD audit, Response Books, SAGE Publications.
7. Mankin, D., Human resource development, Oxford University Press India.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

CYBER LAW AND ETHICS
(Open Elective)

Code: GR20A3138 **L/T/P/C:3/0/0/3**

COURSE OBJECTIVES

1. The course objective is to provide the fundamental skill to understand cyber laws.
2. It enable to understand the legal frameworks
3. It helps the student understand different cyber crimes
4. It provides overview on Intellectual Property, copy rights, patents rights etc.
5. Given rapid changes in technology and the corresponding changes in crime and the law

COURSE OUTCOMES.

1. Students identify and analyze statutory, regulatory, constitutional, and organizational laws that affect the information technology professional.
2. Students locate and apply case law and common law to current legal dilemmas in the technology field.
3. Students apply diverse viewpoints to ethical dilemmas in the information technology field and recommend appropriate actions.
4. Students will be able understand cybercrime and ethical practices and the student will be able to know and learn web technologies and related issues.
5. The student will be in position to interface with various issues pertaining to Intellectual Property, copy rights, patents rights etc. and provide an overview of cybercrime and framework.

UNIT I

THE LEGAL SYSTEM: SOURCES OF LAW AND THE COURT STRUCTURE

Enacted law -Acts of Parliament are of primary legislation, Common Law or Case law- Principles taken from decisions of judges constitute binding legal rules. The Court System in India and Foreign Courtiers. (District Court, District Consumer Forum, Tribunals, High Courts, Supreme Court), Arbitration: As an alternative to resolving disputes in the normal courts, parties who are in dispute can agree that this will instead be referred to arbitration.

UNIT II

INTRODUCTION CYBER LAW

Computers and its Impact in Society, Overview of Computer and Web Technology, Need for Cyber Law, Cyber Jurisprudence at International and Indian Level.

UNIT –III

CONSTITUTIONAL & HUMAN RIGHTS ISSUES IN CYBER SPACE

Freedom of Speech and Expression in Cyberspace, Right to Access Cyberspace, Access to Internet, Right to Privacy, Right to Data Protection.

UNIT –IV

CYBER CRIMES & LEGAL FRAMEWORK

Cyber Crimes against Individuals, Institution and State, Hacking, Digital Forgery, Cyber Stalking/Harassment, Cyber Pornography, Identity Theft & Fraud, Cyber terrorism, Cyber Defamation, Different offences under IT Act

UNIT –V

INTELLECTUAL PROPERTY ISSUES IN CYBER SPACE

Interface with Copyright Law, Interface with Patent Law, Trademarks & Domain Names Related issues.

TEXT BOOKS:

1. Chris Reed & John Angel, Computer Law, OUP, New York, (2007).
2. Justice Yatindra Singh, Cyber Laws, Universal Law Publishing Co, New Delhi, (2012)
3. Verma S, K, Mittal Raman, Legal Dimensions of Cyber Space, Indian Law Institute, New Delhi, (2004)
4. JonthanRosenoer, Cyber Law, Springer, New York, (1997).
5. Sudhir Naib, The Information Technology Act, 2005: A Handbook.
6. S. R. Bhansali, Information Technology Act, 2000
7. University Book House Pvt. Ltd. Jaipur (2003).
8. Vasu Deva, Cyber Crimes and Law Enforcement, Commonwealth Publishers, New Delhi

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ECONOMIC POLICIES IN INDIA
(Open Elective)

Code:GR20A3139 **L/T/P/C:3/0/0/3**

COURSE OBJECTIVE

1. To analyse the overall business environment and evaluate its various components in business decision making.
2. To Provide an analysis and examination of significant contemporary ethical issues and challenges.
3. To Emphases the manager's social and environmental responsibilities to a wide variety of stakeholders.
4. To know the various Government policies governing industry.
5. To know economic terms and its scope.

COURSE OUTCOMES

1. Familiarize with the nature of business environment and its components.
2. The students will be able to demonstrate and develop conceptual framework of business environment.
3. Understand the definition of ethics and the importance and role of ethical behaviour in the business world today.
4. Explain the effects of government policy on the economic environment.
5. Outline how an entity operates in a business environment.

UNIT I

BUSINESS ENVIRONMENT

factors effecting Business Environment-need for industrial policies, Overview of Indian Economy, Trends towards market economy, problems of underdevelopment –meaning, Main problems, reasons, of underdevelopment.

UNIT-II

FACTORS AND MEASURE

Meaning of Economic development, National income, Percapital income,Quality of life, Capital Formation – Savings, Investment.

UNIT III

NITI AAYOG AND PLANNING IN INDIA

Niti Aayog and its function, how is Niti Aayog different from planning commission, Meaning, Importance, Main reasons of adopting, planning in India,Objectives of planning, Economic development, moderation, stability, self-sufficiency, employmentetc, foreign aid, Employment. Allocation of Resources,

UNIT IV

PRIVATE AND PUBLIC SECTOR

Public Sector – role and growth, Achievements of the public sector,Private Sector – Importance Problems, New foreign Trade Policy.

UNIT V

PRESENT ECONOMIC POLICY

Main feature, Globalization, Expansion of Private sector, moremarket orient approach. Public distribution system, Industrial policies before and after 1991, Industrial Licensing, Monetary and Fiscal Policy, elements of Indian current GDP and review of current budget.

TEXT BOOKS

1. Francis Cherunilam: Business Environment: Text and Cases. 18/e. Himalaya. 2009.
2. Misra and Puri: Indian Economy, Himalaya, 2009.

REFERENCES:

1. Indian Economy- A. N. Agarwal
2. Indian Economy – Mishra &Puri
3. Indian Development and planning – M. L. Jhingan
4. Indian Economy – R. S. Rastogi Yozna and Kurukshetra Magazines