Sri Krishnadevaraya University College of Engineering & Technology

Dept. of Computer Science & Engineering

II Year 1st Semester(Theory-6,Lab-3)

S.No	Course No	Course Name	Category	L-T-P	Credits
1.		Mathematical Foundation of Computer Science	BS	3-0-0	3
2.		Database Management Systems	PC	3-0-0	3
3.		Python Programming	ES	3-0-0	3
4.		Design and Analysis of Algorithms	PC	3-0-0	3
5.		Object Oriented Programming Through Java	PC	2-0-0	2
6.		Digital Logic Design	PC	3-0-0	3
7.		Python Programming Lab	ES	0-0-3	1.5
8.		Database Management Systems Lab	PC	0-0-3	1.5
9.		Object Oriented Programming Through Java Lab	PC	0-0-3	1.5
10.		Essence of Indian Traditional Knowledge	MC	3-0-0	0
	Total				**21.5**

Sri Krishnadevaraya University College of Engineering & Technology

Dept. of Computer Science & Engineering

II Year 2nd Semester (Theory-6,Lab-2)

S.No	Course No	Course Name	Category	L-T-P	Credits
1.		Number Theory & Applications	BS	3-0-0	3
2.		FORMAL LANGUAGES AND AUTOMATA THEORY	PC	3-0-0	3
3.		Computer Organization	PC	3-0-0	3
4.		Software Engineering	PC	3-0-0	3
5.		Operating Systems	PC	3-0-0	3
6.		Managerial Economics and Financial Analysis	HS	3-0-0	3
7.		Operating Systems Lab	PC	0-0-3	1.5
8.		Software Engineering Lab	PC	0-0-3	1.5
	Total				**21**

Sri Krishnadevaraya University College of Engineering & Technology

	L	T	P	C
B.Tech – II-I Sem(Computer Science & Engineering)	**L**	**T**	**P**	**C**
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	**3**	**0**	**0**	**3**

Course Objectives

- To explain about the Boolean Algebra, Graph theory and Recurrence relations.
- To demonstrate the application of basic methods of discrete mathematics in Computer Science problem solving.
- To elucidate solving mathematical problems from algorithmic perspective.
- To introduce the mathematical concepts which will be useful to study advanced courses Design and Analysis of Algorithms, Theory of Computation, Cryptography and Software Engineering etc.
- To reveal how solutions of graph theory can be applied to computer science problems

UNIT- I

Statements and Notation, **Connectives**- Negation, Conjunction, Disjunction, Conditional and Bi- conditional, Statement formulas and Truth Tables. Well-formed formulas, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications.

Normal Forms: Disjunctive Normal Forms, Conjunctive Normal Forms, Principal Disjunctive Normal Forms (PDNF), Principal Conjunctive Normal Forms (PCNF), Ordering and Uniqueness of Normal Forms.

The Theory of Inference for the Statement Calculus: Rules of Inference, Consistency of Premises and Indirect Method of Proof.

The predicate Calculus, **Inference theory of the Predicate Calculus**.

Unit Outcomes:

- Describe logical sentences in terms of predicates, quantifiers, and logical connectives (L1) Evaluate basic logic statements using truth tables and the properties of logic (L5).
- Apply rules of inference to test the consistency of premises and validity of arguments (L3).
- Verify the equivalence of two formulas and their duals (L4).
- Find the Principal Conjunctive and Principal Disjunctive Normal Forms of a statement formula (L1).

UNIT-II

Set Theory: Basic concepts of Set Theory, Representation of Discrete structures, Relations and Ordering, Functions, Recursion.

Lattices and Boolean algebra: Lattices as Partially Ordered Sets, Boolean algebra, Boolean Functions, Representation and Minimization of Boolean Functions.

Algebraic Structures: Algebraic Systems: Examples and General Properties, Semi Groups and Monoids, Groups.

Unit Outcomes:

- Describe equivalence, partial order and compatible relations (L1).
- Compute Maximal Compatibility Blocks (L3).
- Identify the properties of Lattices (L2).
- Evaluate Boolean functions and simplify expression using the properties of Boolean algebra (L5).
- Infer Homomorphism and Isomorphism (L4).
- Describe the properties of Semi groups, Monoids and Groups (L1).

UNIT-III

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of

Combinations and Permutations, Enumerating Combinations and Permutations with repetitions, Enumerating Permutations and Combinations with constrained Representations, Binomial Coefficients, The Binomial and Multinomial Theorems, The Principle of Inclusion and Exclusion.

Unit Outcomes:

- Explain fundamental principle of counting (L2).
- Examine the relation between permutation and combination (L4).
- Solve counting problems by applying elementary counting techniques using the product and sum rules (L3).
- Apply permutations, combinations, the pigeon-hole principle, and binomial expansion to solve counting problems (L3).

UNIT-IV:

Recurrence Relations: Generating Functions of Sequences, Calculating Coefficients of Generating Functions, Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, The method of Characteristic Roots, Solution of Inhomogeneous Recurrence Relations.

Unit Outcomes:

- Find the generating functions for a sequence (L1).
- Design recurrence relations using the divide-and-conquer algorithm (L6).
- Solve linear recurrence relations using method of Characteristic Roots (L3).
- Outline the general solution of homogeneous or Inhomogeneous Recurrence Relations using substitution and method of generating functions (L2).
- Solve problems using recurrence relations and recursion to analyze complexity of algorithms (L3).

UNIT-V:

Graphs: Basic Concepts, Isomorphism and Sub graphs, Trees and their Properties, Spanning Trees,

Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multi graphs and Euler Circuits, Hamiltonian Graphs, Chromatics Number, The Four-Color Problem **Unit Outcomes:**

- Investigate if a given graph is simple or a multi graph, directed or undirected, cyclic or acyclic(L4).
- Describe complete graph and complete bipartite graphs (L1).
- Identify Euler Graphs, Hamilton Graph and Chromatic Number of a graph (L2).
- Apply the concepts of functions to identify the Isomorphic Graphs (L3).
- Apply depth-first and breadth-first search (L3).
- Apply Prim's and Kruskal's algorithms to find a minimum spanning tree (L3).

Course Outcomes:

After completion of this course the student would be able to

- Evaluate elementary mathematical arguments and identify fallacious reasoning (L5).
- Understand the properties of Compatibility, Equivalence and Partial Ordering relations, Lattices and has see Diagrams (L1).
- Understand the general properties of Algebric Systems, Semi Groups, Monoids and Groups (L1).
- Design solutions for problems using breadth first and depth first search techniques (L6) Solve the homogeneous and non-homogeneous recurrence relations (L3).
- Apply the concepts of functions to identify the Isomorphic Graphs (L2).
- Identify Euler Graphs, Hamilton Graph and Chromatic Number of a graph (L2).

Text Books:

1. Joe L. Mott. Abraham Kandel and Theodore P. Baker, "Discrete Mathematics for Computer Scientists & Mathematicians", 2nd Edition, Pearson, 2008. (for Units III toV).
2. J P Trembly and R Manohar, "Discrete Mathematical Structures with Applications to Computer Science", 1st Edition, McGraw Hill, 2017(For Unit I&II).

Reference Books:

1. Ralph P. Grimaldi and B.V. Ramana, "Discrete and Combinatorial Mathematics, an Applied Introduction", 5th Edition, Pearson, 2016.
2. NarsinghDeo, "Graph Theory with Applications to Engineering", Prentice Hall,1979.
3. D.S. Malik and M.K. Sen, "Discrete Mathematics theory and Applications", Ist Edition, Cenegage Learning, 2012.
4. C L Liu and D P Mohapatra, "Elements of Discrete Mathematics, A computer Oriented approach", 4th edition, MCGRAW-HILL, 2018.

Sri Krishnadevaraya University College of Engineering & Technology

	L	T	P	C
B.Tech – II-I Sem(Computer Science & Engineering)	3	0	0	3

DATABASE MANAGEMENT SYSTEMS

Course objectives:

This course is designed to:

- Train in the fundamental concepts of database management systems, database modeling and design, SQL, PL/SQL and system implementation techniques. Enable students to model ER diagram for any customized application, inducting appropriate strategies for optimization of queries.
- Provide knowledge on concurrency techniques
- Demonstrate the organization of Databases

UNIT-I: Introduction: Database systems applications, Purpose of Database Systems, view of Data,

Database Languages, Relational Databases, Database Design, Data Storage and Querying,

Transaction Management, Database Architecture, Data Mining and Information Retrieval, Specialty Databases, Database users and Administrators,

Introduction to Relational Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations At the end of the Unit, students will be able to:

- Distinguish between Database and File System
- Categorize different kinds of data models
- Define functional components of DBMS

UNIT-II: Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition,

Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values,

Aggregate Functions, Nested Sub-queries, Modification of the Database. Intermediate SQL: Joint Expressions, Views, Transactions, Integrity Constraints, SQL Data types and schemas, Authorization.

Advanced SQL: Accessing SQL from a Programming Language, Functions and Procedures, Triggers, Recursive Queries, OLAP, Formal relational query languages.

At the end of the Unit, students will be able to:

- Outline the elements of the relational model such as domain, attribute, tuple, relation and entity
- Distinguish between various kinds of constraints like domain, key and integrity
- Define relational schema
- Develop queries using Relational Algebra and SQL
- Perform DML operations on databases

UNIT-III: Database Design and the E-R Model: Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues.

Relational Database Design:

Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition

Using Functional Dependencies, Functional-Dependency Theory, Algorithms for Decomposition,

Decomposition Using Multi valued Dependencies, More Normal Forms. At the end of the Unit, students will be able to:

- Develop E-R model for the given problem
- Derive tables from E-R diagrams
- Differentiate between various normal forms based on functional dependency
- Apply normalization techniques to eliminate redundancy

UNIT-IV: Query Processing: Overview, Measures of Query cost, Selection operation, sorting, Join Operation, other operations, Evaluation of Expressions.

Query optimization: Overview, Transformation of Relational Expressions, Estimating statistics of

Expression results, Choice of Evaluation Plans, Materialized views, Advanced Topics in Query Optimization.

At the end of the Unit, students will be able to:

- Identify variety of methods for effective processing of given queries.
- Obtain knowledge related to optimization techniques.

UNIT V: Transaction Management:

Transactions: Concept, A Simple Transactional Model, Storage Structures, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Isolation and Atomicity, Transaction Isolation Levels, Implementation of Isolation Levels, Transactions as SQL Statements.

Concurrency Control: Lock based Protocols, Deadlock Handling, Multiple granularities, Timestamp based Protocols, Validation based Protocols.

Recovery System: Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Nonvolatile Storage, Early Lock Release and Logical Undo Operations.

At the end of the Unit, students will be able to:

- Understand various properties of transaction.
- Design atomic transactions for an application.
- Gain the knowledge about log mechanism and check pointing techniques for system recovery.

Course Outcomes

Students will be able to:

1. Design a database for a real world information system
2. Define transactions which preserve the integrity of the database
3. Generate tables for a database
4. Organize the data to prevent redundancy
5. Pose queries to retrieve the information from database.

TEXT BOOKS:

1. A.Silberschatz, H.F.Korth, S.Sudarshan, “Database System Concepts”, 6/e, TMH 2019

REFERENCE BOOKS:

1. Shamkant B. Navathe, “Database Management System” 6/e RamezElmasriPEA

2. “Database Principles Fundamentals of Design Implementation and Management”, Carlos Coronel, Steven Morris, Peter Robb, CengageLearning.
3. Raghurama Krishnan, Johannes Gehrke, “Database Management Systems”, 3/e,TMH

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B.Tech – II-I Seem(Computer Science & Engineering)	**L**	**T**	**P**	**C**
PYTHON PROGRAMMING	**3**	**0**	**0**	**3**

Course Objectives:

- To learn the fundamentals of Python
- To elucidate problem-solving using a Python programming language
- To introduce a function-oriented programming paradigm through python
- To get training in the development of solutions using modular concepts
- To introduce the programming constructs of python

Unit – I

Introduction: What is a program, running python, Arithmetic operators, Value and Types.

Variables, Assignments and Statements: Assignment statements, Script mode, Order of operations, string operations, comments.

Functions: Function calls, Math functions, Composition, Adding new Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters are local, Stack diagrams, Fruitful Functions and Void Functions, Why Functions.

Unit Outcomes:

Student should be able to

- List the basic constructs of Python.
- Solve the problems by applying modularity principle.

Unit – II

Case study: The turtle module, Simple Repetition, Encapsulation, Generalization, Interface design, Refactoring, docstring.

Conditionals and Recursion: floor division and modulus, Boolean expressions, Logical operators, Conditional execution, Alternative execution, Chained conditionals, Nested conditionals, Recursion, Infinite Recursion, Keyboard input.

Fruitful Functions: Return values, Incremental development, Composition, Boolean functions, More recursion, Leap of Faith, Checking types

Unit Outcomes:

Student should be able to

- Apply the conditional execution of the program.
- Apply the principle of recursion to solve the problems.

Unit - III

Iteration: Reassignment, Updating variables, The while statement, Break, Square roots, Algorithms.

Strings: A string is a sequence, len, Traversal with a for loop, String slices, Strings are immutable, Searching, Looping and Counting, String methods, The in operator, String comparison.

Case Study: Reading word lists, Search, Looping with indices.

Lists: List is a sequence, Lists are mutable, Traversing a list, List operations, List slices, List methods, Map filter and reduce, Deleting elements, Lists and Strings, Objects and values, Aliasing, List arguments.

Unit Outcomes:

Student should be able to

- Use the data structure list.
- Design programs for manipulating strings.

Unit – IV

Dictionaries: A dictionary is a mapping, Dictionary as a collection of counters, Looping and dictionaries, Reverse Lookup, Dictionaries and lists, Memos, Global Variables.

Tuples: Tuples are immutable, Tuple Assignment, Tuple as Return values, Variable-length argument tuples, Lists and tuples, Dictionaries and tuples, Sequences of sequences.

Files: Persistence, Reading and writing, Format operator, Filename and paths, Catching exceptions, Databases, Pickling, Pipes, Writing modules.

Classes and Objects: Programmer-defined types, Attributes, Instances as Return values, Objects are mutable, Copying. Classes and Functions

Unit Outcomes:

Student should be able to

- Apply object orientation concepts.
- Use data structure dictionaries.
- Organize data in the form of files.

Unit – V

Classes and Functions: Time, Pure functions, Modifiers, Prototyping versus Planning
Classes and Methods: Object oriented features, Printing objects, The init method, The str__method, Operator overloading, Type-based Dispatch, Polymorphism, Interface and Implementation

Inheritance: Card objects, Class attributes, Comparing cards, decks, Printing the Deck, Add Remove shuffle and sort, Inheritance, Class diagrams, Data encapsulation.

The Goodies: Conditional expressions, List comprehensions, Generator expressions, any and all, Sets, Counters, default dict, Named tuples, Gathering keyword Args,

Unit Outcomes:

Student should be able to

- Plan programs using object orientation approach. Illustrate the principle of inheritance.

Course Outcomes:

Student should be able to

- Apply the features of Python language in various real applications.
- Select appropriate data structure of Python for solving a problem.
- Design object oriented programs using Python for solving real-world problems.
- Apply modularity to programs.

TEXT BOOKS:

1. Allen B. Downey, “Think Python”, 2nd edition, SPD/O’Reilly, 2016.

REFERENCE BOOKS:

1. Martin C.Brown, “The Complete Reference: Python”, McGraw-Hill, 2018.
2. Kenneth A. Lambert, B.L. Juneja, “Fundamentals of Python”, CENGAGE, 2015.
3. R. Nageswara Rao, “Core Python Programming”, 2nd edition, Dreamtech Press,2019

Sri Krishnadevaraya University College of Engineering & Technology

	L	T	P	C
B.Tech – II-I Sem (Computer Science & Engineering)	3	0	0	3

DESIGN AND ANALYSIS OFALGORITHMS

Course Objectives:

- To demonstrate the importance of algorithms in computing.
- To explain the analysis of algorithms
- To illustrate the method of finding the complexity of algorithms
- To explain the advanced algorithm design and analysis techniques.
- To introduce special classes of algorithms NP – completeness and the classes P and NP.

UNIT I

Introduction: Algorithm, Algorithm specification, Performance analysis.

Divide and Conquer: General method, Binary Search, Finding the maximum and minimum, Merge sort, Quick Sort, Selection, Strassen's matrix multiplication.

At the end of the unit, students will be able to:

- Understand growth functions and Asymptotic notations
- Derive the recurrence equation for running time of a given algorithm and solve.
- Understand the general principle of Divide and Conquer and identify suitable problems to apply Divide and Conquer paradigm
- Analyze the time complexities of Binary Search, Finding the maximum and minimum, and Strassen's matrix multiplication algorithms.
- Compare complexities of Merge sort, Quick sort and Selection sort techniques

UNIT II

Greedy Method: General method, Knapsack problem, Job Scheduling with Deadlines, Minimum cost Spanning Trees, Optimal storage on tapes, Single-source shortest paths.

Dynamic programming: General Method, Multistage graphs, All-pairs shortest paths, Optimal binary search trees, 0/1 knapsack, the traveling salesperson problem. At the end of the unit, students will be able to:

- Understand optimization problems and the general principles of Greedy and Dynamic Programming paradigms to solve them.
- Apply subset and ordering paradigms of greedy strategy for Knapsack problem, Job Scheduling with Deadlines, Minimum cost Spanning Trees, Optimal storage on tapes, and finding Single-source shortest paths.
- Define Principle of optimality with examples.
- Differentiate Greedy and Dynamic programming paradigms.
- Apply dynamic programming strategy for Optimal binary search trees, Multistage graphs, All-pairs shortest paths, 0/1 knapsack, the traveling salesperson problem.

UNIT III

Basic Traversal and Search Techniques: Techniques for binary trees, Techniques for Graphs,

Connected components and Spanning trees, Bi-connected components and DFS

Back tracking: General Method, 8 – queens problem, Sum of subsets problem, Graph coloring and Hamiltonian cycles, Knapsack Problem.

At the end of the unit, students will be able to:

- Define solution space tree.
- Illustrate graph search strategies: BFS, DFS and D-Search.
- Determine articulation points and bi-connected components in a given graph using Depth First Spanning Trees.
- Demonstrate the recursive and iterative backtracking algorithms.
- Apply backtracking strategy to solve N – queens problem, Sum of subsets problem and Knapsack problem.
- Apply backtracking to solve m-color ability optimization problem.
- Determine all possible Hamiltonian Cycles in a graph using back tracking algorithm.

UNIT IV

Branch and Bound: The method, Travelling salesperson, 0/1 Knapsack problem, Efficiency considerations.

Lower Bound Theory: Comparison trees, Lower bounds through reductions – Multiplying triangular matrices, inverting a lower triangular matrix, computing the transitive closure. At the end of the unit, students will be able to:

- Illustrate the state space search techniques; FIFO, LIFO and LC.
- Analyze the advantage of bounding functions in Branch and Bound technique to solve the Travelling Sales person problem.
- Compare the LC and FIFO branch and bound solutions for 0/1 knapsack problem.
- Understand lower bound theory concept in solving algebraic problems.

UNIT V

NP – Hard and NP – Complete Problems: NP Hardness, NP Completeness, Consequences of being in P, Cook's Theorem, Reduction Source Problems, Reductions: Reductions for some known problems

At the end of the unit, students will be able to:

- Differentiate deterministic and Non-deterministic algorithms.
- Define P, NP, NP –hard and NP-complete classes of problems.
- Understand the satisfiability problem.
- State Cook's Theorem.
- Understand the reduction techniques.

Course Outcomes

- Determine the time complexity of an algorithm by solving the corresponding recurrence equation
- Apply the Divide and Conquer strategy to solve searching, sorting and matrix multiplication problems.
- Analyze the efficiency of Greedy and Dynamic Programming design techniques to solve the optimization problems.
- Apply Backtracking technique for solving constraint satisfaction problems.
- Analyze the LC and FIFO branch and bound solutions for optimization problems, and compare the time complexities with Dynamic Programming techniques.
- Define and Classify deterministic and Non-deterministic algorithms; P, NP, NP –hard and NP-complete classes of problems.

Text Books

1. Ellis Horowitz, Sartaj Sahni and Rajasekaran, "Fundamentals of Computer Algorithms", 2nd Edition, 2012, University Press.
2. ParagHimanshu Dave and Himanshu Bhalchandra Dave, "Design and Analysis of

Algorithms”, Second Edition, Pearson Education.

References

1. Anany Levitin, “Introduction to the Design and Analysis of Algorithms”, Third Edition, Pearson Education,2012.
2. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, “Introduction to Algorithms”, Third Edition, PHI Learning Private Limited, 2012.
3. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, “Data Structures and Algorithms”, Pearson Education, Reprint2006.
4. Donald E. Knuth, “The Art of Computer Programming”, Volumes 1&3 Pearson Education, 2009.

Sri Krishnadevaraya University College of Engineering & Technology

	L	T	P
B.Tech – II-I Sem(Computer Science & Engineering)	3	0	0

OBJECT ORIENTED PROGRAMMING THROUGHJAVA

Course Objectives:

- To understand object oriented concepts and problem solving techniques
- To obtain knowledge about the principles of inheritance and polymorphism
- To implement the concept of packages, interfaces, exception handling and concurrency mechanism.
- To design the GUIs using applets and swing controls.
- To understand the Java Database Connectivity Architecture

UNIT - I

Introduction: Introduction to Object Oriented Programming, The History and Evolution of Java,

Introduction to Classes, Objects, Methods, Constructors, this keyword, Garbage Collection, Data Types,

Variables, Type Conversion and Casting, Arrays, Operators, Control Statements, Method Overloading, Constructor Overloading, Parameter Passing, Recursion, String Class and String handling methods.

Unit Outcomes:

Student should be able to

- Understand the syntax, semantics and features of Java Programming Language.
- Learn object oriented features and understanding type conversion and casting.
- Understand different types of string handling functions and its usage.

UNIT - II

Inheritance: Basics, Using Super, Creating Multilevel hierarchy, Method overriding, Dynamic Method Dispatch, Using Abstract classes, Using final with inheritance, Object class,

Packages: Basics, Creating packages, Understanding CLASSPATH, Access Protection, Importing packages.

Interfaces: Definition, Implementing Interfaces, Extending Interfaces, Nested Interfaces, Applying Interfaces, Variables in Interfaces.

Unit Outcomes:

Student should be able to

- Implement types of Inheritance and developing new classes based on existing classes Distinguish between system packages and user defined packages.
- Demonstrate features of interfaces to implement multiple inheritances.

UNIT - III

Exception handling - Fundamentals, Exception types, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built- in exceptions, creating own exception sub classes.

Stream based I/O (java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, Random access file operations, The Console class.

Unit Outcomes:

Student should be able to

- Learn what exceptions are and how they are handled.
- Learn when to use exception handling and how to create user defined exceptions Learn the difference between various files and streams.

UNIT - IV

Multithreading: The Java thread model, Creating threads, Thread priorities, Synchronizing threads, Inter thread communication.

Event Handing: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

Unit Outcomes:

Student should be able to

- Understand concurrency, parallelism and multithreading Learn what events are and how they are handled.

UNIT – V

Applet: Basics, Architecture, Applet Skeleton, requesting repainting,using the status window, passing parameters to applets.

GUI Programming with Swings – The origin and design philosophy of swing, components and containers, layout managers, event handling, using a push button, jtextfield, jlabel and image icon, the swing buttons, jtext field, jscrollpane, jlist, jcombobox, trees, jtable, An overview of jmenubar, jmenu and jmenuitem, creating a main menu, show message dialog, show confirm dialog, show input dialog, show optiondialog, jdialog, create a modeless dialog.

Accessing Databases with JDBC:

Types of Drivers, JDBC Architecture, JDBC classes and Interfaces, Basic steps in developing JDBC applications, Creating a new database and table with JDBC.

Unit Outcomes:

Student should be able to

- Learn how to use the Nimbus look-and-feel Understand the GUI programming.
- Understand basic steps in developing JDBC applications,

Course Outcomes:

After the completion of the course the student will be able

To solve real world problems using OOP techniques.

- To apply code reusability through inheritance, packages and interfaces to solve problems using java collection framework and I/O classes.
- To develop applications by using parallel streams for better performance.
- To develop applets for web applications.
- To build GUIs and handle events generated by user interactions.
- To use the JDBC API to access database.

Text Books:

1. Herbert Schildt "Java The complete reference", 9th edition, McGraw Hill Education (India) Pvt. Ltd.
2. Paul Dietel, Harvey Dietel "Java How to Program", 10th Edition, Pearson Education.

REFERENCE BOOKS:

1. T. Budd "Understanding Object-Oriented Programming with Java", updated edition, Pearson Education.
2. Cay S. Horstmann, "Core Java Volume – 1 Fundamentals", Pearson Education.
3. Sagayaraj, Dennis, Karthik and Gajalakshmi, "Java Programming for core and advanced learners" University Press
4. Y. Daniel Liang, "Introduction to Java programming", Pearson Education.
5. P. Radha Krishna, "Object Oriented Programming through Java", University Press.
6. S. Malhotra, S. Chudhary, "Programming in Java", 2nd edition, Oxford Univ. Press.7. R.A. Johnson, "Java Programming and Object-oriented Application Development", Cengage Learning.

Sri Krishnadevaraya University College of Engineering & Technology

	L	T	P
B.Tech – II-I Sem(Computer Science & Engineering)	**3**	**0**	**0**

DIGITAL LOGICDESIGN

Course Objectives:

- Understanding basic number systems, codes and logical gates.
- Acquiring the skills to manipulate and examine Boolean algebraic expressions, logical operations, and Boolean functions
- Acquainting with classical hardware design for both combinational and sequential logic circuits
- Experiencing about synchronous circuits.
- Obtaining the knowledge about various types of memories.

UNIT - I

Digital Systems and Binary Numbers: Digital Systems, Binary Numbers, Number base conversions, Octal, Hexadecimal and other base numbers, complements, signed binary numbers, binary codes, binary storage and registers, binary logic.

Boolean algebra and logic gates: Basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, Digital Logic Gates.

Unit Outcomes:

Student is able to

- Summarize the binary number system
- Illustrate various binary codes
- Describe the basic postulates of Boolean Algebra
- Develop a logic diagram using gates from a Boolean function

UNIT - II

Gate–Level Minimization: The Map Method, Four-Variable K-Map, sum of products, product of sums simplification, Don't care conditions, Simplification by Quine- McClusky Method**,** NAND and NOR implementation and other two level implementations, Exclusive-OR function.

Unit Outcomes:

Student is able to

- Apply the map method for simplifying Boolean Expressions.
- Apply Don't care conditions to simplify a Karnaughmap.
- Design two-level Boolean functions with NAND gates and NOR gates

UNIT - III

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

Unit Outcomes:

Student is able to

- Select fundamental combinational logic circuits.
- Analyze and design combinational circuits.
- Design Boolean function with a multiplexer.

UNIT – IV

Synchronous Sequential Circuits: Latches, Flip-flops, analysis of clocked sequential circuits, **Register and Counters:** Registers, Shift registers, Ripple counters, Synchronous counters and other counters.

Unit Outcomes:

Student is able to

- Explain the functionalities of latch and different flip-flops.
- Analyze and design clocked sequential circuits.
- Describe the use of sequential circuit components in complex digital systems.

UNIT - V

Memory and Programmable Logic: Random-Access memory, Memory decoding, ROM, Programmable Logic Array, Programmable Array Logic, Sequential programmable devices.

Digital Integrated Circuits: RTL and DTL Circuits, Transistor-Transistor Logic (TTL), Emitter-Coupled Logic (ECL), MOS, CMOS Logic, Comparisons of Logic Families **Unit Outcomes:**

Student is able to

- Interpret the types of memories.
- Construct the Boolean functions with PLA and PAL.
- Describe the most common integrated circuit digital logic families.

Course Outcomes:

Students should be able to

- Analyze the number systems and codes.
- Decide the Boolean expressions using Minimization methods.
- Design the sequential and combinational circuits.
- Apply state reduction methods to solve sequential circuits.
- Describe various types of memories.

TEXT BOOKS:

1. M. Morris Mano, M.D. Ciletti, "Digital Design", 5th edition, Pearson, 2018.

REFERENCE BOOKS:

1. Donald P Leach, Albert Paul Malvino, GoutamSaha, "Digital Principles and applications", McGrawHill , 8thEdition,2015.
2. David J. Comer, "Digital Logic & State Machine Design", Oxford University Press, 3rd Reprinted Indian Edition,2012
3. R.D. Sudhakar Samuel, "Digital Logic Design", Elsevier Publishers.

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B.Tech – I Sem **(Computer Science & Engineering)**

PYTHON PROGRAMMING LABORATORY

L	T	P	C
0	0	3	1

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Course Objectives:

- To train the students in solving computational problems
- To elucidate solving mathematical problems using Python programming language
- To understand the fundamentals of Python programming concepts and its applications.
- To understand the object-oriented concepts using Python in problem solving.

Laboratory Experiments

1. Install Python Interpreter and use it to perform different Mathematical Computations. Try to do all the operations present in a Scientific Calculator
2. Write a function that draws a grid like the following:

```
+ - - - - + - - - +
|| | | | |
 |        |       |
 |        |       |
+ - - - - + - - - +
 |       |        |
 |       |        |
 |       |        |
 |       |        |
+ - - - - + - - - - +
```

3. Write a function that draws a Pyramid with #symbols

```
            #
         #  #  #
      #  #  #  #  #
   #  #  #  #  #  #
   #
            .
```

Up to 15 hashes at the bottom

4. Using turtles concept draw a wheel of your choice
5. Write a program that draws Archimedean Spiral
6. The letters of the alphabet can be constructed from a moderate number of basic elements, like vertical and horizontal lines and a few curves. Design an alphabet that can be drawn with a minimal number of basic elements and then write functions that draw the letters. The alphabet can belong to any Natural language excluding English. You should consider at least Ten letters of the alphabet.
7. The time module provides a function, also named time that returns the current Greenwich Mean Time in "the epoch", which is an arbitrary time used as a reference point. On UNIX systems, the epoch is 1 January1970.

```
>>> import time
>>>time.time()
1437746094.573595
```

8

Write a script that reads the current time and converts it to a time of day in hours, minutes, and seconds, plus the number of days since the epoch.

8. Given n+r+1 <= 2^r .n is the input and r is to be determined. Write a program which computes minimum value of r that satisfies the above.
9. Write a program that evaluates Ackermann function
10. The mathematician Srinivasa Ramanujan found an infinite series that can be used to generate a numerical approximation of 1/ **π**:

    Write a function called estimate_pi that uses this formula to compute and return an estimate of**π.**

$$\frac{1}{\pi} = \frac{2\sqrt{2}}{9801}\sum_{k=0}^{\infty}\frac{(4k)!(1103+26390k)}{(k!)^4 396^{4k}}$$

    It should use a while loop to compute terms of the summation until the last term is smaller than 1e-15 (which is Python notation for 10^{-15}). You can check the result by comparing it to math.pi.
11. Choose any five built-in string functions of C language. Implement them on your own in Python. You should not use string related Python built-in functions.
12. Given a text of characters, Write a program which counts number of vowels, consonants and special characters.
13. Given a word which is a string of characters. Given an integer say 'n', Rotate each character by 'n' positions and print it. Note that 'n' can be positive or negative.
14. Given rows of text, write it in the form of columns.
15. Given a page of text. Count the number of occurrences of each latter (Assume case insensitivity and don't consider special characters). Draw a histogram to represent the same
16. Write program which performs the following operations on list's. Don't use built-in functions
    a) Updating elements of a list
    b) Concatenation of list's
    c) Check for member in the list
    d) Insert into the list
    e) Sum the elements of the list
    f) Push and pop element of list
    g) Sorting of list
    h) Finding biggest and smallest elements in the list
    i) Finding common elements in the list

1. Write a program that reads a file, breaks each line into words, strips whitespace and punctuation from the words, and converts them to lowercase.
2. Go to Project Gutenberg (http://gutenberg.org) and download your favorite out-of-copyright book in plain text format. Read the book you downloaded, skip over the header information at the beginning of the file, and process the rest of the words as before. Then modify the program to count the total number of words in the book, and the number of times each word is used. Print the number of different words used in the book. Compare different books by different authors, written in different eras.
3. Go to Project Gutenberg (http://gutenberg.org) and download your favorite out-of-copyright book in plain text format. Write a program that allows you to replace words, insert words and delete words from the file.
4. Consider all the files on your PC. Write a program which checks for duplicate files in your PC and displays their location. Hint: If two files have the same checksum, they probably have the same contents.

5. Consider turtle object. Write functions to draw triangle, rectangle, polygon, circle and sphere.

   Use object oriented approach.
6. Write a program illustrating the object oriented features supported by Python.
7. Design a Python script using the Turtle graphics library to construct a turtle bar chart representing the grades obtained by N students read from a file categorising them into distinction, first class, second class, third class and failed.
8. Design a Python script to determine the difference in date for given two dates in YYYY:MM:DD format(0 <= YYYY <= 9999, 1 <= MM <= 12, 1 <= DD <= 31) following the leap year rules.
9. Design a Python Script to determine the time difference between two given times in HH:MM:SS format.(0 <= HH <= 23, 0 <= MM <= 59, 0 <= SS <=59) **Unit Outcomes:**

Student should be able to

- Design solutions to mathematical problems.
- Organize the data for solving the problem.
- Develop Python programs for numerical and text based problems.
- Select appropriate programming construct for solving the problem.
- Illustrate object oriented concepts.

Reference Books:

1. Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers, "How to Think Like a Computer Scientist: Learning with Python 3", 3rd edition, Available at http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf
2. Paul Barry, "Head First Python a Brain Friendly Guide" 2nd Edition, O'Reilly,2016
3. DainelY.Chen "Pandas for Everyone Python Data Analysis" Pearson Education,2019

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – II-I Sem(Computer Science & Engineering)	L	T	P	C
DATABASE MANAGEMENT SYSTEMS LABORATORY	0	0	3	1.

5 Course Objectives:

- To implement the basic knowledge of SQL queries and relational algebra.
- To construct database models for different database applications.
- To apply normalization techniques for refining of databases.
- To practice various triggers, procedures, and cursors using PL/SQL.
- To design and implementation of a database for an organization

Week-1: CREATION OF TABLES

1. Create a table called Employee with the following structure.

Name	**Type**
Empno	Number
Ename	Varchar2(20)
Job	Varchar2(20)
Mgr	Number
Sal	Number

   a. Add a column commission with domain to the Employee table.
   b. Insert any five records into the table.
   c. Update the column details of job
   d. Rename the column of Employ table using alter command.
   e. Delete the employee whose empno is19.

2. Create department table with the following structure.

Name	**Type**
Dept no	Number
Dept name	Varchar2(20)
location	Varchar2(20)

   a. Add column designation to the department table.
   b. Insert values into the table.
   c. List the records of emp table grouped by dept no.
   d. Update the record where dept no is9.
   e. Delete any column data from the table 3.   Create a table called Customer table

Name	Type
Cust name	Varchar2(20)
Cust street	Varchar2(20)
Cust city	Varchar2(20)

a. Insert records into the table.
b. Add salary column to the table.
c. Alter the table column domain.
d. Drop salary column of the customer table.
e. Delete the rows of customer table whose ust_city is 'hyd'.
f. Create a table called branch table.

Name	Type
Branch name	Varchar2(20)
Branch city	Varchar2(20)
Asserts	Number

4.Increase the size of data type for asserts to the branch.

a. Add and drop a column to the branch table.
b. Insert values to the table.
c. Update the branch name column
d. Delete any two columns from the table

5. Create a table called sailor table

Name	Type
Sid	Number
Sname	Varchar2(20)
Rating	Varchar2(20)

a. Add column age to the sailor table.
b. Insert values into the sailor table.
c. Delete the row with rating>8.
d. Update the column details of sailor.
e. Insert null values into the table.

6.Create a table called reserves table

Name	Type
Boat id	Integer
Sid	Integer
Day	Integer

a. Insert values into the reserves table.
b. Add column time to the reserves table.

c. Alter the column day data type to date.
d. Drop the column time in the table.`
e. Delete the row of the table with some condition.

Week-2: QUERIES USING DDL AND DML

1. a. Create a user and grant all permissions to the user.
   b. Insert the any three records in the employee table and use rollback. Check the result.
   c. Add primary key constraint and not null constraint to the employee table.
   d. Insert null values to the employee table and verify the result.
2. a. Create a user and grant all permissions to the user.
   b. Insert values in the department table and use commit.
   c. Add constraints like unique and not null to the department table.
   d. Insert repeated values and null values into the table.
3. a. Create a user and grant all permissions to the user.
   b. Insert values into the table and use commit.
   c. Delete any three records in the department table and use rollback.
   d. Add constraint primary key and foreign key to the table.
4. a. Create a user and grant all permissions to the user.
   b. Insert records in the sailor table and use commit.
   c. Add save point after insertion of records and verify save point.
   d. Add constraints not null and primary key to the sailor table.
5. a. Create a user and grant all permissions to the user.
   b. Use revoke command to remove user permissions.
   c. Change password of the user created.
   d. Add constraint foreign key and no tnull.
6. a. Create a user and grant all permissions to the user.
   b. Update the table reserves and use save point and rollback.
   c. Add constraint primary key , foreign key and not null to the reserves table
   d. Delete constraint not null to the table column

Week-3: QUERIES USING AGGREGATE FUNCTIONS

1. a. By using the group by clause, display the names who belongs to dept no 10 along with average salary.
   b. Display lowest paid employee details under each department.
   c. Display number of employees working in each department and their department number.
   d. Using built in functions, display number of employees working in each department and their department name from dept table. Insert dept name to dept table and insert dept name for each row, do the required thing specified above.
   e. List all employees which start with either B or C.
   f. Display only these ename of employees where the maximum salary is greater than or equal to 5000.
2. a. Calculate the average salary for each different job.
   b. Show the average salary of each job excluding manager.
   c. Show the average salary for all departments employing more than three people.
   d. Display employees who earn more than thelo west salary in department 30
   e. Show that value returned by sign (n) function.
   f. How many days between day of birth to current date 3. a. Show that two substring as single string.
   b. List all employee names, salary and 15% rise in salary.
   c. Display lowest paid emp details under each manager

d. Display the average monthly salary bill for each deptno.
e. Show the average salary for all departments employing more than two people.
f. By using the group by clause, display the eid who belongs to dept no 05 along with average salary.

4. a. Count the number of employees in department20
b. Find the minimum salary earned by clerk.
c. Find minimum, maximum, average salary of all employees.
d. List the minimum and maximum salaries for each job type.
e. List the employee names in descending order.
f. List the employee id, names in ascending order by empid.

5. a. Find the sids ,names of sailors who have reserved all boats called "INTERLAKE
Find the age of youngest sailor who is eligible to vote for each rating level with at least two such sailors.
b. Find the sname , bid and reservation date for each reservation.
c. Find the ages of sailors whose name begin and end with B and has at least 3characters.
d. List in alphabetic order all sailors who have reserved red boat.
e. Find the age of youngest sailor for each rating level.

6. a. List the Vendors who have delivered products within 6 months from order date.
b. Display the Vendor details who have supplied both Assembled and Subparts.
c. Display the Sub parts by grouping the Vendor type (Local or Non Local).
d. Display the Vendor details in ascending order.
e. Display the Sub part which costs more than any of the Assembled parts.
f. Display the second maximum cost Assembled part

Week-4: PROGRAMS ON PL/SQL

1. a. Write a PL/SQL program to swap two numbers.
b. Write a PL/SQL program to find the largest of three numbers.
2. a. Write a PL/SQL program to find the total and average of 6 subjects and display the grade.
b. Write a PL/SQL program to find the sum of digits in a given umber.
3. a. Write a PL/SQL program to display the number in reverse order.
b. Write a PL/SQL program to check whether the given number is prime or not.
4. a. Write a PL/SQL program to find the factorial of a given number.
b. Write a PL/SQL code block to calculate the area of a circle for a value of radius varying from 3 to 7.
Store the radius and the corresponding values of calculated area in an empty table named areas, consisting of two columns radius and area.
5. a. Write a PL/SQL program to accept a string and remove the vowels from the string. (When 'hello' passed to the program it should display 'Hll' removing e and o from the world Hello).
b. Write a PL/SQL program to accept a number and a divisor. Make sure the divisor is less than or equal to10. Else display an error message. Otherwise Display the remainder in words.

Week-5: PROCEDURES AND FUNCTIONS

1. Write a function to accept employee number as parameter and return Basic +HRA together as single column.
2. Accept year as parameter and write a Function to return the total net salary spent for a given year.
3. Create a function to find the factorial of a given number and hence find NCR.
4. Write a PL/SQL block o pint prime Fibonacci series using local functions.
5. Create a procedure to find the lucky number of a given birth date.
6. Create function to the reverse of given number

Week-6: TRIGGERS

1. Create a row level trigger for the customers table that would fire for INSERT or

UPDATE or DELETE operations performed on the CUSTOMERS table. This trigger will display the salary difference between the old values and new values: CUSTOMERS table:

ID	NAME	AGE	ADDRESS	SALARY
1	Alive	24	Khammam	2000
2	Bob	27	Kadapa	3000
3	Catri	25	Guntur	4000
4	Dena	28	Hyderabad	5000
5	Eeshwar	27	Kurnool	6000
6	Farooq	28	Nellur	7000

2. Creation of insert trigger, delete trigger, update trigger practice triggers using the passenger database.

Passenger(Passport_ id INTEGER PRIMARY KEY, Name VARCHAR (50) Not NULL, Age Integer Not NULL, Sex Char, Address VARCHAR (50) Not NULL);

   a. Write a Insert Trigger to check the Passport_id is exactly six digits or not.
   b. Write a trigger on passenger to display messages '1 Record is inserted', '1 record is deleted', '1 record is updated' when insertion, deletion and updation are done on passenger respectively.

3. Insert row in employee table using Triggers. Every trigger is created with name any trigger have same name must be replaced by new name. These triggers can raised before insert, update or delete rows on data base. The main difference between a trigger and a stored procedure is that the former is attached to a table and is only fired when an INSERT, UPDATE or DELETE occurs.
4. Convert employee name into uppercase whenever an employee record is inserted or updated. Trigger to fire before the insert or update.
5. Trigger before deleting a record from emp table. Trigger will insert the row to be deleted into table called delete _emp and also record user who has deleted the record and date and time of delete.
6. Create a transparent audit system for a table CUST_MSTR. The system must keep track of the records that are being deleted or updated

Week-7: PROCEDURES

1. Create the procedure for palindrome of given number.
2. Create the procedure for GCD: Program should load two registers with two Numbers and then apply the logic for GCD of two numbers. GCD of two numbers is performed by dividing the greater number by the smaller number till the remainder is zero. If it is zero, the divisor is the GCD if not the remainder and the divisors of the previous division are the new set of two numbers. The process is repeated by dividing greater of the two numbers by the smaller number till the remainder is zero and GCD is found.
3. Write the PL/SQL programs to create the procedure for factorial of given number.
4. Write the PL/SQL programs to create the procedure to find sum of N natural number.
5. Write the PL/SQL programs to create the procedure to find Fibonacci series.
6. Write the PL/SQL programs to create the procedure to check the given number is perfect or not

Week-8: CURSORS

1. Write a PL/SQL block that will display the name, dept no, salary of fist highest paid employees.
2. Update the balance stock in the item master table each time a transaction takes place in the item transaction table. The change in item master table depends on the item id is already present in the item master then update operation is performed to decrease the balance stock

by the quantity specified in the item transaction in case the item id is not present in the item master table then the record is inserted in the item master table.

3. Write a PL/SQL block that will display the employee details along with salary using cursors.
4. To write a Cursor to display the list of employees who are working as a Managers or Analyst.
5. To write a Cursor to find employee with given job and dept no.
6. Write a PL/SQL block using implicit cursor that will display message, the salaries of all the employees in the 'employee' table are updated. If none of the employee's salary are updated we get a message 'None of the salaries were updated'. Else we get a message like for example, 'Salaries for 1000 employees are updated' if there are 1000 rows in 'employee' table

Week-9: CASE STUDY: BOOK PUBLISHING COMPANY

A publishing company produces scientific books on various subjects. The books are written by authors who specialize in one particular subject. The company employs editors who, not necessarily being specialists in a particular area, each take sole responsibility for editing one or more publications.

A publication covers essentially one of the specialist subjects and is normally written by a single author. When writing a particular book, each author works with on editor, but may submit another work for publication to be supervised by other editors. To improve their competitiveness, the company tries to employ a variety of authors, more than one author being a specialist in a particular subject for the above case study, do the following:

1. Analyze the data required.
2. Normalize the attributes.

Create the logical data model using E-R diagrams

Week-10: **CASE STUDY GENERAL HOSPITAL**

A General Hospital consists of a number of specialized wards (such as Maternity, Pediatric, Oncology, etc). Each ward hosts a number of patients, who were admitted on the recommendation of their own GP and confirmed by a consultant employed by the Hospital. On admission, the personal details of every patient are recorded. A separate register is to be held to store the information of the tests undertaken and the results of a prescribed treatment. A number of tests may be conducted for each patient. Each patient is assigned to one leading consultant but may be examined by another doctor, if required. Doctors are specialists in some branch of medicine and may be leading consultants for a number of patients, not necessarily from the same ward. For the above case study, do the following.

1. Analyze the data required.
2. Normalize the attributes.

Create the logical data model using E-R diagrams

Week-11: **CASE STUDY: CAR RENTAL COMPANY**

A database is to be designed for a car rental company. The information required includes a description of cars, subcontractors (i.e. garages), company expenditures, company revenues and customers. Cars are to be described by such data as: make, model, year of production, engine size, fuel type, number of passengers, registration number, purchase price, purchase date, rent price and insurance details. It is the company policy not to keep any car for a period exceeding one year. All major repairs and maintenance are done by subcontractors (i.e. franchised garages), with whom CRC has long-term agreements. Therefore the data about garages to be kept in the database includes garage names, addresses, range of services and the like. Some garages require payments immediately after a repair has been made; with others CRC has made arrangements for credit facilities. Company expenditures are to be registered for all outgoings connected with purchases, repairs, maintenance, insurance etc. Similarly the cash inflow coming from all sources: Car hire, car sales, insurance claims must be kept of file. CRC maintains a reasonably stable client base. For this privileged category of customers special credit card facilities are provided. These customers may also book in advance a particular car. These reservations can be made for any period of time up to one month. Casual customers must pay a deposit for an estimated time of rental, unless they wish to pay by credit card. All major credit cards are accepted. Personal details such as name, address, telephone number, driving license, number about each customer are kept in the database. For the above case study, do the following:

1. Analyze the data required.
2. Normalize the attributes.

Create the logical data model using E-R diagrams

Week-12: **CASE STUDY: STUDENT PROGRESS MONITORING SYSTEM**

A database is to be designed for a college to monitor students' progress throughout their course of study. The students are reading for a degree (such as BA, BA (Hons) M.Sc., etc) within the framework of the modular system. The college provides a number of modules, each being characterized by its code, title, credit value, module leader, teaching staff and the department they come from. A module is coordinated by a module leader who shares teaching duties with one or more lecturers. A lecturer may teach (and be a module leader for) more than one module. Students are free to choose any module they wish but the following rules must be observed: Some modules require pre- requisites modules and some degree programmes have compulsory modules. The database is also to contain some information about studentsincludingtheirnumbers,names,addresses,degrees they read for,andtheirpastperformanc e i.e. modules taken and examination results. For the above case study, do the following:

1. Analyze the data required.
2. Normalize the attributes.
3. Create the logical data model i.e., ER diagrams.
4. Comprehend the data given in the case study by creating respective tables with primary keys and foreign keys wherever required.
5. Insert values into the tables created (Be vigilant about Master- Slavetables).
6. Display the Students who have taken M.Sc course
7. Display the Module code and Number of Modules taught by each Lecturer.
8. Retrieve the Lecturer names who are not Module Leaders.
9. Display the Department name which offers ‘English ‘module.
10. Retrieve the Prerequisite Courses offered by every Department (with Department names).
11. Present the Lecturer ID and Name who teaches ‘Mathematics’.
12. Discover the number of years a Module is taught.
13. List out all the Faculties who work for ‘Statistics ‘Department.
14. List out the number of Modules taught by each Module Leader.
15. List out the number of Modules taught by a particular Lecturer.
16. Create a view which contains the fields of both Department and Module tables. (Hint- The fields like Module code, title, credit, Department code and its name).
17. Update the credits of all the prerequisite courses to 5. Delete the Module ‘History’ from the Module table.

Unit Outcomes:

Students should be able to

1. Design database for any real world problem
2. Implement PL/SQL programs
3. Define SQL queries
4. Decide the constraints
5. Investigate for data inconsistency

Reference Books:

1.RamezElmasri, Shamkant, B. Navathe, “Database Systems”, Pearson Education, 6th Edition, 2013.

2.Peter Rob, Carles Coronel, “Database System Concepts”, Cengage Learning, 7th Edition, 2008.

WebReferences:

SOFTWARE AND HARDWARE REQUIREMENTS FOR A BATCH OF 24 STUDENTS:

HARDWARE: Desktop Computer Systems: 24 nos SOFTWARE: Oracle 11g.

Sri Krishnadevaraya University College of Engineering & Technology

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B.Tech – II-I Sem(Computer Science & Engineering)	0	0	2	1

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Course Objectives

- To introduce the concepts of Java.
- To Practice object-oriented programs and build java applications.
- To implement java programs for establishing interfaces.
- To implement sample programs for developing reusable software components.
- To establish database connectivity in java and implement GUI applications.

Week-1

a. Installation of Java software, study of any Integrated development environment, Use Eclipse or Net bean platform and acquaint with the various menus. Create a test project, add a test class and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with java program to find prime numbers between 1 to n.

b. Write a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$. Read in a, b, c and use the quadratic formula.

c. Develop a Java application to generate Electricity bill. Create a class with the following members: Consumer no., consumer name, previous month reading, current month reading, type of EB connection
(i.e domestic or commercial). Commute the bill amount using the following tariff.

If the type of the EB connection is domestic, calculate the amount to be paid as follows:

- First 100 units - Rs. 1 per unit
- 101-200 units - Rs. 2.50 per unit
- 201 -500 units - Rs. 4 per unit
- >501units - Rs. 6 per unit

If the type of the EB connection is commercial, calculate the amount to be paid as follows:

- First 100 units - Rs. 2 per unit
- 101-200 units - Rs. 4.50 per unit
- 201 -500 units - Rs. 6 per unit
- >501units - Rs. 7 per unit

d. Write a Java program to multiply two given matrices.

Week-2

a. Write Java program on use of inheritance, preventing inheritance using final, abstract classes.

b. Write Java program on dynamic binding, differentiating method overloading and overriding.

c. Develop a java application to implement currency converter (Dollar to INR, EURO to INR, Yen) using Interfaces.

Week-3

a. Write Java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it's not a duplicate of any number already read display the complete set of unique values input after the user enters each new value.

b. Write a Java Program to create an abstract class named Shape that contains two integers and an empty method named print Area(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

c. Write a Java program to read the time intervals (HH:MM) and to compare system time if the system Time between your time intervals print correct time and exit else try again to repute the same thing. By using String Toknizer class.

Week-4

a. Write a Java program to implement user defined exception handling.

b. Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it‘s not a duplicate of any number already read. Display the complete set of unique values input after the user enters each new value.

Week-5

a. Write a Java program that creates a user interface to perform integer division. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 and Num2 were not integers, the program would throw a Number Format Exception. If Num2 were zero, the program would throw an Arithmetic Exception Display the exception in a message dialogbox.

b. 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.

Week-6

a. Write a java program to split a given text file into n parts. Name each part as the name of the original file followed by .part where n is the sequence number of the partfile.

b. Write a Java program that reads a file name from the user, displays information about whether the file exists, whether the file is readable, or writable, the type of file and the length of the file in bytes.

Week-7

a. Write a java program that displays the number of characters, lines and words in a text file.

b. Write a java program that reads a file and displays the file on the screen with line number Before each line.

Week-8

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

b. Develop a Java application for stack operation using Buttons and JOption Pane input and Message dialogbox.

c. Develop a Java application to perform Addition, Division, Multiplication and subtraction Using J Option Pane dialog Box and Text fields.

Week-9

a. Develop a Java application for the blinking eyes and mouth should open while blinking.

b. Develop a Java application that simulates a traffic light. The program lets the user select one of three lights: Red, Yellow or Green with radio buttons. On selecting a button an appropriate message with ―STOP‖or ―READY‖or‖GO‖ should appear above the buttons in selected color. Initially, there is no message shown.

Week-10

a. Develop a Java application to implement the opening of a door while opening man should present before hut and closing man should disappear.

b. Develop a Java application by using Jtext Field to read decimal value and converting a decimal number into binary number then print the binary value in another Jtext Field.

Week-11

a. Develop a Java application that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. Use adapter classes.

b. Develop a Java application to demonstrate the key event handlers.

Week-12

a. Develop a Java application to find the maximum value from the given type of elements using a generic function.

b. Develop a Java application that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. c. Develop a Java application for handling mouse events.

Week-13

a. Develop a Java application to establish a JDBC connection, create a table student with properties name, register number, mark1, mark2, mark3. Insert the values into the table by using the java and display the information of the students at front end.

Unit Outcomes:

On successful completion of this laboratory students will be able to:

- Recognize the Java programming environment.
- Develop efficient programs using multithreading.
- Design reliable programs using Java exception handling features.
- Extend the programming functionality supported by Java.
- Select appropriate programming construct to solve a problem.

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – II-I Sem(Computer Science & Engineering)

L	T	P	C
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ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

Objectives:

To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system.

- The course aim of the importing basic principle of third process reasoning and inference sustainability is at the course of Indian traditional knowledge system
- To understand the legal framework and traditional knowledge and biological diversity act 2002 and geographical indication act 2003.
- The courses focus on traditional knowledge and intellectual property mechanism of traditional knowledge and protection.
- To know the student traditional knowledge in different sector.

Unit-I:

Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge **Learning Outcomes:**

At the end of the unit the student will able to:

- understand the traditional knowledge.
- contrast and compare characteristics importance kinds of traditional knowledge.
- analyze physical and social contexts of traditional knowledge.
- evaluate social change on traditional knowledge.

Unit-II:

Protection of traditional knowledge: the need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

Learning Outcomes:

At the end of the unit the student will able to:

- know the need of protecting traditional knowledge.
- apply significance of TK protection.
- analyze the value of TK in global economy.
- evaluate role of government **Unit-III**:

Legal framework and TK: A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest

Rights) Act, 2006, Plant Varieties Protection and Farmers Rights Act, 2001 (PPVFR Act); B:The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indications act 2003.

Learning Outcomes:

At the end of the unit the student will able to:

- Understand legal framework of TK.
- Contrast and compare the ST and other traditional forest dwellers
- Analyze plant variant protections
- Evaluate farmers right act

Unit-IV:

Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

Learning Outcomes:

At the end of the unit the student will able to:

- Understand TK and IPR
- Apply systems of TK protection.
- Analyze legal concepts for the protection of TK.
- Evaluate strategies to increase the protection of TK.

Unit-V:

Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

Learning Outcomes:

At the end of the unit the student will able to:

- know TK in different sectors.
- apply TK in engineering.
- analyze TK in various sectors.
- evaluate food security and protection of TK in the country.

Reference Books:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.
3. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
4. "Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino

E-Resources:

1.https://www.youtube.com/watch?v=LZP1StpYEPM 2.http://nptel.ac.in/courses/121106003/

Course Outcomes: After completion of the course, students will be able to:

1. understand the concept of Traditional knowledge and its importance
2. know the need and importance of protecting traditional knowledge
3. know the various enactments related to the protection of traditional knowledge.
4. understand the concepts of Intellectual property to protect the traditional knowledge

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – II-II Sem(Computer Science & Engineering)

	L	T	P	C
NUMBER THEORY AND APPLICATIONS	3	0	0	3

Course Objective:

This course enables the students to learn the concepts of number theory and its applications to information security.

Unit-I-Integers, Greatest common divisors and prime Factorization

The well-ordering property-Divisibility-Representation of integers-Computer operations with integers-Prime numbers-Greatest common divisors-The Euclidean algorithm -The fundamental theorem of arithmetic-Factorization of integers and the Fermat numbers-Linear Diophantine equations

Unit Outcomes:

Students will be able to

1. Understand basics of number theory concepts.
2. Solve problems on prime numbers.
3. Understand Euclidean algorithm and its applications.

Unit-II-Congruences

Introduction to congruences -Linear congruences-The Chinese remainder theorem-Systems of linear congruences

Unit Outcomes:

Students will be able to

1. Understand Congruences and its basic properties.
2. Understand Chinese remainder theorem and its applications.

Unit-III Applications of Congruences

Divisibility tests-The perpetual calendar-Round-robin tournaments-Computer file storage and hashing functions. Wilson's theorem and Fermat's little theorem- Pseudo primes- Euler's theorem- Euler's p hi-function- The sum and number of divisors- Perfect numbers and Mersenne primes.

Unit Outcomes:

Students will be able to

1. Understand divisibility tests.
2. Apply the concept of congruences to various applications.
3. Understand various theorems on Number theory and its applications.

Unit-IV- Finite fields & Primality, factoring

Finite fields- quadratic residues and reciprocity-Pseudo primes-rho method-fermat factorization and factor bases.

Unit Outcomes:

Students will be able to

1. Understand the terminology of finitefields.
2. Understand rho method and fermatfactorization.

Unit-V- Cryptology

Basic terminology-complexity theorem-Character ciphers-Block ciphers-Exponentiation ciphers- Public-key cryptography-Discrete logarithm-Knapsack ciphers- RSA algorithm-

Some applications to computer science.

Unit Outcomes:

Students will be able to

1. Understand the terminology of cryptology.
2. Understand different encryption mechanisms.

Course Outcomes:

After the completion of course, student will be able to Understand number theory and its properties.

- Understand principles on congruences
- Develop the knowledge to apply various applications
- Develop various encryption methods and its applications.

Text Books:

1. Kenneth H Rosen "Elementary number theory and its applications", AT & T Information systems & Belllaboratories.
2. Neal Koblitz" A course in Number theory &Cryptography",Springer.

Reference Books:

1. Herbert S. Zuckerman, "An Introduction To The Theory Of Numbers", Hugh L. Montgomery, Ivan Niven, wileypublishers
2. Tom M Apostol "Introduction to Analytic number theory",Springer
3. VK Krishnan "Elementary number theory", Universities press

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B.Tech – II-II Sem(Computer Science & Engineering) L T P C
FORMAL LANGUAGES AND AUTOMATA THEORY 3 0 0 3

Course Objectives

- Students would be able to explain basic concepts in formal language theory, grammars, automata theory, computability theory, and complexity theory.
- The student will be able to explain the application of machine models and descriptors to compiler theory and parsing.
- Students will be able to relate practical problems to languages, automata, computability, and complexity.
- Students will demonstrate an increased level of mathematical sophistication.
- Students will be able to apply mathematical and formal techniques for solving problems in computer science.
- Students will be able to explain the relationship among language classes and grammars with the help of Chomsky Hierarchy.

UNIT I:

Fundamentals:
Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, deterministic finite automaton and non deterministic finite automaton, transition diagrams and Language recognizers.
Finite Automata:
NFA with Î transitions - Significance, acceptance of languages. Conversions & Equivalence: Equivalence between NFA with and without Î transitions, NFA to DFA conversion, minimization of FSM, equivalence between two FSM's, Finite Automata with output- Moore and Melay machines.

Unit Outcomes:

- Able to manipulate strings on a given alphabet by applying the operations there on.
- Able to visualize languages and finite state machines and their equivalence.
- Able to tell languages by the FSMs.
- Able to differentiate Deterministic and Non-Deterministic automata.
- Able to know the importance of finite automata in compiler design.

- Able to manipulate strings on a given alphabet by applying the operations there on.
- Able to visualize languages and finite state machines and their equivalence.
- Able to tell languages by the FSMs.
- Able to differentiate Deterministic and Non-Deterministic automata.
- Able to know the importance of finite automata in compiler design.

UNIT II:

Regular Languages:
Regular sets, regular expressions, identity rules, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Pumping lemma of regular sets, closure properties of regular sets.
Grammar Formalism:
Regular grammars-right linear and left linear grammars, equivalence between regular linear

grammar and FA, inter conversion, Context free grammar, derivation trees, and sentential forms. Right most and left most derivation of strings.

Unit Outcomes:

- Able to know the importance of regular sets & expressions
- Able to construct FAs for REs and vice versa.
- Able to use pumping lemma for show that a language is not regular.
- Write regular grammar for regular language and be able to differentiate between left linear & right linear grammars.
- Prove the equivalence between regular linear grammar and FA
- Define CFG.
- Derive (L&R) of strings for given CFG.

UNIT III:
Context Free Grammars:
Ambiguity in context free grammars. Minimization of Context Free Grammars. Chomsky normal form, Greiback normal form, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL.
Push Down Automata:
Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, inter conversion. (Proofs not required). Introduction to DCFL and DPDA.

Unit Outcomes:

- Know the cause of ambiguity in CFG & minimize CFG.
- Write CFG in the normal forms.
- Use pumping lemma to prove that a language is not a CFL.
- Define and design a PDA for a given CFL.
- Prove the equivalence of CFL and PDA and their inter-conversions.
- Differentiate DCFL and DPDA

UNIT IV:
Turing Machine:
Turing Machine, definition, model, design of TM, Computable functions, recursively enumerable languages. Church's hypothesis, counter machine, types of Turing machines (proofs not required). , linear bounded automata and context sensitive language 4

Unit Outcomes:

- Define and design TM for a given computation, a total function, or a language.
- Convert algorithms into Turing Machines.
- Arrange the machines in the hierarchy with respect to their capabilities.

UNIT V:
Computability Theory:
Chomsky hierarchy of languages, decidability of, problems, Universal Turing Machine, undecidability of posts. Correspondence problem, Turing reducibility, Definition of P and NP problems, NP complete and NP hard problems.

Unit Outcomes:

- Know the hierarchy of languages and grammars.
- Know decidability of problems.
- Generalize Turing Machines into universal TMs
- Classify P and NP (complete & hard) Problems.

TEXT BOOKS:

1. “Introduction to Automata Theory Languages and Computation”. Hopcroft H.E. and Ullman J. D. Pearson Education.
2. Introduction to Theory of Computation –Sipser 2nd edition Thomson.

REFERENCES:

1. Introduction to Formal Languages, Automata Theory and Computation –
   Kamala Krithivasan, Rama R
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. Theory of Computation : A Problem – Solving Approach- Kavi Mahesh, Wiley India Pvt. Ltd.
4. “Elements of Theory of Computation”, Lewis H.P. & Papadimition C.H. Pearson /PHI.
5. Theory of Computer Science – Automata languages and computation -Mishra and Chandrashekaran, 2nd
   edition, PHI.
6. Introduction to languages and the Theory of Computation, John C Martin, TMH.

Sri Krishnadevaraya University College of Engineering & Technology

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B.Tech – II –II Sem(Computer Science & Engineering)	3	0	0	:

COMPUTER ORGANIZATION

Course Objectives:

- To discuss organization and design of a digital computer.
- To explain how to use RTL to represent memory and Arithmetic/ Logic/ Shift operations
- To introduce computer languages, machine, symbolic and assembly levels
- To present organization of central processing unit and concepts of micro-programmed control
- To explain how input-output devices communicate with the other components and methods of data transfer
- To teach different types of addressing modes and memory organization.

Unit I

Data Representation: Data Types, Complements, Fixed-Point Representation, Conversion of Fractions, Floating-point Representation, Other Binary Codes Register Transfer 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 Outcomes:

- Represent various data types found in digital computers in binary form
- Emphasize representation of numbers employed in arithmetic operations and on binary coding of symbols used in data processing
- Express micro-operations in symbolic form by using register transfer language
- Develop composite arithmetic logic shift unit to show hardware design of micro- operations

Unit II

Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input- Output and Interrupt, Complete Computer Description, Design and Accumulator Logic.

Programming the Basic Computer: Machine Language, Assembly Language, the Assembler, Program Loops, programming arithmetic and logic operations

Unit Outcomes:

- Describe organization and design of a basic digital computer
- Illustrate techniques used in assembly language programming
- Show translation from symbolic code to an equivalent binary program using basic operations of an assembler

Unit III

Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).

Unit Outcomes:

- Develop execution unit to show general register organization of a typical CPU
- Explain operation of a memory stack
- Illustrate various instruction formats together with a variety of addressing modes
- Discuss characteristics and advantages of reduced instruction set computer(RISC)

Unit IV

Micro-programmed Control: Control Memory, Address Sequencing, Micro-program example, Design of Control Unit.

Computer Arithmetic: Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating-Point Arithmetic Operations

Unit Outcomes:

- Develop specific micro-programmed control unit to show how to write microcode for a typical set of instructions
- Design control unit including the hardware for the micro-program sequencer
- Show procedures for implementing arithmetic algorithms for addition, subtraction, multiplication and division with digital hardware
- Discuss algorithms to specify the sequence of micro-operations and control decisions required for implementation

UNIT V

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor (IOP), Serial Communication.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

Unit Outcomes:

- Explain how processor interacts with external peripherals through Interface units
- Compare different modes of data transfer
- Illustrate procedures for serial data transmission
- Describe concept of memory hierarchy composed of cache memory, main memory, and auxiliary memory
- Explain organization and operation of associative memories

Course Outcomes:

CO1: Conceptualize basics of organizational and architectural issues of a digital computer

CO2: Emphasize representation of data types, numbers employed in arithmetic operations and binary coding of symbols used in data processing

CO3: Develop low-level programs to perform different basic instructions **CO4**: Evaluate various modes of data
transfer between CPU and I/O devices **CO5**: Analyze various issues related to memory hierarchy **CO6**: Design basic computer system using the major components

TEXT BOOKS:

1. M. Morris Mano, “Computer System Architecture”, 3rd edition, PearsonEducation, 2017.

REFERENCES:

1. Carl Hamacher, ZvonkoVranesic and SafwatZaky, “Computer Organization”, 5th Edition McGrawHill,
2. John D. Carpinelli, “Computer Systems Organization and Architecture”, 15th reprint Pearson Education,2018,
3. William Stallings, “Computer Organization and Architecture: Designing for Performance”, 8thEdition, Pearson

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	L	T	P	C
B.Tech – II-II Sem(Computer Science & Engineering)	**3**	**0**	**0**	**3**

SOFTWARE ENGINEERING

Course Objectives:

To learn the basic concepts of software engineering and life cycle models

To explore the issues in software requirements specification and enable to write SRS documents for software development problems

To elucidate the basic concepts of software design and enable to carry out procedural and object oriented design of software development problems

To understand the basic concepts of black box and white box software testing and enable to design test cases for unit, integration, and system testing

To reveal the basic concepts in software project management

Unit – I: Basic concepts in software engineering and software project management

Basic concepts: abstraction versus decomposition, evolution of software engineering techniques,

Software development life cycle (SDLC) models: Iterative waterfall model, Prototype model, Evolutionary model, Spiral model, RAD model, Agile models, software project management: project planning, project estimation, COCOMO, Halstead's Software Science, project scheduling, staffing, Organization and team structure, risk management, configuration management.

Unit Outcomes:

Student should be able to

1. Recognize the basic issues in commercial software development.
2. Summarize software life cycle models.
3. Infer Workout project cost estimates using COCOMO and schedules using PERT and GANTT charts.

Unit – II: Requirements analysis and specification

The nature of software, The Unique nature of Webapps, Software Myths, Requirements gathering and analysis, software requirements specification, Traceability, Characteristics of a Good SRS Document, IEEE 830 guidelines, representing complex requirements using decision tables and decision trees, overview of formal system development techniques. axiomatic specification, algebraic specification.

Unit Outcomes:

Student should be able to

1. Identify basic issues in software requirements analysis and specification.
2. Develop SRS document for sample problems using IEEE 830format.
3. Develop algebraic and axiomatic specifications for simple problems.

Unit – III : Software Design

Good Software Design, Cohesion and coupling, Control Hierarchy: Layering, Control Abstraction, Depth and width, Fan-out, Fan-in, Software design approaches, object oriented vs. function oriented design. Overview of SA/SD methodology, structured analysis, Data flow diagram, Extending DFD technique to real life systems, Basic Object oriented concepts, UML Diagrams, Structured design, Detailed design, Design review, Characteristics of a good user interface, User Guidance and Online Help, Mode-based Vs Mode-less Interface, Types of user interfaces, Component-based GUI development, User interface design methodology: GUI design methodology.

Unit Outcomes

Student should be able to

1. Identify the basic issues in software design.
2. Apply the structured, object oriented analysis and design (SA/SD) technique.
3. Recognize the basic issues in user interface design.

Unit – IV : Coding and Testing

Coding standards and guidelines, code review, software documentation, Testing, Black Box Testing, White Box Testing, debugging, integration testing, Program Analysis Tools, system testing, performance testing, regression testing, Testing Object Oriented Programs.

Unit Outcomes:

Student should be able to

1. Identify the basic issues in coding practice.
2. Recognize the basic issues in software testing.
3. Design test cases for black box and white box testing.

Unit – V: Software quality, reliability, and other issues

Software reliability, Statistical testing, Software quality and management, ISO 9000, SEI capability maturity model (CMM), Personal software process (PSP), Six sigma, Software quality metrics, CASE and its scope, CASE environment, CASE support in software life cycle, Characteristics of software maintenance, Software reverse engineering, Software maintenance processes model, Estimation maintenance cost. Basic issues in any reuse program, Reuse approach, Reuse at organization level.

Unit Outcomes:

Student should be able to

1. Summarize various methods of software quality management.
2. Instruct the quality management standards ISO 9001, SEI CMM, PSP, and Six Sigma.
3. Outline software quality assurance, quality measures, and quality control.
4. Identify the basic issues in software maintenance, CASE support, and software reuse.

Course Outcomes:

Student should be able to

- Obtain basic software life cycle activity skills.
- Design software requirements specification for given problems.
- Implement structure, object oriented analysis and design for given problems.
- Design test cases for given problems.
- Apply quality management concepts at the application level.

Text Book:

1. Rajib Mall, “Fundamentals of Software Engineering”, 5th Edition, PHI,2018.
2. Pressman R, “Software Engineering- Practioner Approach”, McGraw Hill.

Reference Books:

1. Somerville, “Software Engineering”, Pearson 2.
2. Richard Fairley, “Software Engineering Concepts”, Tata McGrawHill.
3. JalotePankaj, “An integrated approach to Software Engineering”,Narosa

Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – II-II Sem (Computer Science & Engineering)	**L**	**T**	**P**	**C**
	3	**0**	**3**	**3**

OPERATING SYSTEMS

Course Objectives:

The course is designed to

- Understand basic concepts and functions of operating systems Understand the processes, threads and scheduling algorithms.
- Provide good insight on various memory management techniques
- Expose the students with different techniques of handling deadlocks
- Explore the concept of file-system and its implementation issues
- Familiarize with the basics of Linux operating system
- Implement various schemes for achieving system protection and security

UNIT I

Operating Systems Overview: Introduction, Operating system functions, Operating systems operations, Computing environments, Open-Source Operating Systems

System Structures: Operating System Services, User and Operating-System Interface, systems calls, Types of System Calls, system programs, Operating system Design and Implementation, Operating system structure, Operating system debugging, System Boot.

Unit Outcomes:

- Identify major components of operating systems
- Understand the types of computing environments
- Explore several open source operating systems
- Recognize operating system services to users, processes and other systems

UNIT II

Process Concept: Process scheduling, Operations on processes, Inter-process communication, Communication in client server systems.

Multithreaded Programming: Multithreading models, Thread libraries, Threading issues, Examples.

Process Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processor scheduling, Thread scheduling, Examples.

Inter-process Communication: Race conditions, Critical Regions, Mutual exclusion with busy waiting, Sleep and wakeup, Semaphores, Mutexes, Monitors, Message passing, Barriers, Classical IPC Problems - Dining philosophers problem, Readers and writers problem.

Unit Outcomes:

- Understand the importance, features of a process and methods of communication between processes.
- Improving CPU utilization through multi programming and multithreaded programming
- Examine several classical synchronization problems

UNIT III

Memory-Management Strategies: Introduction, Swapping, Contiguous memory allocation, Paging, Segmentation, Examples.

Virtual Memory Management: Introduction, Demand paging, Copy on-write, Page replacement, Frame allocation, Thrashing, Memory-mapped files, Kernel memory allocation, Examples.

Unit Outcomes:

- Examine the various techniques of allocating memory to processes Summarize how paging works in contemporary computer systems Understanding the benefits of virtual memory systems.

UNIT IV

Deadlocks: Resources, Conditions for resource deadlocks, Ostrich algorithm, Deadlock detection And recovery, Deadlock avoidance, Deadlock prevention.

File Systems: Files, Directories, File system implementation, management and optimization. Secondary-Storage Structure: Overview of disk structure, and attachment, Disk scheduling, RAID structure, Stable storage implementation. **Unit Outcomes:**

Investigate methods for preventing/avoiding deadlocks

Examine file systems and its interface in various operating systems

Analyze different disk scheduling algorithms

UNIT V

System Protection: Goals of protection, Principles and domain of protection, Access matrix, Access control, Revocation of access rights.

System Security: Introduction, Program threats, System and network threats, Cryptography as a security, User authentication, implementing security defenses, firewalling to protect systems and networks, Computer security classification.

Case Studies: Linux, Microsoft Windows.

Unit Outcomes:

- Infer various schemes available for achieving system protection. Acquiring knowledge about various countermeasures to security attacks Outline protection and security in Linux and Microsoft Windows.

Course Outcomes

By the end of this course students will be able to:

- Realize how applications interact with the operating system Analyze the functioning of a kernel in an Operating system.
- Summarize resource management in operating systems
- Analyze various scheduling algorithms
- Examine concurrency mechanism in Operating Systems
- Apply memory management techniques in design of operating systems
- Understand the functionality of file system
- Compare and contrast memory management techniques.
- Understand the deadlock prevention and avoidance.
- Perform administrative tasks on Linux based systems.

Text Books:

1. Silberschatz A, Galvin P B, and Gagne G, Operating System Concepts, 9th edition, Wiley, 2016.

2.Tanenbaum A S, Modern Operating Systems, 3rd edition, Pearson Education, 2008. (Topics: Inter-process Communication and File systems.)

Reference Books:

1.Tanenbaum A S, Woodhull A S, Operating Systems Design and Implementation, 3rd edition, PHI, 2006.

2.Dhamdhere D M, Operating Systems A Concept Based Approach, 3rd edition, Tata McGraw-Hill, 2012.

3.Stallings W, Operating Systems -Internals and Design Principles, 6th edition, Pearson Education, 2009 4.Nutt G, Operating Systems, 3rd edition, Pearson Education, 2004

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Managerial Economics & Financial Analysis

Course Objectives:

- The objective of this course is to inculcate the basic knowledge to the students with the concepts of Economics & Demand to make them effective business decision makers.
- To understand fundamentals of Production & Cost Concepts which is an important subject helps to the Technocrats to take certain business decisions in the processes of optimum utilization of resources.
- To know the various types of Market Structures & pricing methods and its strategies & Trade Blocks.
- To give an overview on investment appraisal methods to promote the students to learn how to plan long-term investment decisions.
- To provide fundamental skills about accounting and to explain the process of preparing accounting statements & analysis for effective business decisions

Unit I: INTRODUCTION TO MANAGERIAL ECONOMICS

Managerial Economics – Definition- Nature- Scope - Contemporary importance of Managerial Economics -

Demand Analysis: Concept of Demand-Demand Function - Law of Demand - Elasticity of Demand- Significance - Types of Elasticity - Measurement of elasticity of demand - Demand Forecasting- factors governing demand forecasting- methods of demand forecasting -Relationship of Managerial Economics with Financial Accounting and Management.

UNIT II: THEORY OF PRODUCTION AND COST ANALYSIS

Production Function- Least cost combination- Short-run and Long- run production function- Isoquantsand Isocosts, MRTS - Cobb-Douglas production function - Laws of returns - Internal and External economies of scale -

Cost Analysis: Cost concepts and cost behavior- Break-Even Analysis (BEA) - Determination of Break Even Point (Simple Problems)-Managerial significance and limitations of Break- Even Point.

UNIT III: INTRODUCTION TO MARKETS AND NEW ECONOMIC ENVIRONMENT

Market structures: Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition- Monopoly-Monopolistic Competition-Oligopoly-Price-Output Determination - Pricing Methods and Strategies Forms of Business Organizations- Sole Proprietorship- Partnership – Joint Stock Companies - Public Sector Enterprises – New Economic Environment- Economic Liberalization – Privatization - Globalization.

UNIT IV: CAPITAL AND CAPITAL BUDGETING

Concept of Capital - Over and Undercapitalization – Remedial Measures - Sources of Shot term and Long term Capital - Estimating Working Capital Requirements – Capital Budgeting – Features of Capital Budgeting

Proposals – Methods and Evaluation of Capital Budgeting Projects – Pay Back Method – Accounting Rate of
Return (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method (simple problems)

UNIT V: INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS

Financial Accounting – Concept - Emerging need and Importance - Double-Entry Book Keeping-Journal - Ledger – Trial Balance - Financial Statements - Trading Account – Profit & Loss Account – Balance Sheet (with simple adjustments). Financial Analysis – Ratios – Liquidity, Leverage, Profitability, and Activity Ratios (simple problems).

Course outcomes:

CO1: Capable of analyzing fundamentals of Economics such as Demand, Elasticity &Forecasting methods

CO2: To apply production, pricing & supply concepts for effective business administration

CO3: Students can able to identify the influence of various markets, the forms of business organization and it's International Economic Environment.

CO4: Analyze how to invest adequate amount of capital in order to get maximum return from selected business activity.

CO5:Prepare and analyze accounting statements like income & expenditure statement, balance sheet apart from the fundamental knowledge, to understand financial performance of the business and to initiate the appropriate decisions to run the business profitably.

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2013.
2. Ahuja H.L Managerial economics. S.Chand, 3/e, 2013

REFERENCES

1. Aryasri: Managerial Economics and Financial Analysis, 4/e, TMH, 2013
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International,. 2013
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage, 2013.

Sri Krishnadevaraya University College of Engineering & Technology

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B.Tech – II-II Sem(Computer Science & Engineering)	0	0	3	1
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OPERATING SYSTEMS LAB

Course Objectives:

- To provide an understanding of the design aspects of operating system concepts through
- Simulation Introduce basic UNIX commands, system call interface for process management, inter process.
- Communication and I/O in Unix Course Outcomes: Simulate and implement operating system concepts such as scheduling, deadlock.
- Management, file management and memory management. Able to implement C programs using Unix system calls

LIST OF EXPERIMENTS:

1. Write C programs to simulate the following CPU Scheduling algorithms a) FCFS b) SJF c) Round Robin d) priority

2. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close, fcntl, seek, stat, opendir, readdir)

3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.

4. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.

5. Write C programs to illustrate the following IPC mechanisms a) Pipes b) FIFOs c) Message Queues d) Shared Memory

6. Write C programs to simulate the following memory management techniques a) Paging b) Segmentation

7. Write a C program to simulate the concept of Dining-philosophers problem

8. Write a C program to simulate the following contiguous memory allocation Techniques a) Worst fit b) Best fit c) First fit.

9. Write a C program to simulate disk scheduling algorithms. a) FCFS b) SCAN c) C-SCAN

10. Simulate all File Organization Techniques a) Single level directory b) Two level directory

TEXT BOOKS: 1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley

2. Advanced programming in the Unix environment, W.R.Stevens, Pearson education.

REFERENCE BOOKS:

1. Operating Systems – Internals and Design Principles, William Stallings, Fifth Edition–2005, Pearson Education/PHI

2. Operating System - A Design Approach-Crowley, TMH.

3. Modern Operating Systems, Andrew S Tanenbaum, 2nd edition, Pearson/PHI

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Sri Krishnadevaraya University College of Engineering & Technology

B.Tech – II-II Sem(Computer Science & Engineering)	**L**	**T**	**P**	**C**
SOFTWARE ENGINEERING LABORATORY	**0**	**0**	**3**	**1.5**

Course Objectives:

1. To Learn and implement the fundamental concepts of software Engineering.
2. To explore functional and non functional requirements through SRS.
3. To practice the various design diagrams through appropriate tool.
4. To learn to implement various software testing strategies.

List of Experiments:

1 Draw the Work Breakdown Structure for the system to be automated

2 Schedule all the activities and sub-activities Using the PERT/CPM charts

3 Define use cases and represent them in use-case document for all the stakeholders ofthe system to be automated

4 Identify and analyze all the possible risks and its risk mitigation plan for the system tobe automated

5 Diagnose any risk using Ishikawa Diagram (Can be called as Fish Bone Diagram or Cause& Effect Diagram)

6 Define Complete Project plan for the system to be automated using Microsoft Project Tool

7 Define the Features, Vision, Bussiness objectives, Bussiness rules and stakeholders in the vision document

8 Define the functional and non-functional requirements of the system to be automated by using Use cases and document in SRS document 9 Define the following tracebility matrices :

1. UsecaseVs. Features
2. Functional requirements Vs.Usecases

10 Estimate the effort using the following methods for the system to be automated:

1. Function point metric
2. Usecase point metric

11 Develop a tool which can be used for quantification of all the non-functional requirements

12 Write C/C++/Java/Python program for classifying the various types of coupling.

13 Write a C/C++/Java/Python program for classifying the various types of cohesion.

14 Write a C/C++/Java/Python program for object oriented metrics for design proposed Chidamber and kremer . (Popularly called as CK metrics) 66 Page

15 Convert the DFD into appropriate architecture styles.

16 Draw complete class diagram and object diagrams using Rational tools

17 Define the design activities along with necessary artifacts using Design Document.

18. Reverse Engineer any object-oriented code to an appropriate class and object diagrams.

19. Test a piece of code which executes a specific functionality in the code
to be tested and asserts a certain behavior or state using Junit.

20. Test the percentage of code to be tested by unit test using any code

coverage tools

21 Define an appropriate metrics for at least 3 quality attributes for any software application of your interest.

22 Define a complete call graph for any C/C++ code. (Note: The student may use any tool that generate call graph for source code)

Unit Outcomes

Student is able to

- Acquaint with historical and modern software methodologies
- Understand the phases of software projects and practice the activities of each phase
- Practice clean coding
- Take part in project management
- Adopt skills such as distributed version control, unit testing, integration testing, build management, and deployment