GokarajuRangarajuInstitute of EngineeringandTechnology

(Autonomous)

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INFORMATION TECHNOLOGY

B.Tech(IT) – GR20 Course Structure

II B.Tech(IT) - I Semester

S.No	BOS	Group	Course Code	Course Name	Credits				Hours				Int.	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	IT	PC		Digital Logic Design	3	0	0	3	3	0	0	3	30	70	100
2	IT	PC		Java Programming	3	0	0	3	3	0	0	3	30	70	100
3	H&S	BS		Probability and Statistics	3	0	0	3	3	0	0	3	30	70	100
4	IT	PC		Database Management Systems	3	0	0	3	3	0	0	3	30	70	100
5	CSE	BS		Discrete Mathematics	2	1	0	3	2	1	0	3	30	70	100
6	IT	PC		Digital Electronics Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
7	IT	PC		Java Programming Lab	0	0	2	2	0	0	4	4	30	70	100
8	IT	PC		Database Management Systems Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
TOTAL					**14**	**1**	**5**	**20**	**14**	**1**	**10**	**25**	**240**	**560**	**800**
9	H&S	MC		Value Ethics & Gender culture	2	0	0	2	2	0	0	2	30	70	100
10	H&S	MC		Design Thinking	1	0	0	1	1	0	0	1	30	70	100

II B. Tech (IT) - II Semester

S.No	BOS	Group	Course Code	Course Name	Credits				Hours				Int.	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	IT	PC		Design and Analysis of Algorithms	3	0	0	3	3	0	0	3	30	70	100
2	IT	PC		Computer Organization	3	0	0	3	3	0	0	3	30	70	100
3	H&S	HS		Economics & Accounting for Engineers	3	0	0	3	3	0	0	3	30	70	100
4	IT	PC		Data Communication & Computer Networks	3	0	0	3	3	0	0	3	30	70	100
5	CSE	PC		Operating systems	2	1	0	3	2	1	0	3	30	70	100
6	IT	PC		Design and Analysis of Algorithms using Java Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
7	IT	PC		Operating systems and Sci Lab	0	0	2	2	0	0	4	4	30	70	100
8	IT	PC		Data Communication & Computer Networks Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
TOTAL					**14**	**1**	**5**	**20**	**14**	**1**	**10**	**25**	**240**	**560**	**800**
9	H&S	MC		Environmental Science	2	0	0	2	2	0	0	2	30	70	100

III B. Tech (IT) - I Semester

S.No	BOS	Group	Course Code	Course Name	Credits				Hours				Int.	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	IT	PC		Software Engineering	3	0	0	3	3	0	0	3	30	70	100
2	CSE	PC		Micro Controllers & IoT Applications	2	1	0	3	2	1	0	3	30	70	100
3	IT	PC		Web Programming	3	0	0	3	3	0	0	3	30	70	100
4	IT	OE		**Open Elective–1**	3	0	0	3	3	0	0	3	30	70	100
5	IT	PE		**Professional Elective – 1**	3	0	0	3	3	0	0	3	30	70	100
6	CSE	PC		MC & IoT Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
7	IT	PC		Web Programming Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
8	IT	PC		Python & R Programming Lab	0	0	2	2	0	0	4	4	30	70	100
				TOTAL	**14**	**1**	**5**	**20**	**14**	**1**	**10**	**25**	**240**	**560**	**800**
9	H&S	MC		Constitution of India	2	0	0	2	2	0	0	2	30	100	100

PROFESSIONAL ELECTIVE – 1				
S. No.	BOS	Group	Course Code	COURSE
1	CSE	PE		Data Warehousing and Data Mining
2	CSE	PE		Principles of Programming Languages
3	IT	PE		Advanced Computer Networks
4	IT	PE		Computer Graphics

OPEN ELECTIVE – 1				
S. No.	BOS	Group	Course Code	COURSE
1	CSE	OE		Artificial Intelligence

III B. Tech (IT) - II Semester

S.No	BOS	Group	Course Code	Course Name	Credits				Hours				Int.	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	H&S	HS		Fundamentals of Management & Entrepreneurship	3	0	0	3	3	0	0	3	30	70	100
2	IT	PC		Machine Learning	2	1	0	3	2	1	0	3	30	70	100
3	IT	PC		Unified Modeling Language	3	0	0	3	3	0	0	3	30	70	100
4	IT	OE		**Open Elective – 2**	3	0	0	3	3	0	0	3	30	70	100
5	IT	PE		**Professional Elective - 2**	3	0	0	3	3	0	0	3	30	70	100
6	IT	PC		Unified Modeling Language Lab	0	0	1.5	1.5	0	0	3	3	30	70	100
7	IT	PC		Machine Learning Lab	0	0	1.5	1.5	0	0	3	4	30	70	100
8	IT	SPW		Mini Project with Seminar	0	0	2	2	0	0	4	3	30	70	100
TOTAL					**14**	**1**	**5**	**20**	**14**	**1**	**10**	**25**	**240**	**560**	**800**
9	IT	MC		Summer Internship	0	0	0	0	0	0	0	0	0	0	100

PROFESSIONAL ELECTIVE – 2				
S. No.	BOS	Group	Course Code	COURSE
1	IT	PE		Unix Programming
2	IT	PE		Automata and Compiler Design
3	IT	PE		Distributed Database and Systems
4	IT	PE		Agile Methodologies

OPEN ELECTIVE – 2				
S. No.	BOS	Group	Course Code	COURSE
1	CSE	OE		Human Computer Interaction

IV B. Tech (IT) - I Semester

S.No	BOS	Group	Course Code	Course Name	Credits				Hours				Int.	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	IT	PC		Full Stack Development	2	1	0	3	2	1	0	3	30	70	100
2	IT	PC		Middleware Technologies	3	0	0	3	3	0	0	3	30	70	100
3	IT	OE		**Open Elective – 3**	3	0	0	3	3	0	0	3	30	70	100
4	IT	PE		**Professional Elective - 3**	3	0	0	3	3	0	0	3	30	70	100
5	IT	PE		**Professional Elective - 4**	3	0	0	3	3	0	0	3	30	70	100
6	IT	PC		Full Stack Development Lab	0	0	2	2	0	0	4	4	30	70	100
7	IT	PC		MWT Lab	0	0	2	2	0	0	4	4	30	70	100
8	IT	SPW		Project Work(Phase-I)	0	0	6	6	0	0	12	12	30	70	100
TOTAL					**14**	**1**	**10**	**25**	**14**	**1**	**20**	**35**	**240**	**560**	**800**

PROFESSIONAL ELECTIVE – 3				
S. No.	BOS	Group	Course Code	COURSE
1	IT	PE		Software Testing Methodologies
2	IT	PE		Network Programming
3	IT	PE		Information Retrieval Systems
4	CSE	PE		Green Computing

PROFESSIONAL ELECTIVE – 4				
S. No.	BOS	Group	Course Code	COURSE
1	IT	PE		Deep Learning
2	IT	PE		Soft Computing
3	CSE	PE		Cyber Security
4	CSE	PE		Cloud Computing

OPEN ELECTIVE – 3				
S. No.	BOS	Group	Course Code	COURSE
1	IT	OE		Data Science

IV B. Tech (IT) - II Semester

S.No	BOS	Group	Course Code	Course Name	Credits				Hours				Int.	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	IT	PC		Software Project Management	2	1	0	3	2	1	0	3	30	70	100
2	IT	PE		**Professional Elective – 5**	3	0	0	3	3	0	0	3	30	70	100
3	IT	PE		**Professional Elective – 6**	3	0	0	3	3	0	0	3	30	70	100
4	IT	SPW		Project Work (Phase II)	0	0	6	6	0	0	12	12	30	70	100
TOTAL					**8**	**1**	**6**	**15**	**8**	**1**	**12**	**21**	**120**	**280**	**400**

PROFESSIONAL ELECTIVE – 5				
S. No.	BOS	Group	Course Code	COURSE
1	CSE	PE		Image and Video Processing
2	IT	PE		Embedded Systems
3	IT	PE		Cyberforensics
4	IT	PE		E Commerce

PROFESSIONAL ELECTIVE – 6				
S. No.	BOS	Group	Course Code	COURSE
1	IT	PE		Essentials of Big Data Programming
2	IT	PE		Speech and Natural Language Processing
3	IT	PE		Storage Area Networks
4	IT	PE		Design Patterns

Professional Elective Threads

Elective/Thread	Systems and Software Architecture	Programming	Data Science and Machine Learning	Applications and Networking
Professional Elective 1(III-I)	Computer Graphics	Principles of Programming Languages	Data Warehousing and Data Mining	Advanced Computer Networks
Professional Elective 2 (III-II)	Automata and Compiler Design	Unix Programming	Distributed Database and Systems	Agile Methodologies
Professional Elective 3 (IV-I)	Network Programming	Green Computing	Information Retrieval Systems	Software Testing Methodologies
Professional Elective 4 (IV-I)	Soft Computing	Cloud Computing	Deep Learning	Cyber Security
Professional Elective 5 (IV-II)	Embedded Systems	Image and Video Processing	Cyberforensics	E Commerce
Professional Elective 6 (IV-II)	Storage Area Networks	Speech and Natural Language Processing	Essentials of Big Data Programming	Design Patterns

Open Electives:

Open Elective 1 (III Yr I Sem)	Artificial Intelligence
Open Elective 2 (III Yr II Sem)	Human Computer Interaction
Open Elective 3 (IV Yr I Sem)	Data Science

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DIGITAL LOGIC DESIGN

Course Code: **L/T/P/C:**

II Year I Semester

Course Objectives:

1. Comprehend different number systems including the binary system and Boolean algebraic principles.
2. Create minimal realizations of single and multiple output Boolean functions;
3. Design and analyze combinational circuits using medium scale integrated (MSI) components, including arithmetic logic units;
4. Apply strategies for state minimization, state assignment, for the implementation of synchronous Finite State Machines
5. Design of Combinational Programmable Logic Devices (CPLDs) like PROM, PAL, and PLA and develop HDL Models for Logic Circuits.

Course Outcomes:

1. Apply knowledge of fundamental Boolean principles and manipulation to design Logic Circuits.
2. Apply various techniques of Boolean function simplification to create minimal expressions.
3. Create combinational circuits for a specified behavior with minimal specification.
4. Synthesize Sequential circuits with minimal states.
5. Realize combinational circuitry using Combinational PLDs and develop & test HDL models of Logic Circuits.

UNIT I

Binary Systems: Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Complements, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic.

Boolean Algebra And Logic Gates: Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operations, Digital Logic Gates, Integrated Circuits.

UNIT II

Gate-Level Minimization: The Map method, Four-variable map, Five-variable map, Product of Sum's simplifications, Don't care conditions, NAND and NOR implementation, other two level implementations, Exclusive-OR Function.

UNIT III

Combinational Logic: Combinational Circuits, Analysis Procedure, Design Procedure, Binary Adder - Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers.

UNIT IV

Synchronous Sequential Logic: Sequential Circuits, Latches, Flip-Flops, Analysis of clocked sequential circuits, State Reduction and Assignment, Design Procedure.

Registers and Counters: Registers, Shift registers, Ripple Counters, Synchronous Counters, other counters.

UNIT V

Memory and Programmable Logic: Introduction, Random Access Memory, Memory decoding, Error detection and correction, Read only Memory, Programmable Logic Array, Programmable Array Logic, Sequential Programmable Devices.

Hardware Description Language: Hardware Description Language, Definition, Structural Definition of HDL, HDL models for Combinational circuits, HDL for models for Sequential circuits.

Teaching methodologies:

- Power Point Presentations
- Tutorial Sheets
- Assignments

Text Books:

1. Digital Design with an Introduction to the Verilog HDL – Fifth Edition, M. Morris Mano, Pearson Education.
2. Fundamentals of Logic Design – Roth, 7th Edition, Thomson.

References:

1. Switching and Finite Automata Theory by ZviKohavi, Tata Mc Graw Hill.
2. switching and Logic Design – CVS Rao, Pearson Education
3. Digital Principles and Design – Donald D.Givone, Tata Mc Graw Hill.
4. Fundamentals of Digital Logic and Micro Computer Design, 5th Edition, M.Rafiquzzaman (John Willey)

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

JAVA PROGRAMMING

Course Code: **L/T/P/C :**

II Year I Semester

Course Objectives: The students will learn the following:

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

Course Outcomes: Upon the successful completion of the course, the student will be able to:

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

UNIT I

OBJECT ORIENTED THINKING

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

Variables, Primitive data types, Identifiers- Naming Conventions, Keywords, Literals, Operators- Binary, Unary and Ternary, Expressions, Primitive Type conversion and casting, flow of control- branching, conditional, loops.

UNIT II

CLASSES, INHERITANCE, POLYMORPHISM

Classes and Objects- Classes, Objects, creating objects, methods, constructors-constructor overloading, cleaning up unused objects- Garbage collector, class variable and methods- static keyword, this keyword, arrays, Command linearguments, NestedClasses

Strings: String, StringBuffer, StringTokenizer

Inheritance and Polymorphism- Types of Inheritance, deriving classes using extends keyword, super keyword, Polymorphism – Method Overloading, Method Overriding, final keyword, abstract classes.

UNIT III

INTERFACES, PACKAGES, EXCEPTIONS

Interfaces: Interface, Extending interface, interface Vs Abstract classes.

Packages- Creating Packages, using Packages, Access protection, java I/O package.

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

UNIT IV

MULTITHREADING, COLLECTIONS

java.lang.Thread, the main Thread, creation of new Threads, Thread priority, multithreading- using isalive() and join(), Synchronization, suspending and resuming Threads, Communication between Threads.Exploring java.io, Exploring java.util

Collections: Overview of Collection Framework : ArrayList, LinkedList, Vector, HastSet,

TreeSet, HashMap, HastTable, TreeMap, Iterator, Comparator

UNIT V
APPLETS, AWT AND SWINGS

Applet class, Applet structure, an example Applet program, Applet life cycle.

Event Handling- Introduction, Event Delegation Model, Java.awt.event Description, Adapter classes, Innerclasses.

Abstract Window Toolkit: Why AWT?,java.awt package, components and containers, Button, Label, Checkbox, Radio buttons, List boxes, choice boxes, Text field and Text area, container classes, Layout Managers.

Swing: Introduction, JFrame, JApplet, JPanel, Components in swings, JList and JScroll Pane, Split Pane, JTabbed Pane, Dialog Box, Pluggable Look andfeel.

Text/Reference Books:

1. Java: The Complete Reference, 10th edition, Herbert Schildt, McgrawHill.
2. Java Fundamentals: A Comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.
3. Java for Programming, P.J.Dietel PearsonEducation
4. Object Oriented Programming through Java, P.Radha Krishna, UniversitiesPress.
5. Thinking in Java, Bruce Eckel, PearsonEducation
6. Programming in Java, S.Malhotra and S.Choudhary, Oxford University Press

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
Probability and Statistics

Code: GR20 **L/T/P/C**

Course objectives

On completion of this Course, the student shall be able to:

1. Interpret the measures of central tendency and dispersion.
2. Distinguish between explanatory and response variables and analyze data using correlation and regression.
3. Applyvarious probability distributions.
4. Apply tests of hypothesis.
5. Employ basic analysis of time series data.

Course Outcomes

The expected outcomes of the Course are:

1. Compute and interpret descriptive statistics.
2. Evaluate random processes which occur in engineering applications governed by the Binomial, Poisson, Normal and Exponential distributions.
3. Forecast the models using Regression Analysis.
4. Apply Inferential Statistics to make predictions or judgments about the population from which the sample data is drawn.
5. Interpret Time series data.

Module 1: Basic Statistics, Correlation and Regression
Measures of central tendency and moments.
Correlation(Karl-Pearson's correlation coefficient and Spearman's Rank correlation (Statements of their properties and problems)), Covariance, Simple and Multiple Linear Regression of three variables (Statements of properties of Regression coefficients and problems).

Module 2: Discrete and Continuous Probability Distributions
Binomial, Poisson,Normal, Exponential and Gamma distribution functions (definition, real life examples, Statements of their Mean and Variance and problems), evaluation of statistical parameters for Binomial, Poisson and Normal distributions.

Module 3:Testing of Hypothesis-1(Large sampling)
Concept of Sampling distribution and Standard error; tests for single proportion, difference of proportions, single mean, difference of means and Chi-square test for independence of attributes.Estimation of confidence interval for population mean and population proportions.

Module 4:Testing of Hypothesis-2(Small Sampling)
Test for single mean, difference of means, Population Variance, ratio of variances, ANOVA 1-way and 2-way. Estimation of confidence interval for Population mean.

Module 5: Time Series analysis
Components of Time series analysis, Estimation of trend by method of moving averages, fitting of various mathematical curves (Straight line, Second degree parabola, Exponential and Power curves) and Estimation of seasonal component by Ratio to trend method and Ratio to Moving Averages method.

Text / References:

1. S. C.Gupta&V.K.Kapoor, “Fundamentals of Mathematical Statistics”, S.Chand.
2. Richard A.Johnson,” Probability and Statistics for Engineers”, Pearson Education.
3. Jay Devore, “Probability and Statistics for Engineering and the Sciences”,Cengage learning.
4. Murat Kulahci,“Time series analysis and forecasting by example*”*,John Wiley & Sons
5. S. C.Gupta&V.K.Kapoor, “Fundamentals of Applied Statistics”, S.Chand.

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

DATABASE MANAGEMENT SYSTEMS

CourseCode:GR20 **L/T/P/C :**

II Year I Semester

Course Objectives:

1. To understand the different issues involved in the design and implementation of a database system.
2. To understand Structured Query Language for manipulating the Data.
3. To study the physical, conceptual and logical database designs
4. To provide concepts of Transaction, Concurrency and Recovery Management Strategies of a DBMS
5. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modelling, designing, and implementing a DBMS.

Course Outcomes:

1. Identify the role of Database System Applications and the design issues related.
2. Design the logical model for the applications and apply indexing techniques.
3. Construct a Database Schema, manipulate data using a SQL.
4. Can apply the Schema Refinement techniques for a database design for optimized access.
5. For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.

UNIT I

INTRODUCTION TO DATABASE AND SYSTEM ARCHITECTURE

Database Systems and their Applications, Database Vs File System, View of Data, Data Models, Database Languages- DDL and DML, Transaction Management, Database users and Administrators, Database System Structure.

Introduction to Database Design: ER Diagrams, Entities, Attributes and Entity sets, Relationships and Relationship set, Extended ER Features, Conceptual Design with the ER Model, Logical database Design.

UNIT II

SQL

Queries and Constraints: SQL Data Definition**,** Types of SQL Commands, Form of Basic SQL Query, SQL Operators, Set Operators, Nested Queries, Aggregate Operators, NULL values, Integrity Constraints Over Relations, Joins, Introduction to Views, Destroying / Altering Tables and Views, Cursors, Triggers and Active Databases.

UNIT III

RELATIONAL MODEL

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

Storage and Indexing: File Organizations and Indexing-Overview of Indexes, Types of Indexes, Index Data Structures, Tree structured Indexing, Hash based Indexing.

UNIT IV

SCHEMA REFINEMENT AND NORMAL FORMS

Introduction to Schema Refinement, Functional Dependencies, Reasoning about FD, Normal Forms, Properties of Decomposition.

UNIT V

TRANSACTION MANAGEMENTTRANSACTIONS

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for Serializability.

Concurrency Control: Lock based Protocols, Timestamp based protocols **Recovery System:** Recovery and Atomicity, Log based recovery, Shadow Paging, Recovery with concurrent Transactions, Buffer Management.

Text/Reference Books

1. "Data base Management Systems", Raghurama Krishnan, Johannes Gehrke,TATA McGraw Hill 3rdEdition
2. "Data base System Concepts", Silberschatz, Korth, McGraw hill, Vedition.
3. "Introduction to Database Systems", C.J.Date PearsonEducation.
4. "Database Systems design, Implementation, and Management", Rob & Coronel5th Edition.
5. "Database Management Systems", P. Radha Krishna HI-TECH Publications 2005.
6. "Database Management System", ElmasriNavate PearsonEducation.
7. "Database Management System", Mathew Leon,Leo

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DISCRETE MATHEMATICS

Course Code: **L/T/P/C**

II Year I Semester

Course Objectives: The Objectives of this course is to provide the student:

1. Use mathematically correct terminology and notation.
2. Construct correct direct and in direct proofs.
3. Use division into cases in a proof.
4. Use counter examples.
5. Apply logical reasoning to solve a variety of problems.

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

1. For a given logic sentence express it in terms of predicates, quantifiers, and logical connectives.
2. For a given a problem, derive the solution using deductive logic and prove the solution based onlogical inference.
3. For a given a mathematical problem, classify its algebraic structure.
4. Evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
5. Develop the given problem as graph networks and solve with techniques of graph theory.

UNIT I
MATHEMATICAL LOGIC

Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, equivalence implication, Normal forms.

Predicates: Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction.

UNIT II
SET THEORY

Properties of binary Relations, equivalence, compatibility and partial ordering relations, Hassediagram.

Functions: Inverse Function Composite of functions, recursive Functions, Lattice and its Properties, Pigeon hole principles and its application.

Algebraic structures: Algebraic systems Examples and general properties, Semi groups and monads, groups sub groups' homomorphism, Isomorphism.

UNIT III
ELEMENTARY COMBINATORICS

Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion.

UNIT IV

RECURRENCE RELATION: Generating Functions, Function of Sequences Calculating Coefficient of generating function, Recurrence relations, solving recurrence relation by substitution and Generating funds. Characteristics roots solution of Inhomogeneous Recurrence Relation.

UNIT V

GRAPH THEORY

Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs
Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

Text /Reference Books:

1. Discrete and Combinational Mathematics- An Applied Introduction-5th Edition– Ralph.P.Grimaldi.PearsonEducation
2. Discrete Mathematical Structures with applications to computer science Trembly J.P. &Manohar.P,TMH
3. Mathematical Foundations for Computer Science Engineers,JayantGanguly,Pearson Education
4. Discrete Mathematics and its Applications, Kenneth H. Rosen,FifthEdition.TMH.
5. Discrete Mathematics with Applications, ThomasKoshy,Elsevier
6. Discrete Mathematical Structures, BernandKolman, Roberty C. Busby, Sharn Cutter Ross, Pearson

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DIGITAL ELECTRONICS LAB

CourseCode:GR20 **L/T/P/C:**
II Year I Semester

Course Objectives: The Objective of this course is to provide the student

1. Introduction to digital fundamental techniques and process in logic design
2. Visualization of digital combinational circuits using VHDL
3. Skill of seeing the equations and code developments in design of digital logic circuits
4. To understand the concept of VHDL fundamentals
5. To understand the counters and registers design with VHDL programming

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

1. Comprehend the fundamentals digital theory to enable the process of logical design
2. Analyze the concept of design of digital combinational circuits using VHDL programming
3. Know the origin of sequential circuits design using VHDL
4. Acquaint with binary to grey and parity checker
5. Discriminate in digital counters and registers

1. DESIGN AND SIMULATION OF COMBINATIONAL CIRCUITS USINGVHDL

Experiment 1:Realization of Gates
Experiment 2:Half adder, Full adder
Experiment 3:Magnitude comparator
Experiment 4:Encoder
Experiment 5:Multiplexer
Experiment 6:Demultiplexer
Experiment 7: Excess-3 code Converter
Experiment 8: Parity Generator
Experiment 9: Programmable Logic Array

2. DESIGN AND SIMULATION OF SEQUENTIAL CIRCUITS USING VHDL

Experiment 10: S-R Flip-Flops
Experiment 11:Left Shift Register
Experiment 12:Serial to Parallel Shift Register
Experiment 13: Binary Counter
Experiment 14:Asynchronous BCD Up Counter
Experiment 15:Synchronous Down Counter

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

Text Books

1. Digital Design –Fourth Edition, M. Morris Mano, Pearson Education.
2. Fundamentals of Logic Design –Roth, 5th Edition, Thomson.

References Books

1. Switching and Finite Automata Theory by ZviKohavi, Tata McGraw Hill.
2. Fundamentals of Digital Logic with VHDL Design, Stephen Brown, Zvonko Vranesic, TataMcGraw Hill, Indian edition.
3. Switching and Logic Design –CVS Rao, Pearson Education

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

JAVA PROGRAMMING LAB

CourseCode: **L/T/P/C :**

II Year I Semester

Course Objectives: The students will learn the following

1. Understand Object Oriented Programming concepts and apply them in problem solving.
2. Get knowledge on Abstract classes, Interfaces and Multithreading
3. Developing java applications and handle theexceptions.
4. Design applications for solving real world problems using Collection framework
5. Building java GUI based applications using Applets, AWT and Swing.

Course Outcomes: Upon the successful completion of the course, the student will be able to:

1. Analyze a problem, identify and define the computing requirements appropriate to its solution using object-oriented programmingconcepts.
2. Design the applications using Inheritance, Polymorphism and Synchronization concepts
3. Handle exceptions at Compile time and Run time
4. Solve the real-world problems using Java Collection framework.
5. Develop GUI applications using Applets, AWT and Swings

Task-1: Write java programs that implement the following

a) Constructor
b) Parameterizedconstructor
c) Methodoverloading
d) Constructoroverloading.

Task-2:

a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is apalindrome.
b) Write a Java program for sorting a given list of names in ascendingorder.
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 ofjava.util)

Task-3: Write java programs that uses the following keywords

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

Task-4:

a) Write a java program to implement methodoverriding
b) Write a java program to implement dynamic methoddispatch.
c) Write a Java program to implement multipleinheritance.
d) Write a java program that uses accessspecifiers.

Task-5:

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 inbytes.

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

Task-6:

a) Write a Java program for handling CheckedExceptions.
b) Write a Java program for handling UncheckedExceptions.

Task- 7:

a) Write a Java program that creates three threads. First thread displays "GoodMorning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every threeseconds.
b) Write a Java program that correctly implements producer consumer problem using the concept of inter threadcommunication.

Task-8:

Write a program illustrating following collections framework
a) ArrayList b) Vector c) HashTable d) Stack

Task-9:

a) Develop an applet that displays a simplemessage.
b) Develop an applet that receives an integer in one text field and compute its factorial value and return it in another text field, when the button named "Compute" isclicked.
c) 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.

Task-10:

a) Write a Java program for handling mouseevents.
b) Write a Java program for handling keyevents.

Task-11:

a) Write a program that creates a user interface to perform integer divisions. Theuser enters two numbers in the text fields Num1 and Num 2.
b) The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1or Num2 were not an integer, the program would throw Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception and display the exeptionin a message dialogbox.

Task -12:

a) Write a java program that simulates 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 andovals.

Task -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/Reference Books:

1. Java: The Complete Reference, 10th edition, Herbert Schildt, McgrawHill.
2. Java Fundamentals- A Comprehensive introduction, Herbert schildtand Dale skrien, TMH.
3. Java for programming, P.J.Dietel Pearson education (OR) Java: How to Program P.J.Dietel and H.M.Dietel,PHI
4. Object Oriented Programming through java, P.Radha Krishna, UniversitiesPress.
5. Thinking in Java, Bruce Eckel, PearsonEducation
6. Programming in Java, S.Malhotra and S.Choudhary, Oxford University Press.

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

DATABASE MANAGEMENT SYSTEMS LAB

CourseCode:GR20 **L/T/P/C :**

II Year I Semester

Course Objectives: The Objectives of this course is to provide the student:

1. Develop the logical design of the database using data modeling concepts such as Relational model
2. Infer the data models and use of queries in retrieving the data.
3. Create a relational database using a relational database package.
4. Manipulate a database using SQL.
5. Render the concepts of database system structure.

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

1. Construct the schema of the database and modify it.
2. Compile a query to obtain the aggregated result from the database.
3. Speculate the concepts of various database objects.
4. Compare the use of procedure and function in database.
5. Use triggers and packages to create applications in the database.

Task-1:

DDL commands (Create, Alter, Drop, Truncate)

1. Create a table EMP with the following structure.

Name	Type
EMPNO	NUMBER(6)
ENAME	VARCHAR2(20)
JOB	VARCHAR2(10)
MGR	NUMBER(4)
DEPTNO	NUMBER(3)
SAL	NUMBER(7,2)

2. Add a column commission to the emptable. Commission should be numeric with null valuesallowed.
3. Modify the column width of the job field of emptable.
4. Create dept table with the following structure.

Name	Type
DEPTNO	NUMBER(2)
DNAME	VARCHAR2(10)
LOC	VARCHAR2(10)

DEPTNO as the primary key

5. Add constraints to the emptable that is empno as the primary key and deptno as the foreignkey.
6. Addconstraintstotheemptabletochecktheempnovaluewhileentering(i.e)empno>
100. Salary value by default is 5000, otherwise it should accept the values from the user.
7. Add columns DOB to the emp table. Add and drop a column DOJ to the emp table.

Task-2: DML COMMANDS (Insert, Update, Delete)

1. Insert 5 records into dept Insert few rows and truncate those from the emp1 table and also dropit.
2. Insert 11 records into emptable.
3. Update the emptable to set the value of commission of all employees to Rs1000/- who are working asmanagers.
4. Delete only those who are working as supervisors.
5. Delete the rows whose empnois7599.

Task-3:TCL COMMANDS (Save Point, Rollback Commit)

Task-4: DQL COMMAND (Select)- SQL Operators and Order by Clause

1. List the records in the emptable order by salary in descending order.
2. Display only those employees whose deptnois30.
3. Display deptno from the table employee avoiding the duplicated values.
4. List all employee names, salary and 15% rise in salary. Label the column as payhike.
5. Display the rows whose salary ranges from 15000 to30000.
6. Display all the employees in dept 10 and 20 in alphabetical order of names.
7. List the employee names who do not earncommission.
8. Display all the details of the records with 5-character names with 'S' as starting character.
9. Display joining date of all employees in the year of1998.
10. List out the employee names whose salary is greater than 5000 and less than6000

Task-5: SQL Aggregate Functions, Group By clause, Having clause

1. Count the total records in the emptable.
2. Calculate the total and average salary of the employee.
3. Determinethemaxandminsalaryandrenamethecolumnasmax-salaryandmin_salary.
4. Find number of departments in employee table.
5. Display job wise sum, average, max, minsalaries.
6. Display maximum salaries of all the departments having maximum salary >2000
7. Display job wise sum, avg, max, min salaries in department 10 having average salary is greater than 1000 and the result is ordered by sum of salary in descending order.

Task-6: SQL Functions

1. Display the employee name concatenate with employee number.
2. Display half of employee name in upper case and half in lowercase.
3. Display the month name of date "14-jul-09" infull.
4. Display the Date of joining of all employees in the format "dd-mm-yy".
5. Display the date two months after the Date of joining of employees.
6. Display the last date of that month in"05-Oct-09".
7. Display the rounded date in the year format, month format, day format in the employee
8. Display the commissions earned by employees. If they do not earn commission, display it as "NoCommission".

Task-7: Nested Queries

1. Find the third highest salary of an employee.
2. Display all employee names and salary whose salary is greater than minimum salary of the company and job title starts with 'M'.
4. Write a query to display information about employees who earn more than any employee in dept30.
5. Display the employees who have the same job as Jones and whose salary is greater than or equal to the salary of Ford.

6. List out the employee names who get the salary greater than the maximum salaries of dept with deptno 20,30.
7. Display the maximum salaries of the departments whose maximum salary is greater than9000.
8. Create a table employee with the same structure as the table empand insert rows into the table using select clauses.
9. Create a manager table from the emp table which should hold details only about the managers.

Task-8

Joins, Set Operators.

1. Display all the employees and the departments implementing a left outer join.
2. Display the employee name and department name in which they are working implementing a full outerjoin.
3. Write a query to display their employee names and their managers' name and salary for every employee.
4. Write a query to output the name, job, empno, deptname and location for each dept, even if there are noemployees.
5. Display the details of those who draw the samesalary.

Task-9: Views

1. Create a view that displays the employee id, name and salary of employees who belong to 10^{th}department.
2. Create a view with read only option that displays the employee name and their department name.
3. Display all the views generated.
4. Execute the DML commands on views created and drop them

Task-10: Practices on DCL commands, Sequence and indexes.

Task-11:

1. Write a PL/SQL code to retrieve the employee name, join date and designation of an employee whose number is given as input by the user.
2. Write a PL/SQL code to calculate tax of employee.
3. Write a PL/SQL program to display top ten employee details based on salary using cursors.
4. Write a PL/SQL program to update the commission values for all the employees' with salary less than 2000, by adding 1000 to the existing values.

Task-12:

1. Write a trigger on employee table that shows the old and new values of employee name after updating on employee name.
2. Write a PL/SQL procedure for inserting, deleting and updating the employee table.
3. Write a PL/SQL function that accepts the department number and returns the total salary of that department.

Task-13:

1. Write PL/SQL program to handle predefined exceptions.
2. Write PL/SQL program to handle user defined exception.
3. Write a PL/SQL code to create

a. Package specification

b. Package body to insert, update, delete and retrieve data on emptable.

Task-14: Table locking (Shared Lock and Exclusive lock)

Text/Reference Books

1. The Complete Reference,3rd edition by James R.Groff, Paul N.Weinberg, AndrewJ. Oppel
2. SQL & PL/SQL for Oracle10g, Black Book,Dr.P.S.Deshpande.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

VALUE ETHICS AND GENDER CULTURE

CourseCode:GR20 **L/T/P/C :**

II Year I Semester

Course objectives

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

Course Outcomes

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

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

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

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

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

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

Text Books

1. Professional Ethics: R. Subramanian, Oxford University Press, 2015.

2. Ethics in Engineering Practice & Research, Caroline Whit beck, 2e, Cambridge University Press 2015.

3. A Bilingual Textbook on Gender" written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by Telugu Akademi, Hyderabad,Telangana State in the year 2015.

Reference Books

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012

2. Abdulali Sohaila. "I Fought For My Life…and Won."Available online at: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/

3. Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S Pritchard, Michael J Rabins, 4e , Cengage learning, 2015.

4. Business Ethics concepts & Cases: Manuel G Velasquez, 6e, PHI, 2008

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DESIGN THINKING

CourseCode: **L/T/P/C**

II Year I Semester

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DESIGN AND ANALYSIS OF ALGORITHMS

Course code:

II Year II Semester

Course Objectives:

Upon completion of this course, students will be able to do the following:

1. Recall algorithm definition, its properties & performance analysis.
2. Demonstrate a familiarity with major algorithms and data structures.
3. Apply important algorithmic design paradigms and methods of analysis.
4. Evaluate efficient algorithms in common engineering design situations.
5. Understanding performances of various techniques.

Course Outcomes:

Students who complete the course will have demonstrated the ability to do the following:

1. Distinguish various performances of algorithms.
2. Illustrating Divide and Conquer Design Paradigm algorithms.
3. Examining various algorithms based on Dynamic programming paradigm.
4. Discriminate greedy approach and back tracking algorithms.
5. Demonstrate branch and bound problems and Distinguish problems related to various complexity classes.

UNIT I

Introduction to algorithms:

Definition of an algorithm, properties of an Algorithm, performance analysis--space complexity & time complexity, asymptotic notations: big oh notation, omega notation, theta notation, little oh notation & little omega notation.

UNIT II

Disjoint sets: disjoint set Representation, Operations, union and find algorithms.

Divide and Conquer

Divide and conquer: General method, applications, binary search, Quick sort, merge sort, strassen's matrix multiplication.

UNIT III

Dynamic Programming:

General method, applications, optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, travelling salesperson problem, optimal rod-cutting-Top down approach and bottom up approach.

UNIT IV

Greedy method: General method, applications-- job sequencing with deadlines, 0/1 knapsack problem, minimum cost spanning trees, single source shortest path problem, activity selection problem.

Backtracking: General method, applications, n-queen problem, sum of subsets problem, Hamiltonian cycles.

UNIT V

Branch and Bound:

General method, applications, travelling sales person problem, 0/1 knapsack problem: LC branch and bound solution, FIFO branch and bound solution

Complexity Classes: non deterministic algorithms, deterministic algorithms, relationship between P, NP, NP-completeness, circuit-satisfiability problem, 3-CNF satisfiability.

Textbooks:

1. Ellis Horowitz, SatrajSahni and S Rajasekharam, Fundamentals of Computer Algorithms, Galgotia publishers 2. T H Cormen, C E Leiserson, and R L Rivest, Introduction to Algorithms, 3rdEdn, Pearson Education

2. Cormen, Thomash H., Leiserson, Charles E., Rivest, Ronald L., & Stein, Clifford. Introduction to Algorithms. 3rd Edition. 2010.

3. Goodrich, Michael T. & Roberto Tamassia, Algorithm Design, Wiley Singapore Edition, 2002.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER ORGANIZATION

Course Code: **L/T/P/C:**

II Year II Semester

Course Objectives:

1. Comprehend operational concepts and understand register organization within a basic computer system
2. Analyze the basic computer organization and understand the concepts of Micro programmed control
3. Understand the design aspects of Central processing unit organization
4. Understand various algorithms for arithmetic operations within a computer system and communication with I/O devices and standard I/O interfaces.
5. Study the hierarchical memory system including cache memory and virtual memory along with the design of Multiprocessor systems using various interconnection structures.

Course Outcomes:

1. Demonstrate knowledge of register organization of a basic computer system
2. Incorporate In-depth understanding of control unit organization and micro programmed control.
3. Understand the performance of central processing unit of a basic computer system.
4. Apply various algorithms to perform arithmetic operations and propose suitable hardware and appraise various methods of communications with I/O devices.
5. Analyze and emphasize various communication media in the basic computer system using design of various memory structures and Multiprocessor systems.

UNIT I

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

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

UNIT II

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

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

UNIT III

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

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

UNIT IV

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

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

UNIT V

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

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

Text books:

1. Computer Systems Architecture – M.Moris Mano, 3rd Edition, Pearson/PHI
2. Computer Organization – Carl Hamacher, ZvonksVranesic, SafeaZaky, 5th Edition, McGraw Hill.

References:

1. Computer Organization and Architecture – William Stallings 7th Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 6th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, - SivaraamaDandamudi Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, 5th Edition Elsevier
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

Economics and Accounting for Engineers

CourseCode:GR20 **L/T/P/C :**

II Year II Semester

Course Objectives:

1. To provide the student with a clear understanding of demand analysis, elasticity of demand and demand forecasting;
2. To provide the insight on theory of productionand cost analysis.
3. To describe different types of markets and competition
4. To elaborate the different forms of organisation and different methods of pricing.
5. To make the students understand various capital budgeting techniques anddescribe fundamentals of accounting.

Course Outcomes:

After studying this course, students will be in a position to:

1. The student will be able to scan the economic environment.
2. To understand markets and competition
3. The student will be able to forecast demand of products through demand forecasting techniques.
4. The student will be able to plan the production levels in tune with maximum utilization of organizational resources and with maximum profitability.
5. To estimate the cost of products and decide the price of the products and services produced
6. To choose an appropriate form of organization.
7. The student will be able to analyze the profitability of various projects using capital budgeting techniques and will be able prepare the financial statements.

Unit-1:Introduction & Demand Analysis: ***Definition and Scope:***Introduction to Economics, 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-2: Production & Cost Analysis: ***Production Function*** – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, 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-3:Markets and Forms of Business organizations: ***Types of competition and Markets***, Features of Perfect competition, Monopoly and Monopolistic Competition. ***Pricing*****:**

Objectives and Policies of Pricing. Methods of Pricing. ***Business:***Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types.

Unit-4: Capital Budgeting: Capital and its significance, Types of Capital, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value (NPV) Method and Internal Rate of Return (IRR) (simple problems) and Profitability Index (PI)

Unit-5: Introduction to Financial Accounting: ***Accounting Concepts and Conventions*** - Double-Entry Book Keeping. ***Accounting Cycle:*** Journal, Ledger, Trial Balance, Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Text Books

1. Aryasri: Managerial Economics and Financial Analysis, TMH, 2009.
2. Managerial Economics: Analysis, Problems and Cases - P. L. Mehta, Edition, 13. Publisher, Sultan Chand, 2007.
3. Financial Accounting -1: S P Jain and K. L. Narang, Kalyani Publishers,2005.

Reference Books

1. Peterson, Lewis and Jain: Managerial Economics, Pearson, 2009
2. Mithani : Managerial Economics , HPH, 2009
3. Lipsey&Chrystel, Economics, Oxford University Press, 2009
4. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2009
5. Horngren : Financial Accounting, Pearson, 2009.
6. Dr. S. N. Maheswari and Dr. S.K. Maheshwari: Financial Accounting, Vikas, 2009.

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

DATA COMMUNICATION & COMPUTER NETWORKS

Course Code: GR20 **L/T/P/C :**

II Year II Semester

Course Objectives: The objectives of this course are to

1. Acquire the fundamental concepts of data communication, computer networks and understand the various transmission media and network topologies
2. Identify various error detection and correction techniques along with protocols related to data link layer
3. Understand various routing algorithms and problems in data transmission.
4. Recognize various transport protocols and different techniques of quality of service (QoS)
5. Comprehend application layer protocols

Course Outcomes: After completing this course the students will be able to

1. Appraise various network topologies and transmission media.
2. Apply framing methods and design error correction technique for specified problems
3. Compare various routing methods and apply them to solve transmission problems
4. Apply various transmission methods and techniques to improve the quality of service.
5. Design and implement different protocols in network design and implementation.

UNIT I

DATA COMMUNICATIONS: Components – Direction of Data flow, Networks: Types of Connections – Topologies – Categories of Networks – The Internet , Protocols and Standards – OSI model – TCP/IP protocol suite.

Physical layer: Transmission modes, Multiplexing, Transmission Media: Guided and Unguided, Switching: Circuit Switched Networks - Datagram Networks - Virtual Circuit Networks.

UNIT II

DATA LINK LAYER: Introduction, Framing, Error Detection and Correction: Parity – Hamming codes – CRCs – Checksum, Flow and Error Control: Noiseless Channels – Noisy Channels.

Medium Access sub layer: Random Access – ALOHA – CSMA – CSMA /CD – CSMA /CA, Controlled Access: Reservation – Polling – Token Passing, Channelization . IEEE Standards, Standard Ethernet 802.3, Wireless LAN 802.11 – Bluetooth 802.15

UNIT III

NETWORK LAYER: Logical Addressing - IPv4 - IPv6, Internetworking, Transition from IPv4 to IPv6 , Address mapping: ARP – RARP–BOOTP–DHCP, ICMP, IGMP, Uni-Cast Routing Protocols, Multicast Routing Protocols.

UNIT IV

TRANSPORT LAYER: Process to Process Delivery, UDP and TCP protocols, Data Traffic, Congestion, Congestion Control, Congestion Control in TCP, QoS, Techniques to Improve QoS, Integrated Services, Differentiated Services.

UNIT V

Application Layer: DNS - Domain name space -DNS in internet, Electronic mail, SMTP, FTP, WWW:Architecture – Web documents, HTTP, SNMP.

Text Books:

1. Data Communications and Networking, Behrouz A. Forouzan , Fourth Edition TMH, 2006.

2. Computer Networks, Andrew S Tanenbaum, 4th Edition. Pearson Education, PHI.

Reference Books:

1. Data communications and Computer Networks, P.C .Gupta, PHI.

2. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, Pearson Education.

3. Data and Computer Communication, William Stallings, Sixth Edition, Pearson Education, 2000

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

OPERATING SYSTEMS

CourseCode: **L/T/P/C**

II Year II Semester

Course Objectives: The Objectives of this course is to provide the student:

1. To understand main concepts of OS and to analyze the different CPU scheduling policies
2. To understand process synchronization and deadlock management.
3. To understand memory management and virtual memory techniques
4. To appreciate the concepts of storage and file management
5. To study OS protection and security concepts.

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

1. Explain functions and structures of operating system and differentiate among different OS types; Implement and analyse various process management conceptsand maximization of CPU throughput
2. Analyse synchronization problems and solutions; Design a deadlock management policy.
3. Optimize memory management for improved system performance.
4. Demonstrate disk management, implement disk scheduling and file system interface
5. Describe and frame protection and security policy for OS.

UNIT I

Operating System Overview: Objectives and functions, Computer System Architecture, Evolution of Operating Systems, System Services, System Calls, System Programs,OS Structure, Virtual machines.

Process Management: Process concepts, CPU scheduling-criteria, algorithms with evaluation,Preemptive/ Non-PreemptiveScheduling, Threads, Multithreading Models.

UNIT II

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

Deadlocks: Principles of deadlock–system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock.

UNIT III

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

Virtual Memory:Demand paging, page replacement algorithms, Allocation of Frames, Thrashing.

UNIT IV

Mass-storage structure: Overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management.

File System implementation: Access Methods, File system structure, file system implementation, directory implementation, allocation methods, free-space management.

UNIT V

Protection: Goals and Principles of Protection, Implementation of Access Matrix, Access control, Revocation of Access Rights.

Security: The Security problem, program threats, system and network threats, implementing security defenses.

TEXT / REFERENCE BOOKS:

- Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia StudentEdition.
- Operating Systems: Internals and Design Principles, 5th Edition, William Stallings, Prentice Hall ofIndia.
- Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, IrwinPublishing
- Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison- Wesley
- Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.
- Operating Systems, R. Elmasri, A. G. Carrick and D. Levine, Mc Graw Hill.

Operating Systems in depth, T. W. Doeppner, Wiley.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

DESIGN AND ANALYSIS OF ALGORITHMS USING JAVA LAB

Coursecode:

II Year II Semester

Course Objectives:

Upon completion of this course, students will be able to do the following

1. Measure and compare the performance of different algorithms.
2. Recall various programming concepts of JAVA.
3. Design and implement various algorithms in JAVA
4. Employ various design strategies for problem solving.
5. Explore the java standard API library to write complex programs.

Course Outcomes:

Students who complete the course will have demonstrated the ability to do the following:

1. Analyze the asymptotic behaviors of functions obtained by elementary composition of polynomials, exponentials and logarithmic functions
2. Apply different sorting algorithms using divide and conquer strategy.
3. Design and implement greedy and dynamic approach.
4. Build various graph algorithms to solve different problems.
5. Develop branch and bound technique algorithms and backtracking algorithms.

Week 1 :

Write a Java program that implements a multi-thread application that has three threads. First thread generates a random integer for every 1 second; second thread computes the square of the number and prints; third thread will print the value of cube of the number.

Week 2:

Demonstrate using Java how the divide -and- conquer method works to sort a given set of n integer elements using Quick Sort method and compute its time complexity. Read the numbers using random number generator.

Week 3:

Write a java program to implement greedy algorithm for job sequencing with deadlines.

Week 4:

Implement in Java, the 0/1 Knapsack problem using greedy approach.

Week 5:

Write a java program to implement Dijkstra’s algorithm for the Single source shortest path problem.

Week 6 :

Write a java program that implements Prim's algorithm to generate minimum cost spanning tree.

Week 7:

Write a java program that implements Kruskal's algorithm to generate minimum cost spanning tree

Week 8:

Implement All-Pairs Shortest Paths problem using Floyd's algorithm

Week 9:

Write a java program to implement Dynamic Programming algorithm for the 0/1 Knapsack problem.

Week 10:

Implement Travelling Sales Person problem using Dynamic programming.

Week 11:

Write a java program to implement the backtracking algorithm for the sum of subsets problem of a given set S = {Sl, S2,.....,Sn} of n positive integers whose SUM is equal to a given positive integer d. For example, if S ={1, 2,5,6, 8} and d= 9, there are two solutions {1,2,6}and {1,8}. Display a suitable message, if the given problem instance doesn't have a solution.

Week 12:

Write a java program to implement the backtracking algorithm for the Hamiltonian Circuits problem.

Textbooks:

T1. Ellis Horowitz, SatrajSahni and S Rajasekharam, Fundamentals of Computer Algorithms, Galgotia publishers 2. T H Cormen, C E Leiserson, and R L Rivest, Introduction to Algorithms, 3rdEdn, Pearson Education

T2. Goodrich, Michael T. & Roberto Tamassia, Algorithm Design, Wiley Singapore Edition, 2002.

T3. Java: The Complete Reference, 10th edition, Herbert Schildt, McgrawHill.

T4. Java Fundamentals- A Comprehensive introduction, Herbert schildtand Dale skrien, TMH.

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

OPERATING SYSTEMS AND SCI LAB

Course Code: **L/T/P/C :**

II Year II Semester

Course Objectives:

1. Demonstrate the core features of Operating Systems and Scilab.
2. Evaluate various Scheduling algorithms, memory management techniques.
3. Understand the file storage and organization concepts.
4. Explain of the syntax, semantics, data-types and library functions of numerical computing using SCILAB.
5. Implement simple mathematical functions/equations in numerical computing environment such as Scilab.

Course Outcomes:

1. Understand and analyze the various file organization and storage concepts.
2. Implementation of CPU scheduling algorithms, memory management techniques.
3. Understand the need for simulation/ implementation for the verification of mathematical functions.
4. Implement simple mathematical functions/ equations in numerical computing environment in Scilab.
5. Interpret and visualize simple mathematical functions and operations there on using plots/display.

PART I:

Task-1: Simulate the following CPU scheduling algorithms

a) FCFS b) SJF c) Priority d) Round Robin

Task-2: Simulate MFT and MVT

Task-3: Simulate Paging Technique of memory management.

Task-4: Simulate all page replacement algorithms

a) FIFO b) Optimal c) LRU

Task-5: Simulate all File Organization Techniques

a) Single level directory b) Two level directory

Task-6: Simulate all file allocation strategies

a) Sequential b) Indexed c) Linked

PART II

To understand Scilab environment and programming

Exercise 1: Scilab environment

Exercise-2: The Workspace and Working Directory

Exercise-3: Vector Operations

Exercise-4: Creating Matrices

Exercise-5: Sub- Matrices

Exercise-6: Statistics

Exercise-7: Working with Polynomials

Exercise-8: Plotting Graphs

Exercise-9: Scilab Programming Languages

Exercise-10: Functions in Scilab

Exercise-11: File Operations

Exercise-12: Reading Microsoft Excel Files

GOKARAJU RANGARAJUINSTITUTE OF ENGINEERING AND TECHNOLOGY

DATA COMMUNICATIONS AND COMPUTER NETWORKSLAB

CourseCode:GR18A2082 **L/T/P/C :**

II Year II Semester

Course Objectives: The objectives of this course are to

1. Introduces the architecture, structure, functions, components, and models of the data communication, devices and configurations
2. Develop network using different topologies and protocols
3. Understanding the working of wired and wireless networks
4. Illustrate various framing techniques, error correction and detection methods
5. Simulate the routing algorithms

Course Outcomes: After completing this course the student must demonstrate the knowledge and ability to:

1. Independently understand basic computer network technology, Data Communications System and its components.
2. Identify the different types of network topologies and protocols.
3. Understanding the working of wired and wireless networks
4. Understand the implementation of different framing techniques, Error detecting and correcting techniques
5. Implementation of various routing algorithms.

PART I

Task-1: Introduction to Cisco Packet tracer Simulator

Task-2: Initial Configuration of switch and router

Task-3: Working with static and dynamic IP addressing

Task-4: Design star,bus,ring topology using packet

tracer **Task-5:**Design a network using Static NAT

and Dynamic NAT

. **Task-6:**Design a wireless LAN

PART II

Task-7: Implement the data link layer framing methods such as character, character stuffing and bit stuffing.

Task-8: Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 andCRC CCIP.

Task-9: Implement Hamming code

Task-10: Implement Dijkstra‘s algorithm to compute the Shortest path through a graph.

Task-11: Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node using distance vector routing algorithm.

Task-12: Take an example subnet of hosts. Obtain broadcast tree for it.

Text/reference Books:

1. Data Communications and Networking, Behrouz A. Forouzan , Fourth Edition TMH,2006.
2. Computer Networks, Andrew S Tanenbaum, 4th Edition. Pearson Education,PHI.
3. Data communications and Computer Networks, P.C .Gupta, PHI.
4. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, Pearson Education.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENVIRONMENTAL SCIENCE

CourseCode:GR18A2082 **L/T/P/C :**

II Year II Semester

Course Objectives:

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations
4. Integrate human ecology and science of environmental problems.
5. The effect of human activities on atmospheric pollution

Course Outcomes:

Based on this course, the Engineering graduate will

1. Understand the harmonious co-existence in between nature and human being
2. Recognize various problems related to environment degradation.
3. Develop relevant research questions for environmental investigation.
4. Generate ideas and solutions to solve environmental problems due to soil, air and water pollution.
5. Evaluate and develop technologies based on ecological principles and environmental regulations which in turn helps in sustainable development.
6. Knowledge of hazardous solid waste and sewage water treatment plants and rules for handling them.
7. Differentiate the use and effects of fossil fuels and alternative energy resources.

UNIT-I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Bio magnification, ecosystem value, services and carrying capacity.

UNIT-II

Natural Resources: Classification of Resources: Living and Non-Living resources, water resources: use and over utilization of surface and ground water, conflicts over water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources, Land resources: Forest resources, Energy resources: growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

UNIT-III

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit.

Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Sources and types of pollution, drinking water quality standards. Soil Pollution: Sources and types, Impacts of modern agriculture, degradation of soil. Noise Pollution: Sources and Health hazards, standards, Solid waste: Municipal Solid Waste management, composition and characteristics of e-Waste and its management. Pollution control technologies: Waste water Treatment methods: Primary, secondary and Tertiary.

Global Environmental Issues and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. How environment benefitted due to global lockdown arose out of corona outbreak.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Towards Sustainable Future: Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Environmental Ethics, Concept of Green Building.

TEXT BOOKS:

1. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
2. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.

REFERENCE BOOKS:

1. Environmental Studies by Anubha, Kaushik, 4th Edition, New age international publishers.
2. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
3. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela.2008 PHI Learning Pvt. Ltd.
4. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
5. Introduction to Environmental Science by Y. Anjaneyulu, BS Publications.

6. Environmental Studies by R. Rajagopalan, Oxford University Press.