

III B.Tech(ECE)			I Semester							
Group	Sub-Code	Name Of Subject	Credits			Total credits	Hours			Total Hours
			L	T	P		L	T	P	
PC	GR15A3042	Antennas and Wave Propagation	3	1		4				5
PC	GR15A3041	Digital Communications	3	1		4				5
PC	GR15A3043	VLSI Design	3	1		4				5
<b>Open Elective 1</b>			<b>2</b>	<b>1</b>		<b>3</b>				<b>4</b>
OE	GR15A3156	Computer Architecture and Organization								
<b>Professional Elective 1</b>			<b>3</b>	<b>1</b>		<b>4</b>				<b>5</b>
PE	GR15A3104	Linear Control Systems								
PE	GR15A3109	System Modeling and Simulation								
PE	GR15A2063	Database Management Systems								
PC	GR15A3045	Digital Communications Lab			2	2				4
PC	GR15A3044	VLSI Design Lab			2	2				4
PC	GR15A3100	Advanced English Communication Skills Lab			2	2				4
<b>Total</b>			<b>14</b>	<b>5</b>	<b>6</b>	<b>25</b>				<b>36</b>

III B.Tech(ECE)			II Semester							
Group	Sub-Code	Name Of Subject	Credits			Total credits	Hours			Total Hours
			L	T	P		L	T	P	
PC	GR15A2104	Managerial Economics and Financial Anaysis	3	1		4				5
PC	GR15A3048	Microwave Engineering	3	1		4				5
PC	GR15A3046	Digital Signal Processing	3	1		4				5
<b>Open Elective 2</b>			<b>2</b>	<b>1</b>		<b>3</b>				<b>4</b>
OE	GR15A3165	Principles of Operating Systems								
<b>Professional Elective 2</b>			<b>3</b>	<b>1</b>		<b>4</b>				<b>5</b>
PE	GR15A2077	Computer Networks								
PE	GR15A3110	Information Theory and Coding								
PE	GR15A3057	Software Engineering								
PC	GR15A3049	Digital Signal Processing Lab			2	2				4
PC	GR15A2072	Object Oriented Programming through Java Lab			2	2				4
PC	GR15A3101	Industry Oriented Mini Project			2	2				4
<b>Total</b>			<b>14</b>	<b>5</b>	<b>6</b>	<b>25</b>				<b>36</b>

**Antennas and Wave Propagation**

Course Code: GR15A3042

L:3 T:2 P:0 C:4

III Year I Semester

**UNIT I:**

**Antenna Basics and Thin Linear Wire Antennas:** Principle of Radiation, Standing wave and Travelling Wave Current Distributions on wire antennas, Fields due to Hertzian Dipole, Near and Far fields, Far fields of Half Wave Dipole, Quarter Wave Monopole and Folded Half-Wave Dipole

Antenna Parameters—Radiation Resistance, Antenna Polarization, Radiation Patterns, Beam Width, Radiation Intensity. Beam Area, Directivity, Gain, Antenna Aperture, Effective length, Reciprocity in Antennas, Equivalence of characteristics in Transmission and Reception, Relation between Directivity and Maximum Effective Aperture, Friis Transmission Formula, Bandwidth, Antenna Temperature.

**UNIT II:**

**Antenna Arrays**

Uniform Linear Arrays of Isotropic Sources, Broadside Arrays (BSA). End fire Arrays (EFA), EFAs with Increased Directivity. Principle of Pattern Multiplication, Binomial arrays, Effect of Amplitude Distribution on Side-Lobe-Level and Beam width, Dolph-Chebyshev Arrays.

**UNIT III:**

**Special Antennas:** Travelling Wave Antenna, Yagi-Uda Arrays, Vee and Rhombic Antennas, Small Loop Antenna, Helical Antenna, Log-Periodic Antenna, Micro strip Patch Antenna.

**UNIT IV:**

**Aperture Antennas, Antenna Measurements:** Slot Antenna, Waveguide Horn Antenna, Reflector Antennas: Flat-sheet/ Corner Reflectors, Parabolic Reflector, Lens Antennas - Dielectric Lenses, Metal-plate Lenses ,Antenna Measurements- Pattern Measurement, Outdoor/ Indoor Test Ranges, Absolute Gain Measurement.

**UNIT V:**

**Radio-Wave Propagation:** Ground Wave Propagation - Space and Surface Waves, Curved Earth Reflections,; Space Wave Propagation – Plane Earth Reflection, Effect of Earth Curvature, Visible Horizon, Effective Heights of Antennas, VHF Communication between aerials placed far apart; Surface Wave Propagation- Factors affecting Magnitude of Surface Wave; Propagation in Troposphere- Refraction in Troposphere, Standard Atmosphere, Radio horizon, Super Refraction, Condition for Duct Propagation, M-Curves, Tropospheric Scatter. Sky Wave Propagation—Structure and Layers of Ionosphere, Electrical Properties of Ionosphere, Refraction and Reflection by Ionosphere, Critical Frequency, MUF. LUF, Skip Distance, Maximum Single-hop Distance, Virtual Height, Ionospheric Measurements, Dominant mechanisms of Propagation in Various Frequency Ranges

**Text Books:**

1. Antennas and Wave Propagation - J.D. Kraus, R.J. Marhefka and Ahmad S. Khan. TMH, New Delhi, 4th ed., (Special Indian Edition), 2010.
2. Antenna and Wave Propagation – Harish AR and Sachidananda M, Oxford University Press, 2007
3. Electromagnetic Waves and Radiating Systems - E.C. Jordan and K.G. Balmain. PHI, 2nd ed., 2000.

**References:**

1. Antenna Theory and Design - Warren L. Stutzman, Gary A. Thiele, John Wiley & Sons, 3<sup>rd</sup> edition. 2013
2. Antenna Theory- Analysis and Design- C.A. Balanis, John Wiley & Sons, 3rd ed.. 2005.

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**  
**DIGITAL COMMUNICATIONS**

Course Code: GR15A3041

L:3 T:2 P:0 C:4

III Year I Semester

**UNIT I**

**Elements of Digital Communication Systems:** Model of Digital Communication Systems, Digital Representation of Analog Signal, Sampling Theorem, Pulse Code Modulation; PCM Generation and Reconstruction, Quantization Noise, Non Uniform Quantization and Compounding, DPCM, Adaptive DPCM, DM and Adaptive DM, Noise in PCM and DM.

**UNIT II**

**Digital Modulation Techniques:** Introduction, ASK, ASK Modulator, Coherent ASK Detector, Non-Coherent ASK Detector, FSK, Band width and Frequency Spectrum FSK, Non Coherent FSK Detector, Coherent FSK Detector, FSK Detection using PLL, BPSK, Coherent PSK Detection, QPSK, Differential PSK.

**UNIT III**

**Base band Transmission and Optimal Reception of Digital Signal:** Pulse Shaping for Optimum Transmissions, Base band Signal Receiver, Probability of Error, Optimum Filter, Matched Filter, Probability of error using Matched Filter Optimal of Coherent Reception, Calculation of Error Probability of ASK, BPSK, BFSK, QPSK.

**UNIT IV**

**Error Control Codes:** Linear Block Codes; Matrix Description of Linear Block Codes, Error Detection and Error Correction Capabilities of Linear Block Codes. Cyclic Codes; Algebraic Structure, Encoding, Syndrome Calculation, Decoding. Convolution Codes; Encoding, Decoding using State, Tree and Trellis Diagrams, Decoding using Viterbi Algorithm.

**UNIT V**

**Spread Spectrum Modulation:** Use of Spread Spectrum, Direct Sequence Spread Spectrum (DSSS), and Code Division Multiple Access, Ranging using DSSS, Frequency Hopping Spread Spectrum, and PN-Sequences: Generation and Characteristics, Synchronization in Spread Spectrum Systems.

**Text Books:**

- Digital Communications, 8<sup>th</sup> Edition, John Wiley & Sons, Simon Haykin, Inc 2007

**References:**

- Tauband Schilling, Principles of Communication Systems, 2nd Edition, TMH, 1986
- Digital and Analog Communication Systems, John Wiley & Sons, Inc, 2002
- Analog and Digital Communications, second edition, Hsuhwei, Schaum's outline, TMH, 2003
- Communication systems 3<sup>rd</sup> edition, Simon Haykin, John Wiley & Sons, 1999

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**  
**VLSI DESIGN**

Course Code: GR15A3043  
III Year I Semester

L: 0 T: 0 P: 4 C: 2

### **UNIT I**

**Introduction:** Introduction to IC Technology–MOS transistors, NMOS, CMOS & BiCMOS fabrication Technologies; fabrication processes: Oxidation, Lithography, Diffusion, Ion implantation, Metallization, Etching, Planarization, Encapsulation, Integrated Resistors and Capacitors, Manufacturing issues.

### **UNIT II**

**Basic Electrical Properties:** Basic Electrical Properties of MOS and BiCMOS Circuits: Ids-Vds relationships, MOS transistor threshold Voltage  $V_t$ ,  $\mu_n$ ,  $\mu_p$ ,  $\theta$ , Figure of merit  $\omega_0$ ; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter-analysis and design, BiCMOS Inverters, Power, Sources of Power Dissipation, Dynamic Power, Static Power, Robustness, Variability, Reliability, Circuit simulation, SPICE tutorials, device models.

### **UNIT III**

**VLSI Circuit Design Processes, Gate Level Design:** VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout,  $2\mu\text{m}$  CMOS Design rules for wires, contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, CMOS Nano technology. Switch logic, Alternate gate circuits, Time delays, driving large capacitive loads, wiring capacitance, Fan-in, Fan-out, Choice of layers.

### **UNIT IV**

**Data path Subsystems, Array Subsystems:** Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters. SRAM, DRAM, ROM, Serial Access Memories, Content Addressable Memory.

### **UNIT V**

**Semicustom Integrated Circuit Design, IC Testing:** PLAs, Programmable Array Logic, FPGAs, CPLDs, Standard cells design approach. Need for testing ICs, Test Principles, Wafer-level, Package-level testing, System-level Test Techniques, and Layout Design for improved Testability and Principles of Design for testability (DFT).

#### **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.

#### **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

# **DATA BASE MANAGEMENT SYSTEMS**

## **(PROFESSIONAL ELECTIVE-I)**

Course Code: GR15A2063

L: 3 T: 2 P: 0 C: 3

III Year I Semester

### **UNIT I:**

Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models –Data base System Structure, Data base Users and Administrator – Transaction Management –Data base design and ER diagrams –Attributes and Entity sets – Relationships and Relationship sets –Design Issues, Extended ER Features, Concept Design with the ER Model

### **UNIT II:**

Relational Model: Introduction to the Relational Model, Basic Structure, Database Schema, Keys Relational Algebra, Relational Calculus.

Data on External storage-File organization and Indexing, cluster Indexes, Primary and Secondary Indexes-Index data structures-Hash based Indexing.

### **UNIT III:**

Form of Basic SQL Query – Database Languages – DDL – DML – database Access for applications Programs, Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values, Integrity Constraint over relations, Introduction to Views – Destroying /altering Tables and Views.

### **UNIT IV:**

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – Fourth Normal Form.

### **UNIT V:**

Transaction Concept: Transaction State – Implementation of Atomicity and Durability-Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation-Testing for serializability – Lock based Protocols – timestamp based protocols – validation based protocols – Multiple Granularity Recovery and Atomicity – Log based recovery – Recovery with concurrent transactions- Buffer Management.

### **TEXT BOOKS:**

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATAMcGrawHill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

### **REFERENCE BOOKS:**

1. Introduction to Database Systems, C.J.Date Pearson Education.
2. Data base Systems design, Implementation, and Management, Rob & Coronel 5th Edition. Thomson.
3. Database Management Systems P. Radha Krishna HI-TECH Publications 2005.

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**  
**LINEAR CONTROL SYSTEMS**  
**(PROFESSIONAL ELECTIVE-I)**

Course Code: GR15A3104

L:3 T:1 P:0 C:4

III Year I Semester

**UNIT I**

**Introduction to control system:** Classification, open-loop, closed-loop system

**Mathematical Models of Physical Systems:** Modeling of mechanical system elements, Electrical systems, Analogous Systems, Transfer function, Procedure for deriving transfer functions, Servomotors, Synchronous.

**Block Diagrams:** Block Diagram and Signal flow graphs: Block Diagrams, of a closed-loop system, block diagrams and transfer functions of multivariable systems, procedure for drawing a block diagram, block diagram reduction,

**Signal Flow Graphs:** construction of Signal Flow Graphs (SFG), Basic properties of signal flow graph, Signal flow graph algebra, construction of signal flow graph

**UNIT II**

**Time Response Analysis I:** Time response of control system, Standard test signals, Time response of first-order systems, second-order systems, steady state errors and error constrains, types of control systems, effect of adding poles and zeros to transfer functions, dominant poles of transfer functions.

**UNIT III**

**Time Response Analysis II:** Routh Stability Criterion: Introduction, Bounded Input and Bounded Output(BIBO), Necessary conditions for stability, Routh stability criterion, difficulties in the formulation of the Routh table, applications of the Routh stability criterion to linear feedback system, relative stability analysis. Root locus concepts, construction of root loci, rules for the construction of the root locus, effect of adding poles and zeros to  $G(s)$  and  $H(s)$ .

**UNIT IV**

**Frequency Domain Analysis:** Correlation between time and frequency response, Polar plots, inverse polar plots, Bode plots, basic factors of  $G(j\omega)H(j\omega)$ , general procedure for constructing Bode plots, all pass and minimum phase systems, computation of Gain Margin and Phase margin, Nyquist plots: principle of argument, Nyquist stability criterion.

**UNIT V**

**State Space Analysis:** Concepts of state, state variables and state models, state-space representation, state transition matrix and state transition equation.

**Text Books:**

1. I. J. Nagrath, M. Gopal, "Control Systems Engineering", Fifth Edition, NewAge International, New Delhi, 2007.

**References:**

1. A. Anand Kumar, "Control Systems", Seventh printing, PHI Learning New Delhi, 2012
2. Katsuhiko Ogata, "Discrete Time Control Systems", Second Edition, PHI Learning New Delhi, 2006.
3. R. Ananda natarajan, P. Ramesh Babu, "Control Systems Engineering", Second edition, Sci Tech Publications Pvt. (India) Ltd, 2008

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**  
**SYSTEMS MODELING & SIMULATION**  
**(PROFESSIONAL ELECTIVE-I)**

Course Code: GR15A3109

L:3 T:1 P:0 C:4

III Year I Semester

**UNIT I System Models:** Concept of a system, System Environment, Stochastic activities, continuous and Discrete Systems, System Modeling, Physical and Mathematical Models for Systems, Static and Dynamic Categorization of these physical and mathematical Models. Principles used in modeling. System Simulation: Monte–Carlo Method: Comparison of Simulation and analytical methods, Experimental nature, Types of Simulation, Numerical Computation Technique for continuous model and for Discrete model, Distributed Lag Models, Cobweb Models.

**UNIT II Continuous System Simulation:** Differential Equations, Analog Computers, Analog Models, hybrid Computers, digital – Analog Simulations, Continuous System Simulation Languages (CSSLS), CSMP – III, Hybrid Simulation, Feedback Systems, Simulation of an, Interactive Systems, Real-Time Simulation. System Dynamics: Exponential Growth Models, Exponential Decay Models, Logistic Curves, Generalization of Growth Models, Simple System Dynamics Diagrams, Multi-segment Models, Representation of Time Delays, WORLD Models.

**UNIT III Probability Concepts In Simulation:** Stochastic Variables, Discrete Probability functions, Continuous Probability functions, Measures of Probability functions, Numerical Evaluation of Continuous Probability functions, continuous Uniformly Distributed Random Numbers, A Uniform Random Number Generator, Generating Discrete Distributions. Arrival Patterns and Service Times: Poisson’s Arrival patterns, Exponential Distribution, Erlang Distribution, Hyper-Exponential Distribution, Normal Distribution, Queuing Disciplines, Mathematical Solutions of Queuing Problems.

**UNIT IV Introduction To Gpss:** GPSS Programs, General Description Action Times, Succession of Events, Choice of Paths, Simulation of a manufacturing Shop, Conditional Transfers, Control Statements, Functions, Simulation of a Super Market, Transfer modes, GPSS Model of a Simple Telephone system.

**UNIT V Random Access Systems:** Aloha, Slotted Aloha, Carrier Sense Multiple Access, Delay Calculations in CSMA/CD, Performance comparisons, Reservation Techniques. Routing And Flow Allocation: Routing Model, Shortest Path Algorithms, Capacity Constrains, Flow control and Routing, Routing in Practice.

**Text Books:**

1. Geoferey Gordon “System Simulation”,PHI, Second Edition.
2. A.M.Law and W.David Kelton, "Simulation Modelling and analysis", Mc Graw Hill Inc. New York ,1991

**Reference Book(s)**

1. Hayes, Khanna Publications.
2. Networks Jeremiah F, “Modeling and Analysis of computer Communications Networks”.



**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY  
ADVANCED ENGLISH COMMUNICATION SKILLS LAB**

Course Code: GR15A3100

L: 0 T: 0 P: 4 C 2

III Year I Semester

**Introduction**

- Gather ideas and information, to organize ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- To take part in social and professional communication.

**Objectives:**

This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.

**Syllabus:**

The following course content is prescribed for the Advanced Communication Skills Lab:

- Functional English-starting a conversation-responding appropriately and relevantly-using the right body language-role play in different situations, Discourse Skills.
- Vocabulary Building-synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases, Collocations.
- Reading Comprehension-reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, Critical reading.
- Writing Skills-structure and presentation of different types of writing-Resume writing/
- E-correspondence/Technicalreportwriting/Portfoliowriting-planningfor writing – research abilities/data collection/organizing data/tools/analysis- improving one’s writing.
- Group Discussion-dynamics of group discussion, intervention, summarizing, and modulation of voice, body language, relevance, fluency and coherence.

- Presentation Skills–Oral presentations (individual and group) through JAM sessions/seminars and written presentations through posters/projects/reports/ PPTs/e-mails/ assignments etc.

Interview Skills–concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.

### **Minimum Requirement:**

The English Language Lab shall have two parts:

- i) The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.
- ii) The Communication Skills Lab with movable chairs and audio- visual aids with a P.A System, a T.V., a digital stereo–audio & video system and camcorder etc.

System Requirement (Hardware component): Computer network with LAN with minimum 60 multimedia systems with the following specifications:

- i) P–IV Processor
  - a) Speed–2.8GHZ
  - b) RAM–512MBMinimum c)HardDisk–80GB
- ii) Head phones of High quality

### **Suggested Software:**

The software consisting of the prescribed topics elaborated above should be procured and used.

### **Suggested Software:**

- Clarity Pronunciation Power–part II
- Oxford Advanced Learner’s Compass, 7<sup>th</sup> Edition
- DELTA’s key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

The following software from ‘train2success.com’

- preparing for being interviewed,
- Positive Thinking,
- Interviewing Skills
- Telephone Skills,
- Time Management
- Team Building,
- Decision making

English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

### **Books Recommended:**

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University

Press2009.

2. Advanced Communication Skills Laboratory Manual by SudhaRani, D,Pearson Education2011.

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY  
VLSI DESIGN LAB**

Course Code: GR15A3044

L:0 T:0 P:4 C:2

III Year I Semester

Design and implementation of the following CMOS digital/analog circuits using Cadence/Mentor Graphics/Synopsys CAD tools including: Gate-level design, Transistor-level design, Hierarchical design, Verilog HDL Equivalent/VHDL design, Logic Synthesis, Simulation and Verification, Scaling of CMOS Inverter for Different Technologies, Study of Secondary Effects (Temperature, Power Supply and Process Corners), Circuit Optimization with Respect to Area, Performance and/or Power, Layout, Extraction of Parasitics and Back Annotation and Related, Modifications in Circuit Parameters and Layout Consumption, DC/ Transient Analysis, Verification of Layouts (DRC, LVS)

**VLSI Programs:**

1. Introduction to Layout Design Rules
2. Layout of Basic Logic Gates
3. Layout of CMOS Inverter
4. Layout of CMOS NOR/NAND Gates
5. Layout of CMOS XOR and MUX Gates
6. Layout of CMOS 1-bit Full Adder
7. Layout of Static/Dynamic Logic Circuit (Register Cell)
8. Layout of Latch
9. Layout of Pass Transistor
10. Layout of any Combinational Circuit (Complex CMOS Logic Gate)-Learning about Data Paths
11. Introduction to SPICE Simulation and Coding of NMOS/CMOS Circuit
12. SPICE Simulation of Basic Analog Circuits: Inverter/Differential Amplifier
13. Analog Circuit Simulation (AC Analysis)–CS & CD Amplifier.
14. System Level Design using PLL
15. Finite State Machine Design

Note: A minimum of 12 (Twelve) experiments have to be performed and recorded by the candidate to attain eligibility for Practical Examination.

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**  
**DIGITAL COMMUNICATION LAB**

Course Code: GR15A3045  
III Year I Semester

L: 0 T: 0 P: 4 C: 2

**List of Experiments:**

1. Design and Implementation of Uniform Quantizer.
2. PCM Generation and Detection
3. Differential Pulse Code Modulation
4. Delta Modulation and Demodulation
5. Time Division Multiplexing of 2 Band Limited Signals
6. Design and implementation of ASK Generator and Detector
7. Design and implementation of PSK Generator and Detector
8. Design and implementation of FSK Generator and Detector
9. Quadrature Phase Shift Keying modulation & Detection.
10. Differential Phase Shift Keying
11. Design and Implementation of Convolutional Coders
12. Design and Implementation of Cyclic code Encoder and its corresponding Syndrome Calculator
13. Generation of PN Sequence and Gold Sequences
14. BER Analysis of binary digital Modulation Schemes (ASK, PSK and FSK) in the presence of Additive White Gaussian Noise
15. BER Analysis of Direct Sequence Spread Spectrum Communication system in the presence of AWGN and interference.

Note: A minimum of 12 (Twelve) experiments have to be performed and recorded by the candidate to attain eligibility for Practical Examination.

**Lab Methodologies:**

1. Assignments
2. Lab experiments with Matlab and CCStudio

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY  
WATER RESOURCES ENGINEERING**

**(Open Elective-1)**

**Course Code: GR15A3151  
III Year. I Semester**

**L T P C  
2 1 0 3**

**UNIT I**

**Introduction to Engineering Hydrology and its applications:** Hydrologic Cycle, types and forms of precipitation, rainfall measurement, types of Rain gauges, computation of average rainfall over a basin, processing of rainfall data-adjustment of record-Rainfall Double Mass Curve. Runoff-Factors affecting Runoff over a Catchment- Empirical and Rational Formulae.

**Abstraction from rainfall:** Evaporation, factors effecting evaporation, Measurement of evaporation- Evapotranspiration- Penman and Blaney & Criddle Methods -Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices'.

**UNIT II**

**Distribution of Runoff:** Hydrograph Analysis Flood Hydrograph – Effective Rainfall - Base Flow- Base Flow Separation - Direct Runoff Hydrograph– Unit Hydrograph, definition and limitations of application of Unit hydrograph, Derivation of Unit Hydrograph from Direct Runoff Hydrograph and vice versa S- hydrograph, Synthetic Unit Hydrograph.

**UNIT III**

**Ground water Occurrence:** Types of aquifers, aquifer parameters,' porosity' Specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifers, Types of wells, Well Construction - Well Development.

**UNIT IV**

**Necessity and importance of irrigation:** Advantages and ill-effects of irrigation, Types of irrigation, Methods of application of irrigation water, Indian Agriculture soils, Methods of improving soil fertility-Crop rotation, preparation land for irrigation, Standards of quality for irrigation water.

**Soil-water-plant relationship:** Vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, Duty and delta, factors Affecting duty- design discharge for a water course. The depth and frequency of Irrigation, Irrigation efficiencies-Water Logging.

**UNIT V**

**Classification of canals:** Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for canal design canal lining.

**Design discharge over a catchment:** computation of design discharge–rational formula, SCS curve number method, flood frequency analysis introductory part only. Stream gauging-measurement and estimation of stream flow.

**TEXT BOOKS**

1. A text book of hydrology by P. Jaya Rami Reddy, laxmi publications pvt limited
2. Irrigation and water power engineering- B.C. Punmia, PandeB. B.Lal, Ashok kumarjain, Arun kumarjain- Laxmi publications 16<sup>th</sup> edition

## **REFERENCE**

1. Elementary hydrology by V.P. Singh PHI publications
2. Irrigation and Water- Resources & Water Power by P'N 'Modi' Standard Book House.
3. Irrigation Water Management by D'K' Majundar' Printice Hall of Indra.
4. Irrigation and Hydraulic structures by S'K'Grag'
5. Applied Hydrology by VenTe Chow' David R' Maidment Larry W' Mays Tata MC. Graw Hill'
6. Introduction to Hydrology by Warren Viessman' Jr' Garyl' Lewis'
7. Handbook of Hydrology by David R. Maidment (Editour-in-chief)-McGrow - Hill

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**SOLAR AND WIND ENERGY SYSTEMS**

**(Open Elective- I)**

**Course Code: GR15A3152**  
**III Year I Sem**

**L T P C**  
**2 1 0 3**

**UNIT I**

**Solar Energy Basics:** The sun as a source of energy, The Earth Sun, Earth Radiation Spectrums, Extra-terrestrial and Terrestrial Radiations, Spectral Energy Distribution of Solar Radiation, Depletion of Solar Radiation, Solar Radiation Data, Measurement of Solar Radiation, Solar Time(Local Apparent Time), Solar Radiation Geometry, Solar Day Length, Empirical Equations for Estimating Solar Radiation Availability on Horizontal Surface For Cloudy skies, Hourly Global, Diffuse and Beam Radiation on Horizontal Surface Under Cloudless Skies, Solar Radiation on Inclined Plane Surface

## **UNIT II**

**Solar Thermal Systems:** Solar Collectors, Solar Water Heater, Solar Passive Space-Heating and Cooling Systems, Solar Ustrial Heating Systems, Solar Refrigeration and Air-Conditioning Systems, Solar Cookers, Solar Furnaces, Solar Green House, Solar Dryer, Solar Distillation(or Desalination of Water), Solar Thermo-Mechanical Systems.

## **UNIT III**

**Solar Photovoltaic Systems:** Solar Cell Fundamentals, Solar Cell Characteristics, Solar Cell Classification, Solar Cell, Module, Panel and Array Construction, Maximizing The Solar PV Output and Load Matching, Maximizing Power point tracker(MPPT),Balance of System Components, Solar PV Systems, Solar PV Applications

## **UNIT IV**

**Wind Energy:** Origin of Winds, Nature of Winds, Wind Turbine Siting, Major Applications of Wind Power, Basics of Fluid Mechanics, Wind Turbine Aerodynamics.

## **UNIT V**

**Wind Energy Conversion Systems:** Wind Energy Conversion Systems (WECS), Wind-Diesel Hybrid System, Effects of Wind Speed and Grid Condition (System Integration), Wind Energy Storage, Environmental Aspects.

## **TEXT BOOKS**

- B.H.Khan, “Non- Conventional Energy Resources”, 2nd edition, Tata McGraw-Hill, New Delhi

## **REFERENCE**

1. SP Sukhatme, Solar Energy - Principles of thermal collection and storage, 2nd edition, Tata McGraw-Hill, New Delhi

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY  
APPLIED THERMODYNAMICS**

**(Open Elective-I)**

**Course Code: GR15A3153**

**L T P C**

**III B. Tech I Semester**

**2 1 0 3**

**UNIT I**

**Steam Power Cycles:** Carnot cycle, Rankine cycle, Modified Rankine - Schematic layouts, Thermodynamic Analysis, Concept of Mean Temperature of Heat addition, Methods to improve cycle performance – Regeneration & Reheating. Binary vapour cycle

**Combustion:** Fuels and combustion, basic chemistry, combustion equations, stoichiometric air fuel ratio, volumetric and mass basis conversion, Flue gas analysis by Orsat apparatus.

**UNIT II**

**Boilers :** Classification – Working principles – with sketches including H.P. Boilers, L.P. Boilers and Modern H.P. Boilers – Mountings and Accessories – Working principles, Boiler horse power, equivalent of evaporation, efficiency and heat balance. Draught, classification – Height of chimney for given draught and discharge, condition for maximum discharge, efficiency of chimney – Artificial draught: induced, forced, balanced and steam jet draught,

**UNIT III**

**Steam Nozzles:** Function of a nozzle – applications - types, Flow through nozzles, thermodynamic analysis, assumptions -velocity of nozzle at exit-Ideal and actual expansion in



nozzle, velocity coefficient, condition for maximum discharge, critical pressure ratio, criteria to decide nozzle shape: Super saturated flow, its effects, degree of super saturation and degree of under cooling - Wilson line.

**Steam Condensers:** Requirements of steam condensing plant – Classification of condensers – working Principle of different types – vacuum efficiency and condenser efficiency – air leakage, sources and its affects, Air pump- cooling water requirement. Cooling towers.

#### UNIT IV

**Steam Turbines:** Classification – Impulse turbine ,De-Laval Turbine its features; Mechanical details – Velocity diagram – effect of friction – power developed, axial thrust, blade or diagram efficiency – condition for maximum efficiency.-.

**Reaction Turbine:** Mechanical details – principle of operation, thermodynamic analysis of a stage.-Degree of reaction –velocity diagram – Parson’s reaction turbine – condition for maximum efficiency.

**Compounding:** Methods to reduce rotor speed-Velocity compounding and pressure compounding, pressure velocity compounding, Velocity and Pressure variation along the flow – combined velocity diagram for a velocity compounded impulse turbine.

#### UNIT V

**Gas Turbines:** Simple gas turbine plant – Ideal cycle, essential components – actual cycle – methods for improvement of performance - regeneration, inter cooling and reheating –Closed and Semi-closed cycles – merits and demerits, Brief concepts about compressors, combustion chambers and turbines of Gas Turbine Plant.

**Jet Propulsion:** Principle of Operation –Classification of jet propulsive engines – Working Principles with Schematic diagrams and representation on T-S diagram - Thrust, Thrust Power and Propulsion Efficiency– Turbo jet engines – Needs and Demands met by Turbo jet – Schematic Diagram, Thermodynamic Cycle, Performance Evaluation Thrust Augmentation – Methods.

**Rockets:** Working Principle – Classification – Propellant Type – Thrust, Propulsive Efficiency – Specific Impulse – Solid and Liquid propellant Rocket Engines.

#### TEXT BOOKS:

1. Thermal Engineering / R.K. Rajput / Lakshmi Publications
2. Thermal Engineering-P.L.Ballaney/ Khanna publishers
3. Thermal Engineering/R.S.Khurmi/JS Gupta/S.Chand.

#### REFERENCES:

1. Thermodynamics and Heat Engines / R. Yadav / Central Book Depot
2. Gas Turbines and Propulsive Systems – P.Khajuria&S.P.Dubey - /Dhanpatrai
3. Gas Turbines / Cohen, Rogers and SaravanaMuttou / Addison Wesley – Longman
4. Thermal Engineering-M.L.Marthur& Mehta/Jain bros

**Teaching Methodology:** Power Point Presentations, Working models, White Board & Marker

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**PRINCIPLES OF E-COMMERCE**

**(OPEN ELECTIVE- I)**

**Course Code: GR15A3154**

**L T P C**

**III Year I Semester**

**2 1 0 3**

**UNIT I**

**INTRODUCTION TO E-COMMERCE**

E-commerce, Difference between E-commerce and E-business, Purpose of E-Commerce, Eight Unique Features of E-commerce Technology, Web 2:0, Types of E-commerce, Growth of the Internet and the Web, Origins and Growth of E-commerce, Understanding E-commerce.

**UNIT II**

**E-COMMERCE BUSINESS MODELS AND CONCEPTS**

E-commerce Business Models, Business-to-Consumer (B2C) Business Models, Business-to-Business (B2B) Business Models, Business Models in Emerging E-commerce Areas.

**UNIT III**

**BUILDING AN E-COM WEB SITE**

Building an E-commerce Web Site, Choosing Software, Choosing the Hardware, E-commerce Site Tools.

**UNIT IV**

**ONLINE SECURITY AND PAYMENT SYSTEMS**

Security Threats in the E-commerce Environment, Technology Solutions, payment systems, E-commerce Payment System, Electronic Billing Presentment and Payment.

**UNIT V**

**ONLINE CONTENT AND MEDIA**

Online Content, Online Publishing Industry, Online Entertainment Industry.

**TEXT BOOKS:**

Kenneth C. Laudon Carol GuercioTraver, “E-commerce: business, technology, society”, Fifth edition, Pearson Prentice Hall, 2009. (Unit-1:Chapter -1, Unit-II: Chapter-2, Unit-III: Chapter-4, Unit-IV: Chapter-5, Unit-V:Chapter-10)

**REFERENCES**

1. Dave Chaffey, "E-Business and E-Commerce Management: Strategy, Implementation and Practice", Fifth edition, Pearson Education, 2013.
2. K.K. Bajaj, Debjani Nag, "E-Commerce: The Cutting Edge of Business", Second edition, McGraw Hill Education (India) Private Limited, 2005.
3. David Whiteley, "E-Commerce: Strategy, Technologies And Applications", McGraw Hill Education (India) Private Limited, 2001.
4. SteffanoKorper, "The E-Commerce Book: Building the E-Empire", Morgan Kaufmann, 2000.

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**DATA MINING AND APPLICATIONS**

**(Open Elective – I)**

**Course Code: GR15A3155**  
**III Year I Semester**

**L T P C**  
**2 1 0 3**

## **UNIT I**

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Major issues in Data Mining. Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

## **UNIT II**

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Itemset Mining Methods, Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint- Based Association Mining

## **UNIT III**

Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation, Support Vector Machines, Associative Classification, Prediction, Accuracy and Error measures, Evaluating the accuracy of a Classifier or a Predictor.

Cluster Analysis Introduction :Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Outlier Analysis - Distance-Based Outlier Detection, Density-Based Local Outlier Detection

## **UNIT IV**

Mining World Wide Web: Mining web page layout structure, Identification of authoritative web pages using web link structures, Automatic Classification of Web Documents, Web Usage Mining.

Spatial Mining: Mining spatial association and colocation patterns, spatial clustering methods, spatial classification and spatial trend analysis.

## **UNIT V**

Text Mining: Text Data analysis and Information retrieval, Dimensionality reduction for text, text mining approaches.

Applications and trends in Data Mining : Data Mining for Financial Data Analysis, , Data Mining for Telecommunication Industry, Data Mining for Intrusion Detection, Various themes on Data Mining, Social impacts of data mining

## **TEXT BOOKS**

1. Data Mining – Concepts and Techniques - Jiawei Han and Micheline Kamber, Morgan

- Kaufmann Publishers, Elsevier, Second Edition, 2006.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.
  3. Data Mining – Introductory and advanced topics – Margaret H. Dunham & S. Sridhar, Pearson Education.

## **REFERENCES**

1. Data Mining Techniques – Arun K. Pujari, Second Edition, Universities Press.
2. Data Warehousing in the Real World, Sam Anahory and Dennis Murray, Pearson Edn Asia.

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**

### **COMPUTER ARCHITECTURE AND ORGANIZATION (OPEN ELECTIVE-I)**

**Course Code: GR15A3156**

**L T P C**

**III Year I Semester**

**2 1 0 3**

#### **UNIT I**

##### **Introduction**

Computing and Computers, Evolution of Computers, VLSI Era, System Design; Register Level, Processor Level, CPU Organization, Data Representation, Fixed Point Numbers, Floating Point Numbers, Instruction Formats, Instruction Types, addressing modes.

#### **UNIT II**

##### **Data Path Design**

Fixed Point Arithmetic, Addition, Subtraction, Multiplication and Division, Combinational and Sequential ALUs, Carry look ahead adder, Robertson algorithm, booth's algorithm, non-restoring division algorithm, Floating Point Arithmetic, Coprocessor, Pipeline Processing, Pipeline design, Modified booth's Algorithm

### **UNIT III**

#### **Control Design**

Hardwired Control, Microprogrammed Control, Multiplier Control Unit, CPU Control Unit, Pipeline Control Instruction Pipelines, Pipeline Performance, Superscalar Processing, Nano Programming.

### **UNIT IV**

#### **Memory Organization**

Random Access Memories, Serial Access Memories, RAM Interfaces, Magnetic Surface Recording, Optical Memories, multilevel memories, Cache & Virtual Memory, Memory Allocation, Associative Memory.

### **UNIT V**

#### **System Organization**

Communication methods, Buses, Bus Control, Bus Interfacing, Bus arbitration, IO and system control, IO interface circuits, Handshaking, DMA and interrupts, vectored interrupts, PCI interrupts, pipeline interrupts, IOP organization, operation systems, multiprocessors, fault tolerance, RISC and CISC processors, Superscalar and vector processor.

#### **TEXT BOOKS:**

1. John P. Hayes, 'Computer architecture and Organisation', TMH Third edition, 1998.
2. V. Carl Hamacher, Zvonko G. Varanasic and Safat G. Zaky, "Computer Organisation", V edition, McGraw-Hill Inc, 1996.

#### **REFERENCES:**

1. Morris Mano, "Computer System Architecture", Prentice-Hall of India, 2000.
2. Paraami, "Computer Architecture", BEH R002, Oxford Press.
3. P. Pal Chaudhuri, "Computer organization and design", 2nd Ed., Prentice Hall of India, 2007.
4. G. Kane & J. Heinrich, "MIPS RISC Architecture", Englewood cliffs, New Jersey, Prentice Hall, 1992.

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**  
**DIGITAL SIGNAL PROCESSING**

Course Code: GR15A3046

L: 3 T: 2 P: 0 C: 4

III Year II Semester

**Prerequisites:**

Fundamentals of Signals and Systems

**Course Objectives:**

- To understand characteristics of discrete time signals and systems
- To analyse and process signals using various transform techniques
- To understand various factors involved in design of digital filters
- To understand the effects of finite word length implementation.

**Course Outcomes:**

After going through this course the student will be able to

- Analyse and process signals in the discrete domain
- Design filters to suit specific requirements for specific applications
- Perform statistical analysis and inferences on various types of signals
- Design multi rate signal processing of signals through systems.
- Analyse binary fixed point and floating-point representation of numbers and arithmetic operations
- 

**UNIT I:**

**Introduction:** Introduction to Digital Signal Processing: Discrete Time Signals & Sequences, Linear Shift Invariant Systems, Stability, and Causality, Linear Constant Coefficient Difference Equations, Frequency Domain Representation of Discrete Time Signals and Systems

**UNIT II:**

**Discrete Fourier series:** DFS Representation of Periodic Sequences, Properties of Discrete Fourier Series, Discrete Fourier Transforms: Properties of DFT, Linear Convolution of Sequences using DFT, Computation of DFT, Relation between DTFT, DFS, DFT and Z-Transform.

**Fast Fourier Transforms:** Fast Fourier Transforms (FFT)-Radix-2, Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Inverse FFT, and FFT with General Radix -N.

**UNIT III:**

**Realization of Digital Filters:** Applications of Z-Transforms, Solution of Difference Equations of Digital Filters, System Function, Stability Criterion, Frequency Response of Stable Systems, Realization of Digital Filters – Direct, Canonical, Cascade and Parallel Forms.

**UNIT IV:**

**IIR Digital Filters:** Analog filter approximations–Butterworth and Chebyshev, Design of IIR Digital Filters from Analog Filters, Step and Impulse Invariant Techniques, Bilinear Transformation Method.

#### **UNIT V:**

**FIR Digital Filters:** Characteristics of FIR Digital Filters, Frequency Response, Design of FIR Filters: Fourier Method, Digital Filters using Window Techniques, Frequency Sampling Technique, and Comparison of IIR & FIR filters.

#### **Teaching Methodologies**

1. Tutorial sheets uploaded in website.
2. NPTEL video lectures.
3. PowerPoint presentations.

#### **TextBooks:**

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education/PHI,2007.
2. Discrete Time Signal Processing–A.V. Oppenheim and R.W.Schaffer, PHI, 2009
3. Fundamentals of Digital Signal Processing–Loney Ludeman, John Wiley, 2009

#### **References:**

1. Johnny R. Johnson, Introduction to Digital Signal Processing, PHI, 2001.
2. Andreas Antoniou, Digital Signal Processing, TMH, 2006.
3. John G.Proakis, Dimitris GManolakis, digital Signal Processing: Principles, Algorithms and Applications, Pearson Education, PHI, 2003



**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**  
**MICROWAVE ENGINEERING**

Course Code:GR15A3048

L: 3 T: 2 P: 0 C: 4

III Year II Semester

**Prerequisites:** Fundamentals of Vector Calculus

**Course Objective**

- To present a cohesive overview of the required fundamentals on transmission lines and Wave guide Propagation theory in the case of Wave guides.
- To familiarize the students with various coupling mechanisms used in waveguides.
- To introduce the basic properties of polarization and Ferrite materials composition in the case of waveguide components.
- To introduce the multiport junction concept for splitting the microwave energy in a desired direction.
- To get the exposure on Microwave components in building a Microwave test bench setup for measurements.

**Course Outcomes**

- Integrating a wide range of Microwave components into one design oriented frame work
- Design and solve real world problems
- Characterize microwave devices in terms of the directionality of communication.
- Use a microwave test bench in analyzing various types of microwave measurements.

**Unit I:**

**Microwave Transmission Lines:** Rectangular Waveguide- Solution of Wave Equations, Modes of Propagation, Power Transmission and losses, Mode Excitation, Characteristics; Circular Waveguide- Solution of Wave Equations, Modes of Propagation, Power Transmission and losses, Mode Excitation, Characteristics; Strip Line- Propagation Constant, Characteristic Impedance, Attenuation; Micro strip Line- Effective Dielectric Constant, Characteristic Impedance, Attenuation

**Unit II:**

Microwave Network Analysis, Reciprocal & Non-Reciprocal Networks Z-, Y-, S-Matrix Concepts, Properties of S-Matrix, S-Matrix of two, three, four port, Reciprocal and non-reciprocal networks: E- and H- Plane Tees, Magic Tees, Hybrid Rings, Isolators; Wilkinson Power Divider-Even and Odd Mode Analysis; Directional Couplers and  $90^\circ$ ,  $180^\circ$  Hybrid, Ferrite Devices.

**Unit II:**

**Microwave Network Analysis, Reciprocal & Non-Reciprocal Networks:** Filter design using Insertion Loss Method, Butterworth and Chebyshev realization of filters, Transformation of Low pass prototype to other filter types, Stepped Impedance Low Pass Filter, Realization of

filters with Microstrip lines, Impedance Matching in RF Networks- L Network, Dealing with Complex Loads, 3-element matching, Wideband Matching Networks

#### **Unit IV:**

**Microwave Tubes and Introduction to Microwave Solid State Devices:** Microwave Tubes- Principles of Operation: Klystron, Reflex Klystron, Travelling Wave Tube, Magnetron; Microwave Diodes: Schottky Diode, PIN Diode; Transferred Electron Devices: Gunn Effect Diode, RWH Theory, Modes of operation; Avalanche Transit-time Devices: IMPATT, TRAPATT

#### **Unit V**

**Noise, Distortion, Oscillators, Mixers, Multipliers:** Noise in Microwave Circuits, Noise Figure, Non-linear Distortion; Microwave Oscillators, Oscillator Phase Noise; Frequency Multipliers- Manley-Rowe Relations; Mixers- Single-ended mixer, Balanced Mixer

#### **Text Books:**

1. "Microwave Engineering", David M Pozar, John Wiley & Sons, 4<sup>th</sup> ed., 2012
2. "Microwave Devices and Circuits", Samuel Y Liao, Pearson Education, 3<sup>rd</sup> ed., 1990
3. "RF Circuit Design", Christopher Bowick, Elsevier Inc, 2008

#### **References:**

1. "RF Circuit Design- Theory and Applications". Reinhold Ludwig and Pavel Bretchko, Prentice Hall Inc., 2000
2. "Foundations for Microwave Engineering", RE Collin, John Wiley & Sons Inc, 2<sup>nd</sup> ed., 2002

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY  
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**

Course Code: GR15A2104

L:2 T:2 P:0 C:3

III Year I Semester

**Prerequisites:**

Knowledge on Commerce  
Knowledge on current market trends

**Course Learning Objectives**

- To explain the features, merits, limitations and suitability of different forms of organizing private and public business enterprises and to analyze the significance of Managerial Economics and how it helps business managers in performing decision – making function.
- To define Demand, Elasticity of Demand and Demand Forecasting and to explain and analyze the factors of Demand, Elasticity of Demand and Demand Forecasting.
- To analyze the nature of various costs and how they influence the total cost, to determine the level of output at which there is neither profit nor loss and to identify the volume of sales at which desired amount of profit can be earned.
- To estimate capital requirements, to describe the sources of mobilizing capital and to evaluate the investment opportunities.

**Course Outcomes:**

After going through this course the student will be able to

- Select the suitable form of business organization which meets the requirement of selected business also perform decision – making effectively in an uncertain frame work by applying concepts of Managerial Economics
- Meet and manipulate the demand efficiently and plan the future course of action.
- Apply right kind cost and to reduce cost by paying attention towards the costs which can be regulated or reduced. Take decision whether to buy or produce.
- Reduce the cost of capital by selecting best sources of fund mobilization and select best investment opportunity which yields higher rate of return.
- Fix the right price which can best meets the predetermined objectives of the business firm under different market conditions.

**UNIT I**

**Introduction & Demand Analysis:** 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 Organization: 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 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 (simple problems).

#### **UNIT V**

**Introduction to Financial Accounting & Financial Analysis:** Accounting concepts and Conventions-Double-Entry Book Keeping, 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**

1. Tutorial sheets uploaded in website.
2. NPTEL video lectures.
3. PowerPoint presentations.

#### **TextBooks:**

1. Arya sri: Managerial Economics and Financial Analysis, TMH, 2009.
2. Atmanand: Managerial Economics, Excel, 2008.

#### **References:**

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,OxfordUniversityPress,2009

## **Computer Networks and Protocols (PROFESSIONAL ELECTIVE-II)**

Course Code: GR15A2077

L:2 T:2 P:0 C:3

III Year I Semester

### **Unit I**

**Computer Network Architecture:** Layered structure, design issues for the layers, interfaces and services, OSI reference model, overview of TCP/IP architecture, Hardware and software components, network topologies.

### **Unit II**

**Peer to Peer Protocols:** Peer – to – Peer protocols and service models; ARQ protocols and adaption function; Data-Link Controls-HDLC and PPP; Link sharing using packet multiplexers; Medium Access Control Protocols.

Packet-Switching protocols: Routing and Congestion Control Protocols-Interior & Exterior Routing Protocols.

### **Unit III**

#### **TCP/IP Architecture:**

The Internet Protocols-IPv4 & IPv6, UDP & TCP, DHCP and Mobile IP; Internet Routing Protocols, Multicast Routing. Broadband Technology and services.

### **Unit IV**

#### **ATM Networks:**

Layers, QoS, ATM Adaptation Layers, Signaling and PNNI Routing. Internetworking: Virtual Circuit and Datagram Subnets: Internet Control Protocols; Security Protocols; Internetworking: Virtual Circuit and Datagram Subnets: Internetworking Protocols; Tunneling; Fragmentation: Firewalls. Security Protocols: Security and Cryptographic Algorithm.

### **Unit V**

#### **Application Protocols**

Application Protocols: Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, WWW, DNS, SSH, SMTP.

#### **Text Books:**

- Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education
- Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.

#### **References:**

- An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education.
- Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
- Introduction to Computer Networks and Cyber Security, Chwan-Hwa (John) Wu, J. David Irwin, CRC Press.

- Computer Networks, L. L. Peterson and B. S. Davie, 4th edition, ELSEVIER.
- Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**

## **Information Theory and Coding**

**(PROFESSIONAL ELECTIVE-II)**

Course Code: GR15A3110

L:2 T:1 P:0 C:3

III Year I Semester

### **UNIT-I**

Information Theory: Definition of Information, Entropy, Mutual Information, Properties of Mutual Information, Fundamental Inequality, I.T. Inequality, Divergence, Properties of Divergence, Divergence Inequality, Relationship between entropy and mutual information, Chain Rules for entropy, relative entropy and mutual information.

### **UNIT II**

Channel Capacity: Uniform Dispersive Channel, Uniform Focusing Channel, Strongly Symmetric Channel, Binary Symmetric Channel, Binary Erasure Channel. Channel Capacity of the all these channels, Channel Coding Theorem, Shannon-Hartley Theorem

Data Compression: Kraft inequality, Huffman codes, Shannon-Fano coding, Arithmetic Coding

### **UNIT III**

Linear Block Codes:

Systematic linear codes and optimum decoding for the binary symmetric channel; Generator and Parity Check matrices, Syndrome decoding on symmetric channels; Hamming codes; Weight enumerators and the MacWilliams identities; Perfect codes. Cyclic Codes, BCH codes; Reed-Solomon codes, Justen codes, MDS codes, Alterant, Goppa and generalized BCH codes; Spectral properties of cyclic codes.

### **UNIT IV**

Decoding of BCH codes: Berlekamp's decoding algorithm, Massey's minimum shift register synthesis technique and its relation to Berlekamp's algorithm. A fast Berlekamp – Massey algorithm.

### **UNIT V**

Convolution codes Wozencraft's sequential decoding algorithm, Fann's algorithm and other sequential decoding algorithms; Viterbi decoding algorithm, Turbo Codes, Concatenated Codes.

### **Text Books**

1. F.J. MacWilliams and N.J.A. Sloane, The theory of error correcting codes, North Holland, 1977.
2. R.E. Balahut, Theory and practice of error control codes, Addison Wesley, 1983.
3. Thomas M. Cover, Joy A. Thomas, "Elements of Information Theory", Wiley Publishers.
4. Ranjan Bose, "Information Theory Coding, Cryptography", TMH Publication.

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY  
SOFTWARE ENGINEERING**

**(PROFESSIONAL ELECTIVE-II)**

Course Code: GR15A3057

L: 3 T: 1 P: 0 C: 4

III Year II Semester

**UNIT - I:**

**Introduction to Software Engineering:** The evolving role of software, Changing Nature of Software, Software myths.

**A Generic view of process:** Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

**Process models:** The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

**UNIT - II:**

**Software Requirements:** Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

**Requirements engineering process:** Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

**System models:** Context Models, Behavioural models, Data models, Object models, structured methods.

**UNIT – III**

**Design Engineering:** Design process and Design quality, Design concepts, the design model.

**Creating an architectural design:** Software architecture, Data design, Architectural styles and patterns, Architectural Design.

**Object-Oriented Design:** Objects and object classes, An Object-Oriented design process, Design evolution.

**Performing User interface design:** Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

**UNIT - IV:**

**Testing Strategies:** A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

**Product metrics:** Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

**Metrics for Process and Products:** Software Measurement, Metrics for software quality.

**Risk management:** Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

#### **UNIT - V:**

**Quality Management:** Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

#### **Text books:**

- Software engineering a practitioner's Approach, Roger S Pressman, 6th edition. McGrawHill International Edition.
- Software Engineering, Ian Sommerville, 7th edition, Pearson education.

#### **Reference books:**

- Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
- Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
- Fundamentals of Software Engineering, Rajib Mall, PHI, 2005
- Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
- Software Engineering1: Abstraction and modelling, Diner Bjorner, Springer International edition, 2006.



**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**  
**DIGITAL SIGNAL PROCESSING LAB**

Course Code: GR153049

L: 0 T: 0 P: 2 C: 2

III Year II Semester

The Programs shall be implemented in Software (Using MATLAB / LabView / C Programming/ Equivalent) and Hardware (Using TI/Analog Devices/ Motorola/ Equivalent DSP processors).

**Experiments Based on Matlab/Lab View/C Programming Equivalent**

- 1 Generation of Sinusoidal waveform/signal based on recursive difference equations
- 2 Linear and circular convolutions and DFT
- 3 To find frequency response of a given system given in (Transfer Function/ Differential equation form) (Frequency response of analog Butterworth filter)
- 4 Implementation of DFT, inverse DFT and FFT of given sequence
- 5 Determination of Power Spectrum of a given signal (s).
- 6 Implementation of LP FIR filter for a given sequence (Frequency response and time-domain simulation of FIR filter (1))
- 7 Implementation of HP FIR filter for a given sequence
- 8 Implementation of LP IIR filter for a given sequence (First order IIR filter (LP): Frequency-response and time-domain simulation)
- 9 Implementation of HP IIR filter for a given sequence First order IIR filter (HP): Frequency response and time-domain simulation
- 10 Generation (Recovery) of Sinusoidal signal through filtering
- 11 Generation of DTMF signals
- 12 Implementation of Decimation Process
- 13 Implementation of Interpolation Process
- 14 Implementation of I/D sampling rate converters

15 Impulse response of first order and second order systems.

### **Experiments Based On DSP Processor**

- 1 Generation of Sine wave with Buffer
- 2 Generation of Sum of sinusoidal signals
- 3 Linear Convolution of Two Signal sequences
- 4 Circular Convolution of Two signal sequences
- 5 Dot Product of Two Sequences
- 6 Square and Sawtooth wave generation
- 7 DFT of a sequence
- 8 IDFT of a sequence
- 9 Low pass and High Pass IIR filter design
- 10 Low pass and High Pass FIR filter design

**NOTE:** A minimum of 12 experiments, choosing 04 (Six) from experiments based on DSP Processor to be performed and recorded by the candidate to attain eligibility for Practical Examination.

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**  
**OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB**

Course Code: GR15A3101

L: 0 T: 0 P: 2 C: 2

III Year II Semester

**Week 1:** Write java programs that implement the following

- a) Constructor
- b) Parameterized constructor
- c) Method overloading
- d) Constructor overloading.

**Week 2:**a) Write a Java program that checks whether a given string is a palindrome or not.

Ex: MADAM is a palindrome.

- b) Write a Java program for sorting a given list of names in ascending order.
- c) Write a Java Program that reads a line of integers, and then displays each integer and the sum of all the integers (Use StringTokenizer class of java.util)

**Week 3:** Write java programs that implement the following keywords

- a) this keyword
- b) super keyword
- c) static keyword
- d) final keyword

**Week 4:** a) Write a java program to implement method overriding

- b) Write a java program to implement dynamic method dispatch.
- c) Write a Java program to implement multiple inheritance.
- d) Write a java program that uses access specifiers.

**Week5:** a) Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.

- b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.
- c) Write a Java program that displays the number of characters, lines and words in a text file

**Week 6:** a) Write a Java program for handling Checked Exceptions.

- b) Write a Java program for handling Unchecked Exceptions.

**Week 7:** a) Write a Java program that creates three threads. First thread displays “Good Morning” every one second, the second thread displays “Hello” every two seconds and the third thread displays “Welcome” every three seconds.

- b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.

**Week 8:** a) Develop an applet that displays a simple message.

- b) Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named

“Compute” is clicked.

**Week 9:** Write a Java program that works as a simple calculator. Use a grid layout to arrange button for the digits and for the +, -, \*, % operations. Add a text field to display the result.

**Week 10:** a) Write a Java program for handling mouse events.  
b) Write a Java program for handling key events.

**Week 11:** Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the textfields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

**Week 12:** a) Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No light is on when the program starts.  
b) Write a Java program that allows the user to draw lines, rectangles and ovals.

**Week 13:** Create a table in Table.txt file such that the first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using JTable component.

#### **TEXT BOOKS :**

1. Java; the complete reference, 7<sup>th</sup> edition, Herbert Schildt, TMH.
2. Java How to Program, Sixth Edition, H.M. Dietel and P.J. Dietel, Pearson Education/PHI.
3. Introduction to Java programming, Sixth edition, Y. Daniel Liang, Pearson Education.
4. Big Java, 2nd edition, Cay Horstmann, Wiley Student Edition, Wiley India Private Limited.

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**  
**TRANSPORTATION ENGINEERING**  
**(Open Elective-II)**

**Course Code: GR15A3161**  
**III Year II Semester**

**L T P C**  
**2 1 0 3**

**UNIT I**

**Highway development and planning:** Highway development in India – Necessity for Highway Planning- Different Road Development Plans- Classification of Roads- Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports.

**UNIT II**

**Highway geometric design:** Importance of Geometric Design- Design controls and Criteria-Highway Cross Section Elements- Sight Distances- Stopping sight Distance, Overtaking Sight Distance, intermediate Sight Distance and Head light sight distance- Design of Horizontal Alignment- Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

**UNIT III**

**Traffic engineering:** Traffic flow parameters-Volume, Speed, Density and headway- Traffic Volume Studies- Data Collection and Presentation-speed studies- Data Collection and Presentation- Parking Studies, Parking types and Parking characteristics- Road Accidents-Causes and Preventive measures- Accident Data Recording – Condition Diagram and Collision Diagrams.

**Traffic regulation and management:** Road Traffic Signs – Types and Specifications – Road markings-Need for Road Markings-Types of Road Markings- Design of Traffic Signals – Webster Method –IRC Method.

**UNIT IV**

**Intersection design:** Types of Intersections – Conflicts at Intersections- Types of At-Grade Intersections- Channelization: Objectives –Traffic Islands and Design criteria-Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary and Design Criteria-Advantages and Disadvantages of Rotary Intersection.

**UNIT V**

**Introduction to railway and airport engineering:** Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve – Crossings and Turn outs.

Factors affecting Selection of site for Airport – Aircraft Characteristics- Geometric Design of Runway- Computation of Runway length – Correction for runway length – Orientation of Runway – Wind Rose Diagram – Runway Lighting system.

**TEXT BOOKS:**

1. Highway Engineering – S.K.Khanna&C.E.G.Justo, Nemchand& Bros., 9th edition (2011).
2. Railway Engineering – A text book of Transportation Engineering – S.P.Chandola – S.Chand& Co. Ltd. – (2001).
3. Highway Engineering Design – L.R.Kadiyali and Lal- Khanna Publications.
4. Airport Planning and Design- S.K.Khanna and Arora,Nemchand Bros.

#### **REFERENCES:**

1. Highway Engineering – S.P.Bindra ,DhanpatRai& Sons. – 4th Edition (1981)
2. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna publications – 8th Edition – 2011.
3. Railway Engineering – S.C.Rangwala –Charotar Publishers.
4. Air Transportation Planning & design – S.K.Khanna – Nem Chnd and Bros.

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**

### **SENSORS AND TRANSDUCERS**

**(Open Elective – II)**

**Course Code: GR15A3162**  
**III Year II Sem**

**L T P C**  
**2 1 0 3**

#### **UNIT I**

**Introduction:** Sensors / Transducers, principles, classification, parameters, characterizations

#### **UNIT II**

**Introduction to mechanical & Electro Mechanical Sensors:** Resistive Potentiometer, Inductive sensors, Capacitive Sensors, Ultrasonic Sensors

### **UNIT III**

**Basics of Thermal and Magnetic Sensors:** Gas thermometric sensors, Thermal expansion type thermometric sensors, acoustic temperature sensors, dielectric constant and refractive index thermo sensors. Sensors and principles: Yoke coil sensor, coaxial type sensor, Force and displacement sensor

### **UNIT IV**

**SMART Sensors:** Introduction, Primary sensors, Excitation, Amplification, Filters, Converters, Compensation, Information coding / processing, Data Communication, The Automation

### **UNIT V**

**Sensors their Applications:** Flow - rate sensors, Pressure Sensors, Temperature Sensors, Torque & Position Sensors, Home Appliance Sensors - Distance Sensing  
Medical Diagnostic sensors, Sensors for Environmental Monitoring

### **TEXT BOOKS:**

1. Sensors & Transducers By D. Patranabis , PHI Publications

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**

### **AUTOMOBILE ENGINEERING (Open Elective-II)**

**Course code: GR15A3163**

**III B. Tech II Semester**

**L T P C**

**2 1 0 3**

### **UNIT I**

#### **INTRODUCTION, ENGINE AND LUBRICATION SYSTEM**

Components of four wheeler automobile – chassis and body – power unit – power transmission – rear wheel drive, front wheel drive, 4 wheel drive – types of automobile engines, Engine construction, turbo charging and super charging, Engine lubrication, splash and pressure lubrication systems, oil filters, oil pumps – crank case ventilation – engine service, reborning, decarbonisation, Nitriding of crank shaft.

**Emissions :** Emission from Automobiles – Pollution standards National and international – Pollution Control – Techniques – Energy alternatives – Photovoltaic, hydrogen, Biomass, alcohols, LPG and CNG.

## UNIT II

### FUEL SYSTEM AND COOLING SYSTEM

**Fuel System in S.I. Engine :** Fuel supply systems, Mechanical and electrical fuel pump – filters– carburetor – types – air filters – petrol injection-Multi point fuel injection(MPFI).

**Fuel System in C.I. Engines:** Requirements of diesel injection systems, types of injection systems, fuel pump, nozzle, spray formation, injection timing, testing of fuel pumps. CRDI engines.

**Cooling System:** Cooling Requirements, Air Cooling, Liquid Cooling, Forced Circulation System – Radiators – Types – Cooling Fan - water pump, thermostat, evaporative cooling – pressure sealed cooling – anti freeze solutions.

## UNIT III

### IGNITION SYSTEM AND ELECTRICAL SYSTEM

**Ignition System:** Function of an ignition system, battery ignition system, constructional features of storage, battery, auto transformer, contact breaker points, condenser and sparkplug – Magneto coil ignition system, electronic ignition system using contact breaker, electronic ignition using contact triggers – spark advance and retard mechanism.

**Electrical System :** Charging circuit, generator, current – voltage regulator – starting system, bendix drive mechanism solenoid switch, lighting systems, Horn, wiper, fuel gauge – oil pressure gauge, engine temperature indicator etc.

## UNIT IV

### TRANSMISSION AND STEERING SYSTEM

**Transmission System:** Clutches, principle, types, cone clutch, single plate clutch, multi plate clutch, magnetic and centrifugal clutches, fluid fly wheel – gear boxes, types, sliding mesh, constant mesh, synchro mesh gear boxes, epicyclic gear box, over drive, torque converter. Propeller shaft – Hotch – Kiss drive, Torque tube drive, universal joint, differential rear axles – types – wheels and tyres.

**Steering System:** Steering geometry – camber, castor, king pin rake, combined angle toein, center point steering. Types of steering mechanism – Ackerman steering mechanism, Davis steering mechanism, steering gears – types, steering linkages.

## UNIT V

### SUSPENSION AND BRAKING SYSTEM

**Suspension System:** Objects of suspension systems – rigid axle suspension system, torsion bar, shock absorber, Independent suspension system.

**Braking System:** Mechanical brake system, Hydraulic brake system, Master cylinder, wheel



Cylinder, tandem master cylinder, Requirement of brake fluid, Pneumatic and vacuum brakes.

**TEXT BOOKS:**

4. Automobile Engineering -R B Gupta
5. Automotive Mechanics – William Crouse
6. Automobile Engineering Vol. 1 & Vol. 2 / Kripal Singh

**REFERENCES**

1. Automotive Engineering / Newton Steeds & Garrett
2. Automotive Mechanics / G.B.S. Narang
3. Automotive Mechanics / Heitner
4. Automotive Engines / Srinivasan
5. Automobile Engineering – K.K. Ramalingam / Scitech Publications (India) PVT.

**Teaching Methodology:**

Power point Presentations, Working models, white board & marker

**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**HUMAN COMPUTER INTERFACE**

**(Open Elective-II)**

**Course Code: GR15A3164**

**III Year II Semester**

**L T P C**

**2 1 0 3**

**UNIT I**

**Introduction:** Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design, The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

**UNIT II**

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

**UNIT III**

Screen Designing: Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow.

**UNIT IV**

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls, Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors, Software tools – Specification methods, interface – Building Tools.

**UNIT V**

Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

**TEXT BOOKS:**

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamaTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

**REFERENCES:**

1. Human – Computer Interaction. ALAN DIX, JANET FINCAY, GRE GORYD, ABOWD, RUSSELL BEALG, PEARSON.
2. Interaction Design PRECE, ROGERS, SHARPS. Wiley Dreamtech,
3. User Interface Design, Soren Lauesen Pearson Education

**UNIT I**

**INTRODUCTION TO BIG DATA AND HADOOP:** Introduction to Big Data Platform – Big Data definition, Challenges of Conventional Systems: Enterprise/structured data, Social/unstructured Data, Unstructured data needs for Analytics, Analytics vs Reporting, Data Analytic Tools, History of Hadoop, Components of Hadoop, Analyzing the Data with Hadoop, Different Echo systems of Hadoop, IBM Big Data Platform Strategy and Introduction to Infosphere Big Insights.

**UNIT II**

**HDFS (Hadoop Distributed File System):** Significance of HDFS in Hadoop, Design of HDFS, HDFS Architecture overview, 5 daemons of Hadoop: Name Node, Data Node, Secondary Node, Job Tracker and Task Tracker, their functionality, Data Storage in HDFS: Introduction about Blocks, Data replication, Accessing HDFS: CLI (Command Line Interface) and admin commands, How to store various types of data in HDFS using CLI-command.

**UNIT III**

Map Reduce Map Reduce Architecture, Map Reduce Programming Model, Map Reduce Java API, Anatomy of Map Reduce Job run, Failures, Job Scheduling, Sort & Shuffle phase, Task Execution. Map Reduce Program using IBM BigInsights. Adaptive Map Reduce.

**Introduction to Oozie:** Overview of Managing job Execution. Apache Pig: Introduction to Apache Pig, Map Reduce Vs Apache Pig, SQL Vs Apache Pig, Pig Datatypes, Modes Of Execution in Pig.

**UNIT IV**

**Data Stores on Hadoop Hive:** Introduction, architecture, Integration with Hadoop, Hive Tables: Managed Tables, External Tables, Hive Query Language (Hive QL) Hbase: Introduction to HBase, Architecture, HBaseVs RDBMS, HBaseUseCasesHmaster. Introduction to Zookeeper.

**UNIT V****BM APPLICATIONS ON HADOOP**

**Big SQL:** Introduction to Big SQL, Datatypes, Big SQL Statistics.

**Big Sheets:** Introduction, Processing and Accessing BigSheets, Big SQL Integration.

**TEXT BOOKS**

1. Tom White “Hadoop: The Definitive Guide” Third Edit on, O’reily Media, 2012.

**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 Jeffrey 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, “Big Data Analytics: Disruptive Technologies for Changing the Game”, MC Press, 2012
10. Paul Zikopoulos, Dirk De Roos, 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**

**PRINCIPLES OF OPERATING SYSTEMS**

**(OPEN ELECTIVE-II)**

**Course Code: GR15A3166**

**III Year II Semester**

**L T P C**

**2 2 0 3**

**UNIT I**

**Computer System and Operating System Overview:** Overview of computer operating systems, operating systems functions, operating systems structures and systems calls, Evaluation of Operating Systems.

**UNIT II**

**Process Management** – Process concept- process scheduling, operations, Inter process communication. Multi Thread programming models. Process scheduling criteria and algorithms, and their evaluation.

**UNIT III**

**Concurrency:** Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors and Synchronization examples

**Memory Management:** Swapping, contiguous memory allocation, paging, structure of the page table, segmentation

**UNIT IV**

**Virtual Memory Management:** virtual memory, demand paging, page-Replacement, algorithms, Allocation of Frames, Thrashing

**Principles of deadlock** – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock,

**UNIT V**

**File system Interface-** the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

**File System implementation-** File system structure, allocation methods, free-space management

**Mass-storage structure** overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, Introduction to Storage Area Networks (SAN), Introduction to Network Attached Storage.

**TEXT BOOKS:**

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition, Wiley Student Edition.
2. Operating systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson.

**REFERENCES:**

1. Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.
2. Operating Systems A concept - based Approach, 2nd Edition, D. M. Dhamdhare, TMH.
3. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
4. Operating Systems, A. S. Godbole, 2nd Edition, TMH
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems, S, Haldar and A. A. Arvind, Pearson Education.
7. Operating Systems, R. Elmasri, A. G. Carrick and D. Levine, Mc Graw Hill.
8. Operating Systems in depth, T. W. Doeppner, Wiley.