THIRUVALLUVARUNIVERSITY

BACHELOR OF SCIENCE

B.Sc. SOFTWARE COMPUTER SCIENCE

CBCS PATTERN

(With effect from 2022-2023)

The Course of Study and the Scheme of Examinations

S. No.	Part	Study Components Course Title		Ins. Hrs / week	Credit	Title of the Paper	Maximum Marks		
		SEMESTER I					**CIA**	**Uni. Exam**	**Total**
1.	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2.	II	English (CE)	Paper-1	6	4	**Communicative English I**	25	75	100
3.	III	Core Theory	Paper-1	6	4	Programmingin C	25	75	100
4.	III	Core Practical	Practical-1	3	2	Programmingin CLab	25	75	100
5.	III	Allied -1	Paper-1	7	3	(**tochooseanyone)** 1. MathematicsI 2. Mathematical FoundationsI	25	75	100
6.	**III**	**PE**	**Paper 1**	**6**	**3**	**Professional English I**	**25**	**75**	**100**
7.	IV	Environmental Studies		2	2	Environmental studies	25	75	100
		Sem. Total		**36**	**22**		**175**	**525**	**700**
		SEMESTER II					**CIA**	**Uni. Exam**	**Total**
8.	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
9.	II	English (CE)	Paper-2	4	4	**Communicative English II**	25	75	100
10.	**II**	**NMSDC I : Language Proficiency for Employability**	**Paper-1**	**2**	**2**	**Effective English**	**25**	**75**	**100**
11.	III	Core Theory	Paper-2	5	4	C++& Data Structure	25	75	100
12.	III	Core Practical	Practical-2	2	2	C++ and Data Structures Lab	25	75	100
13.	III	Allied-1	Paper-2	7	5	**tochooseanyone)** 1. MathematicsII 2. Mathematical FoundationsII	25	75	100
14.	**III**	**PE**	**Paper 1**	**6**	**3**	**Professional English II**	25	75	100
15.	IV	Value Education		2	2	Value Education	25	75	100
16.	IV	Soft Skill		2	1	Soft Skill	25	75	100
		Sem. Total		**36**	**27**		**225**	**675**	**900**
		SEMESTER III					**CIA**	**Uni. Exam**	**Total**
17.	I	Language	Paper-3	6	4	Tamil/ OtherLanguages	25	75	100
18.	II	English	Paper-3	6	4	English	25	75	100
19.	III	Core Theory	Paper-3	5	5	JAVA Programming	25	75	100
20.	III	Core Practical	Practical-3	4	2	JAVA Programming Lab	25	75	100
21.	III	AlliedII	Paper-3	5	3	Quantitative Techniques - I	25	75	100
22.	IV	Skill Based Subject	Paper-1	2	2	Design & Analysis of Algorithms	25	75	100
23.	IV	Non-Major Elective	Paper-1	2	2	Introductionto InformationTechnology	25	75	100
				30	**22**		**175**	**525**	**700**

		SEMESTER IV					CIA	Uni. Exam	Total
24.	I	Language	Paper-4	6	4	Tamil/OtherLanguages	25	75	100
25.	II	English	Paper-4	6	4	English	25	75	100
26.	III	Core Theory	Paper-4	3	5	Relational DatabaseManagement Systems	25	75	100
27.	III	Core Practical	Practical-4	3	2	RDBMSLab	25	75	100
28.	III	Allied2	Paper-4	5	3	Quantitative Techniques - II	25	75	100
29.	III	Allied Practical	Practical 2	3	2	Quantitative Techniques - LAB	25	75	100
30.	**IV**	**NMSDC II : Digital Skills for Employability**	**Paper-2**	**2**	**2**	**Office Fundamentals**	**25**	**75**	**100**
31.	IV	Non-Major Elective	Paper-2	2	2	Internet Technology	25	75	100
				30	**24**		**200**	**600**	**800**
		SEMESTER V					**CIA**	**Uni. Exam**	**Total**
32.	III	Core Theory	Paper-5	6	4	MobileApplication Development	25	75	100
33.	III	Core Theory	Paper-6	6	4	Operating System	25	75	100
34.	III	Core Theory	Paper-7	5	4	Data Mining	25	75	100
35.	III	Core Practical	Practical-5	4	2	OperatingSystem-Lab	25	75	100
36.	III	Core Practical	Practical-6	4	2	MobileApplications Development-Lab	25	75	100
37.	III	ElectiveI	Paper-1	3	3	1. Information Security 2. Software Testing 3. Internet of Things	25	75	100
38.	IV	Skill Based Subject	Paper-2	2	2	Multimedia Systems	25	75	100
				30	**21**		**175**	**525**	**700**
		SEMESTER VI							
39.	III	Core Theory	Paper-8	5	4	OpenSource Software	25	75	100
40.	III	Core Theory	Paper-9	4	4	Python Programming	25	75	100
41.	III	Core Practical	Practical-7	4	2	Open Source Software Lab	25	75	100
42.	III	Core Practical	Practical-8	4	2	Python Programming Lab	25	75	100
43.	III	Project		5	5	Group/Individual project	25	75	100
44.	III	ElectiveII	Paper-2	3	3	1. Computer Architecture Organization 2. Software Metrics 3. Wireless and Data Communication	25	75	100
45.	III	ElectiveIII	Paper-3	3	3	1. Web Technology 2. Software Design 3. Software Quality Assurance	25	75	100
46.	**III**	**NMSE III : Emerging Technology for Employability - II**	**Paper-3**	**2**	**2**	**(Choose any one)** **• PBL Android App Development** **• Machine Learning**	**25**	**75**	**100**
47.	V	Extension Activities		0	1		100	0	100
				30	**26**		300	600	**900**
		Total			**142**				**4700**

Part	Subject	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages	4	4	16	100	400
Part II	Communicative English & English	4	4	16	100	400
	NMSD	1	2	2	100	100
Part III	Allied (Odd Semester)	2	3	6	100	200
	Allied (Even Semester)	2	5	10	100	200
	Allied Practical	1	2		100	100
	Electives	3	3	9	100	300
	Core	9	(3-5)	40	100	900
	Core practical	8	(2-3)	16	100	800
	Professional English	2	3	6	100	200
	Compulsory Project (Group/Individual Project)	1	5	5	100	100
Part IV	Environmental Science	1	2	2	100	100
	Soft skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others /NME	2	2	4	100	200
	Skill Based	4	2	6	100	400
Part V	Extension Activities	1	1	1	100	100
	Total	**46**		**142**		**4700**

ANNEXURE - I

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

B.Sc. SOFTWARE COMPUTER SCIENCE – 2022-2023 onwards

The following details should be given before syllabus of each programme (UG & PG degree)

Programme Objectives: (5 Points Compulsory)

1. Able to communicate and engage effectively with diverse stakeholders.
2. Capable to use appropriate techniques, skills, and tools necessary for computing practice.
3. Apply mathematical foundations, algorithmic principles, and computer science theory in Modelling and design.
4. Understand design and development principles in the construction of software systems of Varying complexity.
5. Equip to identify, formulate, and develop solutions to computational challenges.

Programme Educational Objectives:(5 Points Compulsory)

1. Graduates will drive scientific and societal advancement through technological innovation and entrepreneurship.
2. Graduates will interact with their peers in other disciplines in industry and society and contribute to the economic growth of the country.
3. Graduates will draw upon foundational knowledge, learn, adapt and successfully. bring to bear analytical and computational approaches.
4. Graduates will be successful in pursuing higher studies.
5. Graduates will pursue career paths in teaching or research.

Programme Outcomes: (10 Points Compulsory)

1. Possess an ability to apply mathematics and science in engineering applications
2. Showcase a clear understanding of the subject related concepts and contemporary issues
3. Demonstrate the ability to design a component or a product applying all the relevant standards and with realistic constraint
4. Having an ability to use techniques, skills and modern engineering toolsnecessary for engineering practice
5. Exhibit the problem solving ability-solving social issues and engineering problems
6. Showcaseclear understanding of professional and ethical responsibility
7. Having a good working knowledge of communicating in English
8. Express an interest in lifelong learning.
9. Having an ability to design a component or a product applying all the relevant standards and with realistic constraints
10. Possess adaptive thinking and adaptability

Programme Specific Outcomes:(10 Points Compulsory)

1. Ability to interactwith diverse stakeholders from various industries.
2. Engage the problems in other industries and provide innovativesolutions
3. Apply the industry-specific design and development principles in the construction of software systems
4. Utilize the suitable techniques, skills, and tools for problem-specific computing practice
5. Demonstrate the strong mathematical foundations while modelling a problem.
6. Develop effective algorithms for solving scientific, business or industry problems.
7. Capable to design software solutions through systemprogramming skills based on the knowledge acquired
8. Apply problem solving skillsthrough programming techniques for addressing real life problems
9. Acquire the knowledge about the properties of several data structures and algorithms
10. Ability to design hardware solutions through systemprogramming skills based on the knowledge acquired

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: I **Paper type: Core Theory Paper 1**

Paper code: **Name of the Paper: PROGRAMMING IN C** **Credit: 4**

Total Hours per Week: 6 **Lecture Hours: 78** **Tutorial Hours:** **Practical Hours:**

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COURSE OBJECTIVES

The subject aims to build the concepts regarding:

1. To acquire basic knowledge in C programming
2. In-depth understanding of functional and logical programming in C
3. To provide exposure to problem-solving through programming
4. Understanding a concept of object thinking within the framework of functional model.
5. Understanding a defensive programming concept. Ability to handle possible errors during program execution.

COURSE OUTCOMES

On successful completion of this course, the student can

1. Understand the basic terminology of C Programming
2. Recognize Input / Output statements and control structures
3. Develop programs using Arrays
4. Grasp the concepts of Function and its types
5. Develop the program using Structures and Pointers

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	Yes
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: OVERVIEW OF C **Teaching Hours: 15**

O**verview of C:** History of C - Importance of C – Sample Programs - Basic Structure of C Programs-Executing a ‘C’ Program. **Constants, Variables, and Data Types:** Introduction - Character Set - C Tokens - Keywords and Identifiers - Constants - Variables - Data Types -Declaration of Variables - Declaration of Storage Class - Assigning Values to Variables - Defining Symbolic Constants –Declaring a Variable as Volatile. **Operators and Expressions**: Introduction- Arithmetic Operators - Relational Operators - Logical Operators - Assignment Operators- Increment and Decrement Operators - Conditional Operator- Bitwise Operators - Special Operators

- Arithmetic Expressions - Evaluation of Expressions – Precedence of Arithmetic Operators - Type Conversions in Expressions - Operator Precedence and Associativity

Unit-2:MANAGING INPUT AND OUTPUT OPERATIONS **Teaching Hours: 17**

Introduction - Reading a Character -Writing a Character - Formatted Input- Formatted Output. **Decision Making and Branching:** Introduction - Decision Making with If Statement– Simple If Statement – The If…..Else Statement– Nesting of If…..Else Statements– The Else If Ladder - The Switch Statement – The ?: Operator – The goto Statement. **Decision Making and Looping:** Introduction - The While Statement– The Do Statement– The for Statement - Jumps in Loops.

Unit-3: ARRAYS **Teaching Hours: 15**

Arrays: Introduction – One-Dimensional Arrays - Declaration of One-Dimensional Arrays - Initialization of One-Dimensional Arrays – Two-Dimensional Arrays - Initializing Two-dimensional Arrays – Multi-dimensional Arrays- Dynamic Arrays. **Character Arrays and Strings:** Introduction-Declaring and Initializing String Variables- Reading Strings from Terminal - Writing Strings to Screen - Arithmetic Operations on Characters - Putting Strings Together - Comparison of Two Strings – String-Handling Functions - Table of Strings.

Unit-4:USER-DEFINED FUNCTIONS **Teaching Hours: 13**

User-defined Functions: Introduction-Need for User-Defined Functions- A Multi-Function Program-Elements of User-Defined Functions - Definition of Functions - Return Values and Their Types - Function Calls - Function Declaration - Category of Functions - No Arguments and No Return Values – Arguments but No Return Values – Arguments with Return Values – No Arguments but Returns a Value – Functions that Return Multiple Values –Nesting of Functions-Recursion – Passing Arrays to Functions-Passing Strings to Functions - The Scope, Visibility and Lifetime of Variables.

Unit-5: STRUCTURES AND UNIONS **Teaching Hours: 18**

Structures and Unions: Introduction-Defining a Structure - Declaring Structure Variables - Accessing Structure Members - Structure Initialization –Copying and Comparing Structuring Variables - Operation on Individual Members- Arrays of Structures - Arrays within Structures - Structures within Structures –Structures and Functions - Unions - Size of Structures - Bit Fields.**Pointers:** Introduction- Understanding Pointers-Accessing the Address of a Variable- Declaring Pointer Variables- Initialization of Pointer Variables-Accessing a Variable Through its Pointer –Chain of Pointers—Pointer Expressions-Pointers Increments and Scale Factor- Pointers and Arrays- Pointers and Character Strings-Array of Pointers- Pointers as Function Arguments- Functions Returning Pointers-Pointers to Functions-Pointers and Structures.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.
d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.
f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
g. Extracurricular and cultural activities may be framed through the syllabus content.
h. Grouping students for self discussion, self learning process.
i. Following institution and intellectual and writing reports in the course field.
j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
l. Extracurricular activities may be framed through their syllabus content.
m. Bring the industries to the campus. Bring the students to the industry.
n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbook:

1. *Balagurusamy E*. 2017. **Programming in ANSI C.** [Seventh Edition]. Tata Mc-Graw Hill, New Delhi.

Reference Book:

1. *YashavantKanetkar*. 2004**. Let Us C**. [Fifth Edition]. BPB Publications, NewDelhi.
2. *Jeyapoovan T.* 2007. **A First Course in Programming with C**. [Second Edition].Vikas Publishing House Pvt. Ltd., New Delhi.
3. Deitel&Deitel. 2016. "**C How to Program**". [Eighth Edition]. Prentice Hall
4. Byron Gottfried. 2006. "**Programming in C**". [Second Edition]. Tata McGraw Hill

Course Material:

1. http://www.learn-c.org/
2. http://www.tutorialspoint.com/cprogramming/index.htm

3. http://www.geeksforgeeks.org

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: I **Paper type: Core Practical Practical-1**

Paper code: **Name of the Paper: Programming in C - Lab** **Credit: 2**

Total Hours per Week: 3 **Lecture Hours:** **Tutorial Hours:** **Practical Hours: 39**

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COURSEOBJECTIVES:

The subject aims to build the concepts regarding:

1. To acquire the knowledge in structured programming language
2. To make the student learn a programming language.
3. To learn problem solving techniques.
4. To teach the student to write programs in C and to solve the problems.
5. To learn uses of pointer, structure, union concepts.

COURSE OUTCOMES:

On successful completion of this course, the student can

1. Implement various input and output functions
2. Develop program using control structures
3. Develop program using Arrays and String Handling concepts
4. Execute Function concepts
5. Implement Structure and Pointer concepts

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	Yes
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXCERSIES:

1. Program to implement the formatted Input / Output Functions.
2. Program to illustrate the working of Branching Statements.
3. Program to illustrate the working of Looping Statements.
4. Program to highlight the Relational and Logical Operations.
5. Program to illustrate Array Concepts.
6. Program using String Handling Functions
7. Program using User Defined Function.

8. Program to illustrate the Concept of Recursion.
9. Program to implement the Structure Concept.
10. Program to implement Unions
11. Program to illustrate Pointer Concept.
12. Program using Pointers and Structures.

WEB REFERENCES:

https://www.cprogramming.com/tutorial/c-tutorial.html

https://www.learn-c.org/

https://www.geeksforgeeks.org

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: I **Paper type: Allied - 1 Paper 1**

Paper code: **Name of the Paper: MATHEMATICS – I** **Credit: 3**

Total Hours per Week: 7 **Lecture Hours: 91** **Tutorial Hours: …..** **Practical Hours: …..**

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ALLIED 1

Course Objectives:

To Explore the Fundamental Concepts of Mathematics

UNIT-I: ALGEBRA

Partial Fractions - Binomial, Exponential and logarithmic Series (without Proof) - Summation - Simple problems

UNIT-II : THEORY OF EQUATIONS

Polynomial Equations with real Coefficients - Irrational roots - Complex roots- Transformation of equation by increasing or decreasing roots by a constant - Reciprocal equations - Newton's method to find a root approximately - Simple problems.

UNIT-III : MATRICES

Symmetric - Skew-Symmetric - Orthogonal and Unitary matrices - Eigen roots and eigen vectors – Cayley - Hamilton theorem (without proof)-Verification and computation of inverse matrix

UNIT-IV: TRIGONOMETRY

Expansions of $\sin^n \theta$, $\cos^n \theta$, $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ - Expansions of $\sin \theta$, $\cos \theta$, $\tan \theta$ in terms of θ.

UNIT-V: DIFFERENTIAL CALCULUS

Successive differentiation upto third order, Jacobians -Concepts of polar co-ordinates- Curvature and radius of curvature in Cartesian co-ordinates and in polar co-ordinates.

Text Book.

P.Duraipandian and S.Udayabaskaran,(1997) *Allied Mathematics,* Vol. I & II.Muhil Publishers, Chennai.

Reference Books:

1. P.Balasubramanian and K.G.Subramanian,(1997) *Ancillary Mathematics.* Vol. I & II. Tata McGraw Hill, New Delhi.
2. S.P.Rajagopalan and R.Sattanathan,(2005) *Allied Mathematics* .Vol. I & II. VikasPublications, New Delhi.
3. P.R.Vittal (2003) *Allied Mathematics* .Marghan Publications, Chennai
4. P.Kandasamy, K.Thilagavathy (2003) Allied Mathematics Vol-I, II S.Chand& company Ltd., New Delhi-55.

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
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Semester: I **Paper type: Allied 1 PAPER-1**

Paper code: **Name of the Paper: MATHEMATICAL FOUNDATIONS-I** **Credit: 3**

Total Hours per Week: 7 **Lecture Hours: 91 Tutorial Hours: ….. Practical Hours: …..**

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Course Objectives

To know about Logical operators, valid

ity of arguments, set theory and set operations, relations and functions, Binary operations, Binary algebra, Permutations & Combinations, Differentiation, Straight lines, pair of straight lines, Circles, Parabola, Ellipse, Hyperbola.

Course Out Comes:

On successful completion of this course, the student can

- Understand the difference between Procedure-oriented and Object-Oriented Programming
- Create classes and objects with different types of functions
- Approach a program logically using Inheritance and Polymorphism
- Design and analyze of various data structures
- Understand various sorting and searching algorithms

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: SYMBOLIC LOGIC

Proposition, Logical operators, conjunction, disjunction, negation, conditional and bi-conditional operators, converse, Inverse, Contra Positive, logically equivalent, tautology and contradiction. Arguments and validity of arguments.

UNIT-II: SET THEORY

Sets, set operations, venndiagram, Properties of sets, number of elements in a set, Cartesian product, relations & functions,

Relations : Equivalence relation. Equivalence class, Partially and Totally Ordered sets,

Functions: Types of Functions, Composition of Functions.

UNIT-III: BINARY OPERATIONS

Types of Binary Operations: Commutative, Associative, Distributive and identity, Boolean algebra: simple properties. Permutations and Combinations.

UNIT-IV: DIFFERENTIATION

Simple problems using standard limits,

Lt x^n-a^n, lt sinx, lt tanxlt e^x-1, lt $(1+1/n)^n$, lt $(1+n)$

1/n

X→ x-a x → x x →x x 0→ n ∞→ n 0 →

Differentiation, successive differentiation, Leibnitz theorem, partial differentiation, Applications of differentiation, Tangent and normal, angle between two curves.

UNIT-V: TWO DIMENSIONAL ANALYTICAL GEOMETRY

Straight Lines - Pair Straight Lines

Text Book.

P.R. Vittal, Mathematical Foundations – Maragham Publication, Chennai.

Reference Books

1. U. Rizwan, Mathematical Foundation - SciTech, Chennai
2. V.Sundaram& Others, Dircrete Mathematical Foundation - A.P.Publication, sirkali.
3. P.Duraipandian& Others, Analytical Geometry 2 Dimension - Emerald publication 1992 Reprint.
4. Manicavachagompillay&Natarajan. Analytical Geometry part I - Two Dimension - S.Viswanathan (printers & publication) Put Ltd., 1991.

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1										
CO2										
CO3										
CO4										
CO5										

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: II **Paper type:Core Theory Paper - 2**

Paper code: Name of the Paper: C++ & DATA STRUCTURES **Credit:4**

Total Hours per Week: 5 **Lecture Hours:65** **Tutorial Hours:** **Practical Hours:**

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COURSE OBJECTIVES

The subject aims to build the concepts regarding:

1. The improvements in C++ over C
2. The Object Oriented Features in C++
3. The various design and analysis of algorithms
4. The representation of data in memory
5. Various sorting and searching algorithm

COURSE OUTCOMES:

On successful completion of this course, the student can

1. Understand the difference between Procedure-oriented and Object-Oriented Programming
2. Create classes and objects with different types of functions
3. Approach a program logically using Inheritance and Polymorphism
4. Design and analyze of various data structures
5. Understand various sorting and searching algorithms

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	No
2	Yes	Yes	Yes	No	Yes	Yes
3	Yes	Yes	Yes	Yes	No	Yes
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT- I: PRINCIPLES OF OBJECT-ORIENTED PROGRAMMINGTeaching Hours: 12

Basic concepts of Object Oriented Programming - Difference between Procedure Oriented and Object-Oriented Programming– Operators - Control Structures - Expressions - Manipulators.**FunctionsinC++**:Introduction-TheMainFunction–FunctionPrototyping– Call by value - CallbyReference– Returnby Reference—Inlinefunctions–Function Overloading-Static Data Members and Static Member Functions - Friend Functions.Classes and Objects - Constructors and Destructors.

UNIT-IIINHERITANCE AND POLYMORPHISM **Teaching Hours: 14**

Single inheritance - Multilevel Inheritance- Multipleinheritance – Hierarchicalinheritance – Hybridinheritance – Virtualbase classes – Abstract classes – Pointers, Virtual Functions and Polymorphism. **Working with Files**: Introduction- classes for file stream operations–OpeningandClosingafile– Detectingendoffile–File modes- File Pointers and their Manipulations–ErrorHandling During File Operations.

UNIT-III INTRODUCTION TO DATA STRUCTURES AND ALGORITHMSTeaching Hours: 13

Basic Terminology - Classification of Data Structures - Abstract Data Type - Time and Space Complexity – Arrays - **Stacks and Queues**: Introduction to Stacks - Array Representation of Stacks - Operations on a Stack - Applications of Stacks - Queues: Array Representation of Queues – CircularQueues - Deques - Priority Queues - Multiple Queues.

UNIT-IVLINKED LISTS **Teaching Hours: 12**

Linked Lists: Singly Linked Lists - Circular Linked Lists -Doubly Linked Lists - Polynomial Representation. **Trees**: Binary Trees - Expression Trees - Traversing a Binary Tree - Efficient Binary Trees: Binary Search Trees - Operations on Binary Search Trees.

UNIT-V GRAPHS **Teaching Hours: 14**

Graphs: Introduction-Representation of Graphs - Graph Traversal Algorithms. Shortest Path Algorithms: Minimum Spanning Trees - Prim‘s Algorithm - Kruskal‘s Algorithm - Dijkstra‘s Algorithm. **Searching and Sorting:** Linear Search - Binary Search - Bubble Sort - Insertion Sort - Selection Sort - Merge Sort - Quick Sort - Heap Sort.

TEXTBOOKS:

1. Object Oriented Programming with C++, E Balagurusamy , Tata McGraw Hill, 6th Edition, 2014.
2. C++ Plus Data Structure, Nell Dale, Jones & Bartlett Publishers , 4th Edition, 2010.

REFERENCE BOOKS:

1. C++ The Complete Reference, Herbert Schildt, Tata McGraw Hill, 4th Edition, 2003.
2. OOP In ANSI C and Turbo C, Ashok N.Kamthene, Pearson Education, 6th Edition, 2008.
3. Data Structures and Algorithms, Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft, Addison Wesley Longman Inc., 2nd Edition, 1999.

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M

CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: II **Paper type:Core Practical** **Practical - 2**

Paper code: Name of the Paper: C++ & DATA STRUCTURES LAB **Credit:2**

Total Hours per Week: 2 **Lecture Hours:** **Tutorial Hours:** **Practical Hours: 26**

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COURSE OBJECTIVES:

The subject aims to build the concepts regarding:

1. To implement various OOPs concepts
2. To implement various data structures using C++
3. Identify importance of object oriented programming and difference between structured oriented and object oriented programming features.
4. Able to make use of objects and classes for developing programs.
5. Able to use various object oriented concepts to solve different problems.

COURSE OUTCOMES:

On successful completion of this course, the student can

- The student could implement Classes and objects, Constructor, Operator Overloading concepts in C++
- Student could implement inheritance concept.
- The student could implement various Data structures such as Stack, Queue, Linked list, Tree Traversal and Graph Traversals.
- Student could implement various file operations.
- Student could implement various operations on array.

LIST OF PRACTICAL EXERCISES:

1. Implementing classes, object, constructors and member functions for calculating area and perimeter of a circle.
2. Implementing function overloading(Find area/volume of rectangle, circle, sphere, cylinder, cone etc).
3. Implementing operator over loading(Addition, subtraction, multiplication of matrices)
4. Implementing single, multiple , hierarchical inheritance.
5. Implementing sequential file operations using error handling functions.
6. Implementing PUSH, POP operations of stack using Arrays.
7. Implementing add, delete operations of a queue using Arrays.
8. Implementing Infix to postfix conversion of an expression using stack.
9. Implementing Binary tree recursive traversals (in-order, pre-order, and post-order).
10. Implementing Polynomial addition using linked list.

WEB REFERENCES

1. https://www.jdoodle.com/online-compiler-c++
2. https://www.cpp.thiyagaraaj.com/c-programs/c-basic-example-programs
3. https://www.programiz.com/cpp-programming/examples

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: II **Paper type: Allied I PAPER-2**

Paper code: **Name of the Paper:MATHEMATICS-II** **Credit: 5**

Total Hours per Week: 7 **Lecture Hours: 91 Tutorial Hours: ….. Practical Hours: …..**

……

Course Objectives :

To Explore the Fundamental Concepts of Mathematics

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: Application of Integration

Evaluation of double, triple integrals - Simple applications to area, volume -Fourier series for functions in (0,2□) and □□□□□□□□

UNIT-II: Partial Differential Equations

Formation, complete integrals and general integrals - Four standard types, Lagrange's equations.

UNIT-III: Laplace Transforms

Laplace Transformations of standard functions and simple properties - Inverse Laplace transforms - Applications to solutions of linear differential equations of order 1 and 2-simple problems

UNIT-IV: Vector Analysis

Scalar point functions - Vector point functions - Gradient, divergence, curl - Directional derivatives - Unit to normal to a surface.

UNIT-V: Vector Analysis (continued)

Line and surface integrals - Guass, Stoke's and Green's theorems (without proofs) - Simple problem based on these Theorems.

Text Book:

P.Duraipandian and S.Udayabaskaran,(1997) *Allied Mathematics*, Vol. I & II.Muhil Publishers, Chennai

Reference Books:

1. P.Balasubramanian and K.G.Subramanian,(1997)*Ancillary Mathematics*. Vol. I & II. Tata McGraw Hill, New Delhi.
2. S.P.Rajagopalan and R.Sattanathan,(2005) *Allied Mathematics* .Vol. I & II.Vikas Publications,

New Delhi.

3. P.R.Vittal(2003). *Allied Mathematics* .Marghan Publications, Chennai.
4. P.Kandasamy, K.Thilagavathy (2003) Allied Mathematics Vol-I, II S.Chand& company Ltd., New Delhi-55.
5. Isaac, Allied Mathematics. New Gamma Publishing House, Palayamkottai

Mapping with Programme Outcomes:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: II **Paper type:ALLIED 1 PAPER-2**

Paper code: **Name of the Paper:MATHEMATICAL FOUNDATIONS II** **Credit:5**

Total Hours per Week: 7 **Lecture Hours: 91 Tutorial Hours: ….. Practical Hours: …..**

……

Course Objectives :

To know about Matrix Operations, Symmetric, Skew-Symmetric, Hermitian, Skew-Hermitian, Orthogonal, Unitary Matrices. Rank of a Matrix Solutions of linear equations Consistency and Inconsistency, Characteristic roots and Characteristics Vectors, Cayley - Hamilton Theorem, Integration of rational functions, Integration by parts, Reduction formulae, Area and volume using integration, Planes, Straight lines, Spheres, Curves, Cylinders.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: MATRICES

Multiplication of matrices, Singular and Non-Singular matrices, Adjoint of a Matrix, Inverse of a matrix Symmetric and Skew-Symmetric, Hermitian and Skew-Hermition, Orthogonal and unitary matrices, Rank of a matrix, Solution of Simultaneous Linear equations by

(i) Cramer's rule.

(ii) Matrix Inversion Method.

UNIT-II: MATRICES

Test for Consistency and Inconsistency of linear equations, (Rank Method), characteristic roots and characteristic vectors, Cayley - Hamilton theorem, matrix of linear transformations: reflection about the x, y axes and the line y=x, rotation about the origin through an angle, expansion or compression, shears, translation.

UNIT-III

Integration Simple problems, integration of rational function involving algebraic expressions of the form

$$\frac{1}{\sqrt{ax^2+bx+c}}, \frac{1}{\sqrt{ax^2+bx+c}\sqrt{ax^2+bx+c}}, \frac{px+q}{\sqrt{ax^2+bx+c}}, \frac{px+q}{\sqrt{ax^2+bx+c}}, \sqrt{px+q}$$

integrations using simple substitutions integrations involving trigonometric functions of the form

$\frac{1}{a+b\cos x}$, $\frac{1}{a^2\sin^2 x+b^2\cos^2 x}$ Integration by parts.

UNIT-IV

Properties of definite integrals. Reduction formulae for

$\int x^n e^{ax} dx$, $\int \sin^n x dx$, $\int \cos^n x dx$, $\int x^m (1-x)^n dx$, applications of integration for (i) Area under plane caurves, (ii) Volume of solid of revolution.

UNIT-V: ANALYTICAL GEOMETRY OF THREE DIMENSION

Planes, straight lines.

Text Book.

P.R.Vittal, Mathematical Foundations - Margham Publication, Chennai.

Reference Books

1. U. Rizwan, Mathematical Foundation - SciTech, Chennai
2. V.Sundaram& Others, Dircrete Mathematical Foundation - A.P.Publication, sirkali.
3. P.Duraipandian& Others, Analytical Geometry 3 Dimension – Emerald publication 1992 Reprint.
4. Manicavachagompillay&Natarajan. Analytical Geometry part II - three Dimension - S.Viswanathan (printers & publication) Put Ltd., 1991.

Mapping with Programme Outcomes:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: III **Paper type: Core Theory** **Paper - 3**

Paper code: **Name of the Paper: JAVA PROGRAMMING** **Credit: 5**

Total Hours per Week: 5 **Lecture Hours: 65** **Tutorial Hours:** **Practical Hours:**

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COURSE OBJECTIVES:

1. Knowing about a General-purpose and Purely object-oriented programming language including data types, control statements, and classes
2. Secured, well-suited for internet programming using applets and GUI-based
3. To understand the basic concepts and fundamentals of platform independent object oriented language.
4. To demonstrate skills in writing programs using exception handling techniques and multithreading.
5. To understand streams and efficient user interface design techniques.

COURSE OUTCOMES:

1. Students are able to know about a General-purpose and Purely object-oriented programming language including data types, control statements, and classes
2. Students are able to Secured, well-suited for internet programming using applets and GUI-based
3. Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages.
4. Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes.
5. Design event driven GUI and web related applications which mimic the real word scenarios.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT I INTRODUCTION TO JAVA **Teaching Hours: 13**

Declarations and Access Control: Identifiers and Keywords: Oracle'sJava Code Conventions. Define Classes: Import Statements and the Java API - Static Import Statements. Use Interfaces: Declaring anInterface-Declaring Interface Constants. Declare Class Members: Access Modifiers- Nonaccess MemberModifiers - Constructor Declarations - Variable Declarations. Declare and Use enums: Declaring enums. Object Orientation: Encapsulation-Inheritance and Polymorphism-Polymorphism - Overriding / Overloading: Overridden Methods -Overloaded Methods.

UNIT II OBJECT ORIENTATION AND OPERATORS **Teaching Hours: 14**

Object Orientation: Casting - Implementing an Interface - Legal Return Types: Return Type Declarations - Returning a Value. Constructors and Instantiation: Overloaded Constructors - Initialization Blocks. Statics: Static Variables and Methods. Assignments: Stack and Heap - Literals, Assignments, and Variables: Literal Values for All Primitive Types. Scope - Variable Initialization - Passing Variables into Methods: Passing Object Reference Variables - Passing Primitive Variables. GarbageCollection. Operators: Java Operators - Assignment Operators -Relational Operators - instanceof Comparison - Arithmetic Operators -Conditional Operator - Logical Operators.

UNIT III ARRAYS AND STRINGS **Teaching Hours: 14**

Working with Strings, Arrays, and Array Lists: Using String and StringBuilder: The String Class - The StringBuilder Class - Important Methods in the StringBuilder Class. Using Arrays: Declaring an Array -Constructing an Array - Initializing an Array. Using ArrayList:ArrayList Methods in Action - Important Methods in the ArrayList Class. Flow Control and Exceptions: Using if and switch Statements - Creating Loops Constructs - Handling Exceptions - Catching anException Using try and catch - Using finally. String Processing, Data Formatting Resource Bundles: String, StringBuilder, and StringBuffer -Dates, Numbers, Currencies, and Locales.

UNIT IVFILES AND THREADS **Teaching Hours: 12**

I/O and NIO: File Navigation and I/O: Creating Files Using the File Class - Using FileWriter and FileReader. File and Directory Attributes -DirectoryStream - Serialization. Generics and Collections: toString(), hashCode(), and equals(): The toString() Method - Generic Types - Generic Methods - Generic Declarations. Inner Classes: Method – Local. Inner Classes - Static Nested Classes - Threads: Defining, Instantiating, and Starting Threads - Thread States and Transitions - Synchronizing Code, Thread Problems - Thread Interaction. Concurrency: Concurrency with the java.util.concurrent Package - Apply Atomic Variables and Locks - Use java.util.concurrent Collections - Use Executors and ThreadPools.

UNIT V APPLETS **Teaching Hours: 12**

Applets: Applet fundamentals - Applet class - Applet life cycle - Steps for developing an applet program - Passing values through parameters -Graphics in an applet - Event-handling. GUI Applications - Part 1: Graphical user interface - Creating windows - Dialog boxes - Layout managers - AWT component classes - Swing component classes. GUI Applications - Part 2: Event handling - Other AWT components - AWT graphics classes - Other swing controls.

TEXTBOOKS:

1. Kathy Sierra, Bert Bates — OCA/OCP Java SE 7 Programmer I & II Study Guide, Oracle Press. (Unit I,II,III,IV).
2. Sagayaraj, Denis, Karthik and Gajalakshmi, 2018, Java Programming - For Core and Advanced Learners,

University Press (India) Private Limited, Hyderabad.(Unit V).

REFERENCE BOOKS:

1. Hebert Schild, 2002, The Complete Reference Java2, [Fifth Edition]. Tata McGraw-Hill, New Delhi.

2. John Hubbard, R.2004. Programming with Java. [Second Edition]. Tata McGraw-Hill,New Delhi.

3. Debasish Jana. 2005. Java and Object-Oriented Programming Paradigm, [SecondPrinting]. Prentice-Hall of India, New Delhi.

4. Sagayaraj, Denis, Karthik and Gajalakshmi 2018, Java Programming for core and advanced Learners, University Press India Pvt. Ltd., Hyderabad.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: III Paper type: Core Practical Practical - 3

Paper code: Name of the Paper: JAVA PROGRAMMINGLAB Credit: 2

Total Hours per Week: 4 Lecture Hours: Tutorial Hours: Practical Hours:52

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COURSE OBJECTIVES

1. To understand the concepts of classes and objects.
2. To know about layout managers.
3. To gain knowledge of frames and menus.
4. To understand the concept of RMI.
5. To learn how to handle exceptions.

COURSE OUTCOMES

1. After studied unit-1, the student will be able to understand the concept of purely object- oriented programming language including data types and classes.
2. After studied unit-2, the student will be able to implement layout managers.
3. After studied unit-3, the student will be able to develop an application using frames.
4. After studied unit-4, the student will be able to understand the concepts of RMI.
5. After studied unit-5, the student will be able to handle exceptions in program.

LIST OF PRACTICAL PROGRAMS:

1. Implementation of Classes and Objects
2. Implementation of Inheritance and Polymorphism
3. Implementation of Interface and Package concepts
4. Implementation of Flow, Border ,Grid Layouts
5. Implementation of Tic-Tac Toe Application Using Applets
6. Implementation of Frames, Menus, Dialog
7. Implementation of Swing concepts
8. Implementation of Exception Handling
9. Implementation of Multi Threading
10. Implementation of I/O Streams
11. Implementation of Java Networking concepts
12. Implementation of Java Servlets (Connecting Database)
13. Implementation of RMI
14. Implementation of Java Beans

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignmentframework)

a. Bookreviewandresearchpaperreview, syllabusandcurriculumreview.
b. Datacollectionandpaperwritingpractices:bookslevel,fieldstudylevel.Usingthecoursestudyforsocietyandnaturedevelopment–exercise
c. Workshops, preparing technicaltermdictionariesfromtextbooksandreferencebooks.
d. Preparingquestionpaperbythecandidates:objectivetype,descriptivetype,trainingcanbegivenbytheteacher
e. Formingdigitallibrary:collectingtextandreferencebooks,coursematerial.
f. Villages, institutions, various people groups may be adopted by the departments of thecolleges for practicing their theoretical study. Innovative methods may be implemented inthepracticesandreportcanbewrittenfordocumentation,furtherdiscussionandresearch.
g. Extracurricularandculturalactivities maybeframedthroughthesyllabuscontent.
h. Groupingstudentsforselfdiscussion,selflearningprocess.
i. Followinginstitutionandintellectualandwritingreportsinthecoursefield.
j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process withinthe frameworkofquestionsettingpatternandinternalassessmentpattern.
k. For application oriented study: Villages, Institutions, various people groups may be adoptedby the departments of the colleges for practicing their theoretical study. Innovative methodsmay be implemented in the practices and report can be written for documentation, furtherdiscussionandresearch.
l. Extracurricularactivitiesmaybeframedthroughtheirsyllabuscontent.
m. Bringtheindustriestothecampus.Bringthestudentstotheindustry.
n. Ph.D. Research Methodology is applicable to write project report and any kind of researchreportslike assignment,seminarpapers,casestudyreports,etc.

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	M	S	S	S	S
CO2	S	M	M	M	M	M	S	M	S	M
CO3	S	M	S	M	M	S	S	M	S	S
CO4	S	M	S	M	M	M	S	M	S	M
CO5	S	M	M	M	M	M	S	S	S	S

PO–ProgrammeOutcome,CO –Courseoutcome
S –Strong ,M–Medium,L– Low(maybeavoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: III **Paper type:ALLIED-2 PAPER-3**

Paper code: **Name of the Paper:QUANTITATIVE TECHNIQUES-1** **Credit: 3**

Total Hours per Week: 5 **Lecture Hours: 65** **Tutorial Hours: ….. Practical Hours: …..**

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UNIT - I

Operation Research (O.R.) - Nature and significance of Operation Research - Various models - Application and scope of Operation Research.

UNIT - II

Linear Programming Problem (L.P.P.) - characteristic of Linear Programming Problem and its formulation - graphical method of solving Linear Programming Problem - simplex method of solving Linear Programming Problem.

UNIT - III

Linear Programming Problem - Big M. Method - Two phase method Duality

1. North west corner
2. Least cost
3. Vogel's

UNIT - IV

Transportation Problem - Methods of finding Initial Basic Feasible Solution - Optimal Solution - simple problem.

UNIT - V

Assignment Problem - Balanced and unbalanced Assignment Problems - Optimal solution - simple problems.

Text Book

Kanti swarup Manmohan and Gupta - Operation Research chand and sons, New Delhi.

Reference Books:

1. J.K.Sharma (2003) Operation Research - Theory and its application, Mac Millan.
2. Taha. H.A. O.R. An Introduction PHI
3. P.K. Gupta and Hira, Problems in O.R. S.Chand and company Ltd., New Delhi.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: III **Paper type: SKILL BASED SUBJECT** **Paper - 1**

Paper code: **Name of the Paper: DESIGN AND ANALYSIS OF ALGORITHM** **Credit: 2**

Total Hours per Week: 2 **Lecture Hours: 26** **Tutorial Hours:** **Practical Hours:**

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COURSE OBJECTIVES:

1. To introduce the classic algorithms in various domains, and techniques for designing efficient algorithms.
2. To create analytical skills, to enable the students to design algorithms for various real time problems and to analyze the algorithms.
3. To understand the dynamic programming concepts.
4. To know about the basis of traversal and searching techniques.
5. To understand about NP-Hard and NP-Complete Problems

COURSE OUTCOMES:

1. Students are able to understand the classic algorithms in various domains, and techniques for designing efficient algorithms.
2. Students are able to create analytical skills, to enable the students to design algorithms for various real time problems and to analyze the algorithms.
3. Students are able to understand the dynamic programming concepts.
4. Students are able to know about the basis of traversal and searching techniques.
5. Students are able to understand about NP-Hard and NP-Complete Problems

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – I INTRODUCTION **Teaching Hours: 5**

Introduction: Algorithm - Algorithm Specification - Performance Analysis - Randomized Algorithms - Divide-And-Conquer: General Method - Binary Search - Finding the Maximum and Minimum - Merge Sort - Quick Sort -Selection - Strassen's Matrix Multiplication - Convex Hull.

UNIT – II GREEDY METHOD **Teaching Hours: 4**

The Greedy Method: The General Method - Knapsack Problem - Job Sequencing with Deadlines -Minimum-Cost Spanning Trees -Optimal Storage on Tapes - Single-Source Shortest Paths.

UNIT - III DYNAMIC PROGRAMMING **Teaching Hours: 4**

Dynamic Programming: The General Method- Multistage Graphs -All Pairs Shortest Path - Single-Source Shortest Paths: General Weights -Optimal Binary Search Trees -String Editing -0/1-Knapsack - Reliability Design -The Traveling Salesperson Problem.

UNIT – IV BASIC TRAVERSAL AND SEARCH TECHNIQUES **Teaching Hours: 6**

Basic Traversal and Search Techniques: Techniques for Binary Trees -Techniques for Graphs - Connected Components And Spanning Trees -Biconnected Components and DFS.Backtracking: The General Method -The 8-Queens Problems -Some of Subsets -Graph Coloring -Hamiltonian Cycles - Knapsack Problem. Branch-And-Bound: The Method -0/1 Knapsack Problem -Travelling Salesperson - Efficiency Considerations.

UNIT – V*NP*-HARD AND *NP*-COMPLETE PROBLEMS **Teaching Hours: 7**

***NP*-Hard and *NP*-Complete Problems:** Basic Concepts -Cook's Theorem -NP-Hard Graph Problems - NP-Hard Scheduling Problems - NP-Hard Code Generation Problems -Some Simplified NP-Hard Problems. Genetic Algorithms: Introduction -Use Genetic Algorithms -Genetic Algorithms Work - GA Works -Some GA Implementations.

TEXTBOOKS:

1. *Ellis Horowitz,Sartaj Sahni and Sanguthevar Rajasekaran*. 2007. **Fundamentals of Computer Algorithms**.[First Edition] Galgotia Publication Pvt. Ltd, New Delhi.
2. *Basu,S.K.* 2007**. Design Methods and Analysis of Algorithms**.[First Edition]. PHI Pvt. Ltd, New Delhi.

REFERENCE BOOKS:

1. *AnanyLevitin*. 2005. **Introduction to the Design and Analysis of Algorithms**. [First Edition]. Pearson Education Asia, New Delhi.
2. *Thomas H.Cormen , Charles E. Leiserson,Ronald L. Rivest and Clifford Stein.* 2009**. Introduction to Algorithms**. [Third Edition].PHI Pvt. Ltd, New Delhi.
3. *Sara Baase and Allen Van Gelder*. 2006. **Computer Algorithms -Introduction to Design and Analysis**.[Third Edition]. Pearson Education Asia, New Delhi.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: III **Paper type: NON MAJOR ELECTIVE PAPER-1**

Paper code: Name of the Paper: Introduction to Information Technology **Credit: 2**

Total Hours per Week:2 **Lecture Hours: 26** **Tutorial Hours:** **Practical Hours:**

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COURSE OBJECTIVES:

1. Major components of Computer System and its working principles.
2. Role of an Operating System and basic terminologies of networks.
3. How the Information Technology aids for the Current Scenario.
4. To understand the Computer Software.
5. To understand internet applications

COURSE OUTCOMES:

1. Students understand Major components of Computer System and its working principles.
2. Students learn and understand the Role of an Operating System and basic terminologies of networks.
3. Students understand how the Information Technology aids for the Current Scenario.
4. Students understand the Computer Software.
5. Students understand internet applications

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I INTRODUCTION **Teaching Hours: 5**

Introduction: Characteristics of Computers-Technological Evolution of Computers-The Computer Generations-Categories of Computer. **Data and Information:** Introduction-Types of Data-A Simple Model of a Computer-Data Processing Using a Computer-Desktop Computer. **Acquisition of Number and Textual Data:** Introduction- Input Units-Internal Representation of Numeric Data-Representation of Characters in Computers–Error-Detecting Codes.

UNIT-II DATA STORAGE **Teaching Hours: 5**

Data Storage: Introduction-Memory Cell-Physical Devices Used as Memory Cells-Random Access Memory-Read Only Memory- Secondary Memory- Floppy Disk Drive- Compact Disk Read Only Memory (CDROM)-Archival Memory. **Central Processing Unit:** The Structure of a Central Processing Unit-Specification of a CPU-Interconnection of CPU with Memory and I/O Units.

UNIT-III COMPUTER NETWORKSTeaching Hours: 5

Computer Networks: Introduction-Local Area Network (LAN)- Applications of LAN-Wide Area Network (WAN)–The Future of Internet Technology. **Output Devices:** Introduction- Video Display Devices-Flat Panel Displays–Printers.

UNIT-IV COMPUTER SOFTWARE **Teaching Hours: 5**

Computer Software: Introduction-Operating System-Programming Languages–A Classification of Programming Languages. **Data Organization:** Introduction-Organizing a Database-Structure of a Database-Database Management System-Example of Database Design.

UNIT-V SOME INTERNET APPLICATIONSTeaching Hours: 6

Some Internet Applications: Introduction- E-mail- Information Browsing Service- The World Wide Web- Information Retrieval from the World WideWeb-Other Facilities Provided by Browsers - Audio on the Internet.**Societal Impactsof Information Technology:** CareersinInformation Technology.

TEXTBOOKS:

1. *Rajaraman,V.*2008.**IntroductiontoInformationTechnology.**[SixthPrinting]. PrenticeHall of India Pvt. Limited, New Delhi.(UNIT I toV)
2. *Nagpal,D.P.*2010.**ComputerFundamentals**.[FirstEdition,Revised].S.Chand &CompanyLtd, New Delhi. (**UNIT I(Introduction: Characteristics of Computers toCategoriesof Computer**))

REFERENCE BOOKS:

1. *ITL EducationsSolution Limited.* 2009. **Introduction toComputer Science**. [Fourth Impression].Pearson Education, New Delhi.
2. *Alexis Leon and Mathews Leon.* 1999. **Fundamentals of Information Technology.**[FirstEdition]. Leon TECHWorld, New Delhi.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: IV Paper type: CORE THEORY PAPER - 4

Paper code: Name of the Paper: Relational Database Management System Credit: 5

Total Hours per Week: 3 Lecture Hours: 39 Tutorial Hours: Practical Hours:

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COURSE OBJECTIVES

1. The fundamental concepts of database management including database languages and database -system implementation.
2. To understand basic SQL structure and Constraints.
3. To know about the important the Normalizations
4. To know about PL/SQL and File Storage structure.
5. To understand cursors and Exception handling

Course Outcomes:

1. Students are able to understand the fundamental concepts of database management including database languages and database -system implementation.
2. To understand basic SQL structure and Constraints.
3. To know about the important the Normalizations
4. To know about PL/SQL and File Storage structure.
5. To understand cursors and Exception handling.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT –I INTRODUCTION **Teaching Hours: 8**

Introduction: Database -System Applications -Purpose of Database Systems -View of Data - Database languages - Data Storage and Querying - Database Architecture -Database Users and Administrators. **Relational Databases: Introduction to the Relational Model:**Structure of Relational Databases -Keys.

UNIT – II INTRODUCTION TO SQL **Teaching Hours: 8**

Introduction to SQL: SQL Data Definition -Basic Structure of SQL Queries - Set Operations - Aggregate Functions - Nested Subqueries - Modification of the Database. **Intermediate SQL**: Views - Integrity Constraints - Authorization. **Database Design: Database Design and the E-R Model**: The Entity-Relationship Model - Entity-Relationship Diagrams - Extended E-R Features.

UNIT – III DATA NORMALIZATION **Teaching Hours: 7**

Data Normalization: Introduction - First Normal Form (1NF) -Second Normal Form (2NF), Third Normal Form (3NF) -Boyce - Codd Normal Form (BCNF), Fourth Normal Form (4NF)-Fifth Normal Form (5NF) - Denormalization. **Transaction Management and Concurrency Control**: Introduction -Transactions -Transaction Properties (ACID Properties) Transaction States - Concurrency Control - The COMMIT Command -The ROLLBACK Command -The SAVEPOINT Command.

UNIT – IV STORAGE AND FILE STRUCTURE **Teaching Hours: 8**

Storage and File Structure: Overview of Physical Storage Media- RAID -File Organization - Organization of Records in Files. **PL/SQL: A Programming Language:** Fundamentals of PL/SQL - PL/SQL Block Structure -Comments -Data Types -Variable Declaration - Assignment Operation -Bind Variables. **More on PL/SQL: Control Structures and Embedded SQL:** Control Structures - Nested Blocks - SQL in PL/SQL.

UNIT –V PL/SQL Cursors and Exceptions **Teaching Hours: 8**

PL/SQL Cursors and Exceptions: Cursors -Implicit Cursors -Explicit Cursors -Explicit Cursor Attributes -Implicit Cursor Attributes -Cursor FOR Loops**. PL/SQL Named Blocks: Procedure, Function, Package and Trigger:** Procedures - Functions-Triggers.

TEXTBOOKS

1. *Abraham Silberschatz, Henry F.Korth, and S.Sudarshan* 2015, **Database System Concepts,**

[SixthEdition]. McGraw-Hill Education (India) Private Limited, New Delhi.(UNIT I, II, IV (Storage and File Structure chapteronly))

2. *Alexis Leon and Mathews Leon* 2006, **Essentials of Database ManagementSystems,** Vijay Nicole Imprints Private Limited, Chennai. (UNIT III)
3. *Nilesh Shah 2009*, **Database Systems Using Oracle- A Simplified Guide to SQL and PL/SQL**, [Second Edition],PHI Learning Private Limited, New Delhi.(Unit IV and V)

REFERENCE BOOKS

1. *Date,C.J.* 1995, An **Introduction to Database Systems,** [Sixth Edition], Addison Wesley, USA.
2. *Raghu Ramakrishnan and Johannes Gehrke,* 2003, **Database Management Systems,**[Third Edition], Tata Mc - Graw Hill, New Delhi.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: IV Paper type: CORE PRACTICAL PRACTICAL - 4

Paper code: Name of the Paper: RDBMS -Lab Credit:2

Total Hours per Week: 3 Lecture Hours: ….. Tutorial Hours: ….. Practical Hours: 39

……

COURSE OBJECTIVES

1. To understand the concepts of DDL/DML/DCL/TCL commands.
2. To understand the concepts of Join queries.
3. To understand the concepts of exception handling.
4. To understand the concepts of cursors.
5. To understand the concepts of packages.

COURSE OUTCOMES

1. Design and Implement a database schema for a given problem domain.
2. Populate and Query a database using SQL DDL/DML Commands.
3. Build well formed in String Date/Aggregate Functions.
4. Design and Implement a database query using Joins, Sub-Queries and Set Operations.
5. Program in SQL including Objects (Functions, Procedures, Triggers)

LIST OF PRACTICAL EXCERSISE:

1. SQL Queries for DDL Commands.
2. SQL Queries for DML Commands.
3. Creating a Table to implement Integrity Constraints and Referential Integrity Constraints in Column and Table Level.
4. SQL Queries for Built-in functions.
5. SQL Queries for creating an Index, Synonym, and Sequence.
6. SQL Queries for creating a User and assigning privileges and roles.
7. Program using PL/SQL for preparing Students Mark Statement.
8. Program for Looping Statements using PL/SQL
9. Program using PL/SQL to prepare Employee Pay slip using Cursor.
10. Program using PL/SQL to implement Functions.
11. Program using PL/SQL to implement Procedures.
12. Program using PL/SQL to implement Triggers

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.
d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.
f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
g. Extracurricular and cultural activities may be framed through the syllabus content.
h. Grouping students for self discussion, self learning process.
i. Following institution and intellectual and writing reports in the course field.
j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
l. Extracurricular activities may be framed through their syllabus content.
m. Bring the industries to the campus. Bring the students to the industry.
n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	M	M	S	S	S	S
CO2	S	S	M	S	M	S	S	S	S	S
CO3	S	M	M	M	M	S	M	S	S	S
CO4	S	M	S	M	S	S	S	S	S	S
CO5	S	M	M	M	M	S	M	M	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: IV **Paper type:Allied 2** **PAPER-4**

Paper code: **Name of the Paper:QUANTITATIVE TECHNIQUES – II** **Credit: 3**

Total Hours per Week:5. **Lecture Hours: 65 Tutorial Hours: ….. Practical Hours: …..**

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UNIT - I

Network scheduling by CPM/PERT - project network diagram - Critical path method (CPM) - PERT Computations.

UNIT - II

Inventory models - EOQ model (a) Uniform demand rate infinite production rate with no shortages (b) Uniform demand rate finite production rate with no shortages - Inventory control with Price Breaks.

UNIT - III

Sequencing problem - n jobs through 2 machines, n jobs through 3 machines - two jobs through m machines - n jobs through m machines.

UNIT - IV

Game Theory - Two person zero sum game - pure and mixed strategies - saddle point - domain and rule - graphical solution of rectangle games.

UNIT - V

Replacement problem - introduction - replacement of items that deteriorate with time - replacement of items that fail completely.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Recommended Text

Gupta P.K. and Hira D.S. (2000) *Problems in Operations Research*, S.Chand & Co. Delhi

Reference Books

1. J.K.Sharma, (2001) Operations Research: Theory and Applications, Macmillan, Delhi

2. Kanti Swaroop, Gupta P.K. and Manmohan, (1999) *Operation Research*, Sultan Chand & Sons., Delhi.

3. V.K.Kapoor [1989] *Operations Research*, sultan Chand & sons.

4. Ravindran A., Philips D.T. and Solberg J.J., (1987)*Operations research*, John Wiley & Sons, New York.

5. Taha H.A. (2003) *Operations Research,* Macmillan Publishing Company, New York.

6. P.R.Vittal (2003) *Operations Research*, Margham Publications, Chennai.

7. S.J.Venkatesan, *Operations Research,* J.S. Publishers, Cheyyar-604 407.

8. Arumugam & Issac, Operation research - Vol. - I, New Gamma Pub., House. Palayamkottai.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: IV **Paper type: ALLIED PRACTICAL Practical 2**

Paper code: **Name of the Paper:QUANTITATIVE TECHNIQUES LAB** **Credit: 2**

Total Hours per Week: 3 **Lecture Hours: .. Tutorial Hours: ….. Practical Hours: 39**

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1. Solving Linear Programming Problem by graphical methods.
2. Solving Linear Programming Problem by simplex methods (Two variables three and more variables)
3. Solving Linear Programming Problem by Big M. methods

4. Solving Linear Programming Problem by Two phase method
5. Solving Linear Programming Problem by Duality
6. Solving Transportation problems (Balanced unbalanced)
7. Solving Assignment Problems (Balanced unbalanced)
8. Solving job sequencing Problems
9. Solving Problems related to game theory

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: IV **Paper type: NON MAJOR ELECTIVE PAPER-2**

Paper code **Name of the Paper: INTERNET TECHNOLOGY** **Credit: 2**

Total Hours per Week: 2 **Lecture Hours: 26** **Tutorial Hours:** **Practical Hours:**

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COURSE OBJECTIVES

1. Fundamentals of Internet, Connectivity and its Resource Requirements.
2. To understand the Internet Technology and its applications
3. To Understand WWW and Web Browsers.
4. Mailing system and applications of Internet.
5. To Understand relay chat

COURSE OUTCOMES :

1. Students understand the Fundamentals of Internet, Connectivity and its Resource Requirements.
2. Students understand the Internet Technology and its applications
3. Students Understand the basis of WWW and Web Browsers.
4. Students learn how to Mailing system and applications of Internet.
5. Students Understand relay chat that is how to read e- contents.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-IINTRODUCTION TO INTERNET **Teaching Hours: 4**

Introduction to internet: What is Internet? Evolution and History of Internet- Growth of Internet- Owners of Internet- Internet Services- How does the Internet Works?-Anatomy of Internet-Internet Addressing-Internet vs Intranet-Impact of Internet- Governance of Internet.

UNIT-II INTERNET TECHNOLOGY AND PROTOCOL **Teaching Hours: 6**

Internet Technology and Protocol: ISO-OSI Reference Model**-Internet Connectivity:** Getting Connected-Different Types of Connections- Levels of Internet Connectivity- Internet Service Provider. **Internet Tools and Multimedia:** Current Trends on Internet-Multimedia and Animation.

UNIT-III WWW AND WEB BROWSER Teaching Hours: 6

WWW and Web Browser: WWW-Evolution of Web-Basic Elements of WWW-Web Browsers- Search Engines- Search Criteria. **Web Publishing:** Web Publishing- Web Page Design.

UNIT-IV EMAIL Teaching Hours: 4

Email: E-Mail Basics- E-Mail System-E-Mail Protocol-E-Mail Addresses-Structure of an E-Mail Message-E-Mail Clients&Servers-MailingList-E-MailSecurity.

UNIT-V USENET AND INTERNET RELAY CHAT Teaching Hours: 6

Usenet and Internet Relay Chat: What is Usenet?-Newsgroup Hierarchies-What is a Newsreader?-How do you Read Newsgroups?- Who Administers Usenet?- Common News reading Tasks- How to Read Articles from Network News?- Relationship between Netnews and E-Mail-What is IRC?-Channels-Nicknames- Microsoft NetMeeting. **Internet and Web Security**: Overview of Internet Security-Aspects and Need of Security-E-Mail Threats and Secure E-mail-Web Security andPrivacy Concepts-Firewall.

TEXTBOOK:

1. *ISRD Group*. 2012. **Internet Technology andWebDesign.** [Fourth reprint]. Tata McGraw-HillEducationPrivateLimited., New Delhi.

REFERENCE BOOKS:

1. *Deitel,H.M Dietel,P.J.andGoldbergA.B*.2008.**Internet&Worldwide Web- How toProgram.**[Third Edition].PHL,New Delhi.
2. *Comdex.*2000.**Teachyourselfcomputersandtheinternetvisually**.[First Edition]. IDGBookIndia (p)Ltd.
3. *Ramachandran,T.M.Nambissan*.2003.**AnOverviewofinternetandweb development**. [FirstEdition].T M-Dhruv Publications.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: V **Paper type: CORE THEORY PAPER - 5**

Paper code **Name of the Paper: MOBILE APPLICATIONS DEVELOPMENT** **Credit: 4**

Total Hours per Week: 6 **Lecture Hours: 78** **Tutorial Hours: …..** **Practical Hours: …..**

……

COURSE OBJECTIVES:

1. To understand the basics of smart phones and android platforms**.**
2. To understand the basic concepts of user interface related to app development.
3. To understand the important of data persistence in mobile environment.
4. To understand the various services and network facilities provided by android platform.
5. To understand the various apps deployed and developed on by mobile platform.

COURSE OUTCOMES:

1. Students are able to understand the basics of smart phones and android platforms**.**
2. Students are able to understand about the basic concepts of user interface related to app development.
3. Students are able understand the importance of data persistence in mobile environment.
4. Students are able to understand about the various services and network facilities provided by android platform.
5. Students are able to understand about the various apps deployed and developed on by mobile platform.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT –I INTRODUCTION TO ANDROID PLATFORM **Teaching Hours: 16 Hrs**

Introduction to Mobile Application Development -Various platforms -Smart phones -Android platform: features -Architecture -Versions -ART (Android Runtime) -ADB (Android Debug Bridge) -Development environment/IDE: Android studio and its working environment -Emulator setup -Application framework basics -XML representation and Android manifest file -Creating a simple application.

UNIT - II ANDROID UI DESIGN **Teaching Hours: 14Hrs**

GUI for Android: activities lifecycle -Android v7 support library -Intent: Intent object -Intent filters -Adding categories -Linking activities -User Interface design components -Basic Views -Picker Views -List View -Specialized Fragment -Gallery and Image View -Image Switcher -Grid View, Options Menu -Context Menu -Clock View - Web view -Recycler View.

UNIT - III DATA PERSISTENCE **Teaching Hours: 17 Hrs**

Different Data Persistence schemes: Shared preferences -File Handling -Managing data using SQLite database -Content providers: user content provider -Android in build content providers.

UNIT - IV ANDROID SERVICES & NETWORK ENVIRONMENT **Teaching Hours: 17 Hrs**

Services: Introduction to services -Local service -Remote service -Binding the service -Communication between service and activity -Intent Service - Multi-Threading: Handlers - AsyncTask-Android network programming: HttpUrlConnection-Connecting to REST - based -SOAP based Web services -Broad cast receivers: LocalBroadcastManager-Dynamic broadcast receiver -System Broadcast -Telephony Manager: Sending SMS and making calls.

UNIT - V ADVANCED APPLICATIONS **Teaching Hours: 14 Hrs**

Location based services: Google maps V2 services using Google API -Animations and Graphics: Property Animation -View Animations - Drawable Animations -Media and Camera API: Working with video and audio inputs -camera API -Sensor programming: Motion sensors -Position sensors -Environmental sensors -Publishing Android Apps: Guide lines -policies and process of uploading Apps to Google play.

TEXTBOOKS:

1. "Head First: Android Development", Dawn Griffiths, David Griffiths, OReilly, 1st Edition, 2015.
2. Barry Burd, "Android Application Development -All-in-one for Dummies", 2nd Edition, Wiley India, 2016.

REFERENCES:

1. "Professional Android™ Sensor Programming", Greg Milette,Adam Stroud, John Wiley and Sons, Inc 2012.
2. "Android 6 for Programmers, App Driven approach", Paul Deital, Harvey Deital, Alexander Wald, Prentice Hall, 2015.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: V **Paper type: CORE THEORY PAPER-6**

Paper code **Name of the Paper: OPERATING SYSTEM** **Credit: 4**

Total Hours per Week: 6 Lecture Hours: 78 **Tutorial Hours: …..** **Practical Hours: …..**

……

COURSE OBJECTIVES:

1. To understand the structure and functions of operating systems.
2. To understand the principles of scheduler, scheduler algorithms and Deadlock.
3. To learn various memory management schemes.
4. To study I/O management, File system and Mass Storage Structure.
5. To learn the basics of UNIX, LINUX systems and perform administrative tasks on LINUX servers.

COURSE OUTCOMES:

1. Students are able to understand the structure and functions of operating systems.
2. Students are able to understand the principles of scheduler, scheduler algorithms and Deadlock.
3. Students are able to learn various memory management schemes.
4. Students are able to study I/O management, File system and Mass Storage Structure.
5. Students are able to learn the basics of UNIX, LINUX systems and perform administrative tasks on LINUX servers.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I OPERATING SYSTEM BASICS **Teaching Hours: 14 Hrs**

Basic Concepts of Operating System -Services of Operating System -Operating System Types -Computer System Operation -I/O Structure - Storage Structure -Memory Hierarchy -System Components -System Calls -System Programs -System Design and Implementation -Introduction to Process -Process State -Process Control Block -Process Scheduling -Operations on Process -Interprocess Communication -Communication in Client/Server Systems -Threads.

UNIT - II CPU SCHEDULING ALGORITHM AND PREVENTION Teaching Hours: 15Hrs

Introduction- Types of CPU Scheduler -Scheduling Criteria -Scheduling Algorithms -Semaphores -Classic Problems of Synchronization -Basic Concept of Deadlocks -Deadlock Characterization -Deadlock Prevention -Deadlock Avoidance -Deadlock Detection -Recovery of Deadlock.

UNIT - III STORAGE MANAGEMENT Teaching Hours: 17Hrs

Memory Management -Basics Concept of Memory -Address Binding -Logical and Physical Address Space -Memory Partitioning -Memory Allocation -Paging -Segmentation - Segmentation and Paging -Protection -Fragmentation -Compaction -Demand Paging -Page Replacement Algorithm -Classification of Page Replacement Algorithm .

UNIT - IV I/O SYSTEMS Teaching Hours: 14Hrs

File System Storage -File Concept-File Access Methods -Directory Structure -File Sharing -File Protection -File System Implementation -File System Structure -Allocation Methods -Free Space Management -Mass Storage Structure -Disk structure -Disk Scheduling and Management -RAID Levels.

UNIT - V CASE STUDIES Teaching Hours: 18 Hrs

UNIX System -A Case Study -LINUX System -Case Study -Design Principles -Process Management -Scheduling -Memory Management -File Systems -Security .

TEXTBOOKS:

1. "Operating System Concepts" - Abraham Silberschatz Peter B. Galvin, G. Gagne, Sixth Edition, Addison Wesley Publishing Co., 2003.
2. "Operating System" -William Stalling, Fourth Edition, Pearson Education,2003.

REFERENCES:

1. "Operating systems -Internals and Design Principles", W. Stallings, 6th Edition, Pearson.
2. "Modern Operating Systems", Andrew S.Tanenbaum, Second Edition, Addison WesleyPublishing Co., 2001.
3. "Fundamentals of Operating System", Prof. R. Sriddhar, Dynaram Publication, Bangalore Company.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: V **Paper type: CORE THEORY** **PAPER-7**

Paper code **Name of the Paper: DATA MINING** **Credit:4**

Total Hours per Week: 5 **Lecture Hours: 65** **Tutorial Hours:** **Practical Hours:**

……

COURSE OBJECTIVES

1. To understand about the basics of Data Mining and Data
2. To understand about the methods of Data Warehousing
3. To understand about the techniques of Data Mining
4. To understand about the importance of Cluster and outlier detection
5. To improve the student's knowledge with recent trends and tools

COURSE OUTCOMES:

1. Students are able to understand about the basics of Data Mining and Data
2. Students are able to understand about the methods of Data Warehousing
3. Students are able to understand about the techniques of Data Mining
4. Students are able to understand about the importance of Cluster and outlier detection
5. Students are able to improve the student's knowledge with recent trends and tools

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT –IDATA MINING BASICS **Teaching Hours: 13 Hrs**

What is Data Mining-Kinds of Data -Kinds of patterns -Technologies used for Data Mining-Major Issues in Data Mining-Data - Data Objects and Attribute types-Data Visualization-Measuring Data

Similarity and Dissimilarity - Data Preprocessing -overview-Data Cleaning-Data Integration-Data Reduction-Data Transformation and Data Discretization.

UNIT- II DATA WAREHOUSING AND ONLINE ANALYTICAL PROCESSING

Teaching Hours: 15Hrs

Data Warehouse-Basic concepts - Data Warehouse Modeling: Data Cube and OLAP-Data Warehouse Design and Usage-Data Warehouse Implementation-Data Generalization by Attribute - Oriented Induction-Data Cube Technology-Data Cube Computation Methods-Exploring Cube Technology - Multidimensional Data Analysis in cube space.

UNIT - III PATTERNS AND CLASSIFICATION **Teaching Hours: 14Hrs**

Patterns-Basic concepts-Pattern Evaluation Methods - Pattern Mining: Pattern Mining in Multilevel-Multidimensional space - Constraint - Based Frequent Pattern Mining-Mining High Dimensional Data and Colossal patterns-Mining compressed or Approximate patterns-Pattern Exploration and Application. Classification -Decision tree Induction-Bayes Classification methods-Rule based Classification-Model Evaluation and selection-Techniques to Improve Classification Accuracy-Other Classification methods.

UNIT - IV CLUSTERING AND OUTLIER DETECTION **Teaching Hours: 14Hrs**

Cluster Analysis-Partitioning Methods - Hierarchical Methods - Density - Based Methods - Grid - Based Methods -Evaluation of Clustering.-Clustering High -Dimensional Data - Clustering Graph and Network Data -Clustering with Constraints - Web Mining-Spatial Mining. Outlier Detection -Outliers and Outliers Analysis - Outlier Detection Methods - Outlier Approaches - Statistical - Proximity - Based - Clustering - Based-Classification Based - High - Dimensional Data.

UNIT - V RECENT TRENDS IN DATA MINING AND TOOLS **Teaching Hours: 8Hrs**

Other Methodologies of Data Mining- Data Mining Applications - Data Mining Trends-Recent Data Mining Tools - Rapid miner - Orange - Weka - Knime - Sisense - Ssdt (SQL Server Data Tools) - Oracle - Rattle - Data melt - Apache Mahout.

TEXTBOOKS:

1. "Data Warehousing Fundamentals", PaulrajPonnaiah, Wiley Publishers, 2001.

2. “Data Mining: Concepts and Techniques”, Jiawei Han, MichelineKamber, Morgan Kaufman Publishers, 2006.
3. “Introduction to Data mining with case studies”, G.K. Gupta, PHI Private limited, New Delhi, 2008. 2nd Edition, PHI, 2011

REFERENCES:

1. “Advances in Knowledge Discover and Data Mining”, Usama M. Fayyad, Gregory Piatetsky Shapiro, Padhrai Smyth RamasamyUthurusamy, the M.I.T. Press, 2007.
2. “The Data Warehouse Toolkit”, Ralph Kimball, Margy Ross, John Wiley and Sons Inc., 2002
3. “Building Data Mining Applications for CRM”, Alex Berson, Stephen Smith, Kurt Thearling, Tata McGraw Hill, 2000.
4. “Data Mining: Introductory and Advanced Topics”, Margaret Dunham, Prentice Hall, 2002.
5. “Discovering Knowledge in Data: An Introduction to Data Mining”, Daniel T. Larose John Wiley & Sons, Hoboken, New Jersey, 2004

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: V **Paper type: CORE PRACTICAL** **PRACTICAL-5**

Paper code **Name of the Paper: OPERATING SYSTEM LAB** **Credit: 2**

Total Hours per Week: 4 **Lecture Hours:** **Tutorial Hours:** **Practical Hours: 52**

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COURSE OBJECTIVES

1. To know about UNIX commands.
2. To understand the concept of shell programming.
3. To learn how to use vi editor.
4. To understand the concepts of semaphores.
5. To understand the concepts of synchronization.

COURSE OUTCOMES

1. After studied unit-1, the student will be able to understand UNIX commands.
2. After studied unit-2, the student will be able to write a program using shell commands.
3. After studied unit-3, the student will be able to build an application for semaphores.
4. After studied unit-4, the student will be able to implement synchronization applications.
5. After studied unit-5, the student will be able to develop a program for file allocation strategies.

LIST OF PRACTICALS EXCERISES:

1. Basics of UNIX commands.
2. Shell Programming.
3. Implement the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
4. Implement all file allocation strategies
   a) Sequential b) Indexed c) Linked
5. Implement Semaphores
6. Implement all File Organization Techniques
   a) Single level directory b) Two level c) Hierarchical d) DAG
7. Implement Bankers Algorithm for Dead Lock Avoidance
8. Implement an Algorithm for Dead Lock Detection

9. Implement e all page replacement algorithms

   a) FIFO b) LRU c) LFU

10. Implement Shared memory and IPC
11. Implement Paging Technique of memory management.
12. Implement Threading & Synchronization Applications.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self discussion, self learning process.

i. Following institution and intellectual and writing reports in the course field.

j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.

k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

l. Extracurricular activities may be framed through their syllabus content. aa. Bring the industries to the campus. Bring the students to the industry.

m. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	M	M	S	S	S
CO2	S	S	M	S	M	S	S	S	S	S
CO3	S	S	M	M	M	M	M	S	S	M
CO4	S	S	M	M	M	S	M	S	S	M
CO5	S	S	M	M	M	M	S	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: V **Paper type: CORE PRACTICAL PRACTICL -6**

Paper code **Name of the Paper:Mobile Applications Development Lab** **Credit: 2**

Total Hours per Week: 4 **Lecture Hours:** **Tutorial Hours:** **Practical Hours: 52**

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COURSE OBJECTIVES

1. To understand how to change fonts.
2. To understand how to change colors.
3. To know about layout managers.
4. to understand drawing methods.
5. To understand database connectivity.

COURSE OUTCOMES

1. After studied unit-1, the student will be able to build application to change fonts and colors.
2. After studied unit-2, the student will be able to implement multithreading.
3. After studied unit-3, the student will be able to develop GUI application with drawing methods.
4. After studied unit-4, the student will be able to build application to create alarm clock.
5. After studied unit-5, the student will be able to implement layout managers.

LIST OF PRACTICAL EXCERISES:

1. Develop an application that uses GUI components, Font and Colors.
2. Develop an application that uses Intent and Activity.
3. Develop an application that uses Layout Managers and event listeners.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of RSS Feed.
6. Implement an application that implements Multi-threading.
7. Develop an application that create alarm clock.
8. Develop an application Using Widgets.
9. Implement an application that writes data to the SD card.

10. Implement an application that creates an alert upon receiving a message.
11. Develop an application that makes use of database.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise

c. Workshops, preparing technical term dictionaries from text books and reference books.

d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher

e. Forming digital library: collecting text and reference books, course material.

f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

g. Extracurricular and cultural activities may be framed through the syllabus content.

h. Grouping students for self discussion, self learning process.

i. Following institution and intellectual and writing reports in the course field.

j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.

k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

l. Extracurricular activities may be framed through their syllabus content.

m. Bring the industries to the campus. Bring the students to the industry.

n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	M	M	S	S	S	S
CO2	S	M	S	S	M	M	M	M	S	S
CO3	S	M	M	S	S	M	M	S	S	S
CO4	S	S	S	M	S	S	S	S	M	S
CO5	S	S	M	S	M	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: V **Paper type: ELECTIVE 1 PAPER-1**

Paper code : **Name of the Paper: INFORMATION SECURITY** **Credit: 3**

Total Hours per Week: 3 **Lecture Hours: 39** **Tutorial Hours:** **Practical Hours:**

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COURSE OBJECTIVES

1. To understand the basic concepts of Information Security
2. To understand the legal, ethical and professional issues in Information Security
3. To know about risk management
4. To understand the technological aspects of Information Security
5. To understand the concepts of Cryptography and Hacking methods

COURSE OUTCOMES:

1. Students are able to understand about the basic concepts of Information Security
2. Students are able to understand about the legal, ethical and professional issues in Information Security
3. Students are able to understand about risk management
4. Students are able to understand about the technological aspects of Information Security
5. Students are able to understand about the concepts of Cryptography and Hacking methods

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I INFORMATION SECURITY BASICS **Teaching Hours: 8Hrs**

Introduction -History -What is Information Security?-Critical Characteristics of Information-NSTISSC Security Model-Components of an Information System-Securing the Components-Balancing Security and Access-The SDLC-The Security SDLC.

UNIT - II SECURITY INVESTIGATION **Teaching Hours: 8Hrs**

Security-Business Needs - Threats - Attacks - Legal-Ethical and Professional Issues-Relevant U.S. Laws -International Laws and Legal Bodies -Ethics and Information Security -Codes of Ethics and Professional Organizations

UNIT - III SECURITY ANALYSIS **Teaching Hours: 8HrsRisk Management -Introduction** -An Overview of Risk Management -Risk Identification -Risk Assessment -Risk Control Strategies -Selecting a Risk Control Strategy -Quantitative versus Qualitative Risk Control Practices -Risk Management Discussion Points.

UNIT –IV SECURITY MODELS **Teaching Hours: 8Hrs**

LOGICAL DESIGN-Blueprint for Security-Information Security Policy -Standards and Practices-ISO 17799/BS 7799-NIST Models-VISA International Security Model-Design of Security Architecture-Planning for Continuity -Security Physical Design - Firewalls - Security Technology - IDS - IPS - Honey Pots-Honey Nets -Padded cell Systems Scanning and Analysis Tools - Access Control Devices.

UNIT - V CRYPTOGRAPHY AND ETHICAL HACKING **Teaching Hours: 7Hrs**

Cipher methods-Cryptographic Algorithms and Tools - Attacks on Cryptosystems –Hacking-Effects of Hacking-Hacker -Types of Hacker-Ethical Hacker-Hacktivism - Networking & Computer Attacks - Malicious Software (Malware) -Protection Against Malware-Intruder Attacks on Networks and Computers -Wireless Hacking-Windows Hacking-Linux Hacking Session.

TEXTBOOKS:

1. "Principles of Information Security", Michael E Whitman and Herbert J Mattord, 5th Edition, Vikas Publishing House, New Delhi, 2003.
2. "Fundamentals of Information Systems Security", David Kim,MichaelG.Solomon, 3rd Edition ,Jones & Bartlett Learning, October 2016.

3. "The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy", Patrick Engebretson, 2nd Edition, Syngress Basics Series -Elsevier, 2011.
4. "Hands-On Ethical Hacking and Network Defense", Michael T. Simpson, Kent Backman, James E. Corley, Second Edition, CENGAGE Learning, 2010.

REFERENCES:

1. "Handbook of Information Security Management", Micki Krause, Harold F. Tipton, sixth Edition, CRC Press LLC, 2004.
2. "Hacking Exposed", Stuart McClure, Joel Scrambray, George Kurtz, Tata McGraw-Hill, 2003.
3. "Computer Security Art and Science", Matt Bishop, 2ndEdition , Pearson/PHI, 2002.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: V Paper type: ELECTIVE1 PAPER-1

Paper code Name of the Paper: SOFTWARE TESTING Credit:3

Total Hours per Week: 3 Lecture Hours: 39 Tutorial Hours: ….. Practical Hours: …..

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COURSE OBJECTIVES

1. To understand the concept of software testing, and software quality
2. To learn to inspect and detect errors by going through each and every code segment
3. To gain knowledge of various functional and structural testing techniques
4. To understand basic concept of Software Management tools and object oriented testing
5. To understand basic concept of Software quality and software quality assurance

COURSE OUTCOMES:

1. Students are able to understand the concept of software testing, and software quality
2. Students are able to learn to inspect and detect errors by going through each and every code segment
3. Students are able to gain knowledge of various functional and structural testing techniques
4. Students are able to understand basic concept of Software Management tools and object oriented testing
5. Students are able to understand basic concept of Software quality and software quality assurance

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I INTRODUCTION TO SOFTWARE TESTING **Teaching Hours: 8Hrs**

Fundamentals of software testing -need for software testing-Psychology of testing -various approaches -characteristics of testing -principles of testing -testing strategies -verification and validation -Defect and Prevention strategies.

UNIT - II SOFTWARE DEVELOPMENT MODEL AND TESTING Teaching Hours: 8Hrs

Water fall model - V - model-Spiral model-Agile model -Life cycle of testing-Static Testing -dynamic testing -White box testing -Block box testing -Regression testing -Integration Testing -System and Performance Testing -Usability Testing

UNIT –IIIFUNCTIONAL AND STRUCTURAL TESTING **Teaching Hours: 8Hrs**

Boundary Value Analysis -Equivalence Class Testing -Decision Table -Based Testing -Cause Effect Graphing Technique -Path testing - Cyclomatic Complexity -Graph Metrics -Data Flow Testing -Slice based testing.

UNIT - IV TEST MANAGEMENT AND TOOLS **Teaching Hours: 8Hrs**

Test planning- cost - benefit analysis of testing -monitoring and control - Test reporting - Test control -Specialized testing -Object Oriented Testing -Automated Tools for Testing -Tool Selection and Implementation -Challenges in test automation -GUI Testing

UNIT –VSOFTWARE QUALITY AND SOFTWARE QUALITY ASSURANCE

Teaching Hours: 7Hrs

Introduction to software quality and software quality assurance -basic principles about the software quality and software quality assurance -Planning for SQA -various models for software product quality and process quality -SCM -RAD -System Documentation

TEXTBOOKS:

1. "Software Testing-A Craftsman's Approach" -Paul C. Jorgensen -Second Edition -CRC Press 2008
2. "Software Testing", -Ron Patton, Second Edition - Sams Publishing, Pearson Education, 2007.
3. "Software Testing-A Craftsman's Approach" -Paul C. Jorgensen, Second Edition -CRC Press, 2008

REFERENCES:

1. "Software Testing and Analysis: Process, Principles and Techniques" -Mauro Pezze, Michal Young - Wiley India , 2008
2. "Software Engineering" -K.K. Aggarwal&Yogesh Singh -New Age International Publishers -New Delhi, 2003.
3. "Software Testing -Principles and Practices" -SrinivasanDesikan and Gopalaswamy Ramesh, Pearson Education, 2006.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: V **Paper type: ELECTIVE 1** **PAPER-1**

Paper code **Name of the Paper: INTERNET OF THINGS** **Credit:3**

Total Hours per Week: 3. Lecture Hours:39 **Tutorial Hours: …..** **Practical Hours: …..**

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COURSE OBJECTIVES

1. To understand the fundamentals of Internet of Things.
2. To understand the M2M and IoT Architecture
3. To understand the IoT Model And Views
4. To learn about the basics of IOT protocols.
5. Analyze applications of IoT in real time scenario.

Course outcomes:

1. Students are able to understand the fundamentals of Internet of Things.
2. Students are able to understand about M2M and IoT Architecture
3. Students are able to understand the IoT Model And Views
4. Students are able to learn about the basics of IOT protocols.
5. Students are able to analyze applications of IoT in real time scenario.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I INTRODUCTION TO IoT **Teaching Hours: 8**

Introduction to Internet of Things- Definition and Characteristics of IoT-Physical Design-Logical Design - IoT Enabling Technologies - IoT Levels & Deployment Templates -Domain Specific IoTs -Home -City -Environment -Energy -Retail -Logistics -Agriculture -Industry -health and Lifestyle.

UNIT - II M2M and IoT ARCHITECTURE **Teaching Hours: 8**

IoT and M2M -Difference between IoT and M2M - SDN - IoT System Management with NETCONF - YANG - IoT Platforms Design Methodology -M2M high - level ETSI architecture -IETF architecture for IoT-OGC architecture - Service Oriented Architecture -IoT reference architecture

UNIT - III IoT MODEL AND VIEWS **Teaching Hours: 8**

IoT reference model -Domain model -information model -functional model -communication model -Functional View - Information View -Deployment and operational View -other relevant architectural views -data representation and visualization.

UNIT - IV IoT PROTOCOLS **Teaching Hours: 8**

Protocol Standardization for IoT -Efforts -M2M and WSN Protocols -SCADA and RFID Protocols -Unified Data Standards -Protocols -IEEE 802.15.4 -BACNet Protocol - Modbus-Zigbee Architecture -Network layer -6LowPAN - CoAP -Security

UNIT - V REAL - WORLD APPLICATIONS **Teaching Hours: 7**

Real world design constraints -Applications -Asset management, Industrial automation, smart grid, Commercial building automation, Smart cities -participatory sensing -Data Analytics for IoT - Software & Management Tools for IoT Cloud Storage Models & Communication APIs -Cloud for IoT-Amazon Web Services for IoT.

TEXTBOOKS:

1. "Interconnecting Smart Objects with IP: The Next Internet", Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann, 2010.
2. Internet of Things -A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015.
3. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014.

REFERENCES:

1. “Internet of Things -A hands-on approach‖”, ArshdeepBahga, Vijay Madisetti, Universities Press, 2015
2. “Architecting the Internet of Things‖,”DieterUckelmann, Mark Harrison, Michahelles, Florian (Eds), Springer, 2011.
3. “The Internet of Things in the Cloud: A Middleware Perspective‖”, Honbo Zhou, CRC Press, 2012.
4. "From Machine-to-Machine to the Internet of Things -Introduction to a New Age of Intelligence", Jan Ho¨ ller, VlasiosTsiatsis, Catherine Mulligan, Stamatis , Karnouskos, Stefan Avesand, David Boyle, Elsevier, 2014.
5. “The Internet of Things -Key applications and Protocols”, Olivier Hersent, David Boswarthick, Omar Elloumi ,Wiley, 2012.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: V **Paper type: SKILLED BASED SUBJECT PAPER-3**

Paper code **Name of the Paper: MULTIMEDIA SYSTEMS** **Credit:2**

Total Hours per Week: 2 . Lecture Hours: 26 Tutorial Hours:. Practical Hours: …..

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COURSE OBJECTIVES

This course presents the Introduction to Multimedia, Images & Animation and enables the students to learn the concepts of Multimedia.

1. To Learn about fundamentals of Multimedia**.**
2. To Learn how to make Video and Animation**.**
3. To Learn how to Create Presentation in Multimedia**.**
4. To Learn how to Create Sound Links in Multimedia**.**
5. To Learn about Imaging Special Visual Effects in Multimedia**.**

Course outcomes:

1. Students are able to Learn about fundamentals of Multimedia**.**

2. Students are able to learn how to make Video and Animation**.**

3. Students are able to Learn how to Create Presentation in Multimedia**.**

4. Students are able to Learn how to Create Sound Links in Multimedia**.**

5. Students are able to Learn about Imaging Special Visual Effects in Multimedia**.**

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I INTRODUCTION TO MULTIMEDIA **Teaching Hours: 5Hrs**

Introduction to Multimedia PCs -Components of Multimedia - Multimedia Tools - Sound and Graphics - Digital Sound -Editing and Mixing sound files -MIDI creation -Tracking Procedure - Interactive and Non Interactive Graphics -High Resolution Graphics -Difference between TV and Computer Display.

UNIT - II VIDEO AND ANIMATION **Teaching Hours: 5Hrs**

Digital Image concepts -Video Capturing -Scanning Images -Digital Filters - Morphing and Warping -Two Dimensional and Three dimensional animation -Animation Tools -Layering technique - Blue Screen technique -Latest movie technologies -Motion Tracking System -Motion Capturing System.

UNIT - III CREATING PRESENTATION: **Teaching Hours: 5Hrs**

Script Writing and creating interactive and non-interactive presentation -Linear and Non Linear Editing -Authoring Tools -File Formats SOUND -VIDEO -ANIMATION - Presentation Images - Multimedia Programming - Text Links -Hyper Text system -Form Creation -File storing - Error Trapping.

UNIT –IVSOUND LINKS **Teaching Hours: 5Hrs**

Multimedia interfaces- MCI - API- High Level Multimedia Functions -WAVE, MIDI file processing -Animation - Color Palette -Events -ROPs.

UNIT - V IMAGING SPECIAL VISUAL EFFECTS **Teaching Hours: 6Hrs**

Bitmap -Brushes -Dissolve -Hotspot Editor -Scrolling - Media Control Interface: Simple Commands -API functions -CD player -Video Capturing -Form -AVI Play Form.

TEXTBOOKS:

1. "Introduction to Multimedia System", KaliyaperumalKarthikeyan, LAP Lambert Academic Publishing, 2011.
2. "Multimedia Making It Work ",TayVaughan, Tata McGraw-Hill Publishing Company, Eighth Edition, 2011.
3. "Multimedia Systems", ParagHavaldar and Gerald Medioni, Cengage Learning, 2011.
4. "Multimedia Systems", S. K. Bansal, Aph Publishing Corporation, 2011.

REFERENCES:

1. "Multimedia Handbook", Keyes, TMH, 2000.
2. "Multimedia Computing Communications & Applications", R. Steinmetz and K. Naharstedt, Pearson, Delhi. 2001.
3. "Advanced Multimedia Programming", S. Rimmer, PHI, New Delhi, 2000.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: VI Paper type: CORE THEORY PAPER-8

Paper code Name of the Paper: OPEN SOURCE SOFTWARE Credit:4

Total Hours per Week: 7 Lecture Hours: 91 Tutorial Hours: ….. Practical Hours: …..

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COURSE OBJECTIVES

1. To understand the basics of open source software
2. To familiarize with open source software licensing models
3. To learn to use open source software for development
4. To understand the basics of open source software operating systems
5. To educate the fundamentals of open source software databases

COURSE OUTCOMES

1. The student will be able to understand the basics of open source software
2. The student will be able to develop software under various open source software licensing models
3. The student will be able to develop applications using open source software
4. The student will be able to use open source software operating systems
5. The student will be able to develop applications that uses open source software databases

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – I INTRODUCTION: **Teaching Hours: 18Hrs**

INTRODUCTION: Objectives, Overview of Open Source System, Open source tools, Open source components, Open source methodology, Open Source Software Development Models, The FOSS Philosophy, Social and Cultural Impacts

UNIT – II LICENSING **Teaching Hours: 18 Hrs**

LICENSING: Licensing, Types of licensing, Intellectual Proprietary Right, Commercial License versus Open Source License - Open Source Licensing: Contract, and Copyright Law -Basic Principles of Copyright Law, Contract and Copyright, Open Source Software Licensing, Types of OSS licenses, OSS licensing strategies, Issues with Copyrights and Patents, Warranties - The MIT (or X) License, The BSD License, The Apache License, Versions of Apache License - Academic Free Licenses, Provisions under Academic Free License (v2.0), Applications of AFL, Philosophy of Open Source License

UNIT – III OPEN SOURCE DEVELOPMENT **Teaching Hours: 20Hrs**

OPEN SOURCE DEVELOPMENT: Infrastructure Needed for an Open-Source Project, Public code archive, Project documentation,Bug database, Open mailing lists and newsgroup, Project website, Software Development Life Cycle, Building a Community - Joining an Existing Open Source Project, To become a good community member, To adopt development process of OSS, Get the contributions accepted, Ending an Open-Source Project, Open Source Within a Company

UNIT – IVOPEN SOURCE OPERATING SYSTEM (SHELL PROGRAMMING)

Teaching Hours: 18 Hrs

OPEN SOURCE OPERATING SYSTEM (SHELL PROGRAMMING): Bash Shell Scripting, Executing Script, Working withVariables and Input, Using Control Structures, Handling signals, creating functions, working sed and gawk, working with web using shell script: Downloading web page, Converting Web page content to a text file, parsing data, working cURL.

UNIT – V OPEN SOURCE DATABASE AND APPLICATION **Teaching Hours: 17 Hrs**

OPEN SOURCE DATABASE AND APPLICATION: MySQL: Configuring MySQL Server, working with MySQL Databases, MySQL Tables, SQL Commands -INSERT, SELECT, UPDATE,

REPLACE, DELETE. Date and Time functions in MySQL. PHP -MySQL Application Development: Connecting to MySQL with PHP, Inserting data with PHP, Retrieving data with PHP

TEXTBOOKS

1. Prof.DayanandAmbawade, Deven Shah, "Linux Labs And Open Source Technologies", Dream Tech Press, 2014
2. Julie C Meloni, "PHP, MySQLand Apache", Pearson Education, 2009

Reference Book

1. Peterson, "The Complete Reference Linux", Tata McGraw HILL, 2010
2. Steve Suehring, Tim Converse and Joyce Park, "PHP6 and MySQL Bible", Wiley-India, New Delhi, 2009

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: VI **Paper type: CORE THEORY PAPER-9**

Paper code **Name of the Paper: PYTHON PROGRAMMING** **Credit: 4**

Total Hours per Week: 6 Lecture Hours: 78 **Tutorial Hours:** **Practical Hours:**

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COURSE OBJECTIVES

1.To understand the basics of python programming language

2.To familiarize with control flow statements, exceptions and string manipulations

3.To learn to use the python built-in functions: tuple, zip and set

4.To understand the basic python list operations

5.To educate the fundamentals of python OOPS concepts.6.

COURSE OUTCOMES

1. The student will be able to understand the basics of python programming.
2. The student will be able to develop string manipulation programs with exception handling
3. The student will be able to invoke the built-in functions
4. The student will be able to develop list manipulation programs
5. The student will be able to develop python based OOPS programs

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT– I INTRODUCTION **Teaching Hours: 18 Hrs**

Identifiers -Keywords - Statements and Expressions -Variables -Operators -Arithmetic operators- Assignment operators -Comparison operators -Logical operators -Bitwise operators - Precedence and

Associativity -Data types - Number -Booleans -Srrings - Indentation - Comments-Single line comment - Multiline comments - Reading Input -Print Output -Type Conversions -int function -float function -str() function -chr() function -complex() function -ord() function -hex() function -oct() function - type() function and Is operator -Dynamic and Strongly typed language.

UNIT- II CONTROL FLOW STATEMENTS **Teaching Hours: 18 Hrs**

Control Flow Statements -If statement -If else statement -If elif else statement -nested if statement- while loop -for loop -continue and break statements -catching exceptions using try and except statement -syntax errors -exceptions -exception handling -Strings -str() function - Basic string operations -String comparison -Built in functions using strings -Accessing characters in string -String slicing -String joining -split() method -string traversing

UNIT- III FUNCTIONS **Teaching Hours: 16Hrs**

Functions -Built in functions -function definition and calling - return statement -void function - scope and lifetime of variables -args and kwargs -command line arguments -Tuples -creation -basic tuple operations -tuple() function -indexing -slicing -built-in functions used on tuples -tuple methods -packing - unpacking -traversing of tuples -populating tuples -zip() function - Sets -Traversing of sets -set methods -frozenset.

UNIT- IV LISTS **Teaching Hours: 12Hrs**

Lists: Using List- List Assignment and Equivalence -List Bounds- Slicing - Lists and Functions- Prime Generation with a List.List Processing: Sorting-Flexible Sorting - Search- List Permutations- Randomly Permuting a List- Reversing a List.

UNIT- V OBJECTS **Teaching Hours: 14Hrs**

Objects: Using Objects- String Objects- List Objects. Custom Types: Geometric Points - Methods- Custom Type Examples- Class Inheritance. Handling Exceptions: Motivation- Exception Examples- Using Exceptions - Custom Exceptions.

TEXTBOOKS

1. Gowrishankar S, Veena A, “Introduction to Python programming”, 1st Edition, CRC Press/Taylor & Francis, 2008. (Units 1-3)

2. Learn to Program with Python, 3th Edition, Richard L. Halterman, Southern Adventist University. (Units 4-5)

REFERENCES

1. Core Python Programming, 2thEdition, Wesley J. Chun, Prentice Hall.
2. Jake VanderPlas,"Python Data Science Handbook:Essential Tools for working with Data",1st edition, O'Reilly Media, 2016.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: VI Paper type: CORE PRACTICAL PRACTICAL - 7

Paper code Name of the Paper: OPEN SOURCE SOFTWARE LAB Credit: 2

Total Hours per Week: 5 Lecture Hours:. Tutorial Hours: ….. Practical Hours: 65.

……

COURSE OBJECTIVES

1. To understand the basic HTML Tags.
2. To understand the types of CSS.
3. To learn Javascript functions.
4. To know about PHP form elements.
5. To learn PHP with MYSQLdatabase connectivity.

COURSE OUTCOMES

1. After studied unit-1, the student will be able to design static web pages.
2. After studied unit-2, the student will be able to link common style to the web pages using CSS.
3. After studied unit-3, the student will be able to validate form controls using javascript.
4. After studied unit-4, the student will be able to design dynamic webpages using PHP.
5. After studied unit-5, the student will be able to develop PHP program with MYSQL database connection.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXCERCISES

1. Creating a basic website using HTML. The website should contain the following pages:
   a. User Registration page, Login Page, Home Page
   b. Profile page, Product details page
   c. Shopping Cart page and Payment Page
2. Implement CSS for the website using inline, internal and external Stylesheets
3. Event Handling in the website using JavaScript
4. Validate the registration, user login and payment details using JavaScript
5. Design a scientific calculator using JavaScript
6. Implement the following using JavaScript:
   a. Find factorial of the given number.
   b. Find if a given number is an Armstrong number
   c. Find if a given number is Automorphic
7. Create an XML document, which contains 10 users information. Implement a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.
8. Create an XML document for library. Display the books for any particular subject in table form using XSLT.
9. Handling form elements in servlets.
10. Program for finding whether a given number is palindrome or not using JSP
11. Create user information and product information table in MySQL database and perform user verification via JSP

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.

b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.
d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.
f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
g. Extracurricular and cultural activities may be framed through the syllabus content.
h. Grouping students for self discussion, self learning process.
i. Following institution and intellectual and writing reports in the course field.
j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
l. Extracurricular activities may be framed through their syllabus content.
m. Bring the industries to the campus. Bring the students to the industry.
n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	M	S	S	S	S
CO2	S	S	M	S	S	S	M	M	S	S
CO3	S	M	M	S	M	M	S	M	M	S
CO4	S	S	M	M	M	S	S	S	S	S
CO5	S	S	S	S	M	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: VI Paper type: CORE PRACTICAL PRACTICAL - 8

Paper code Name of the Paper: PYTHON PROGRAMMING LAB Credit:2

Total Hours per Week:4. Lecture Hours: Tutorial Hours: ….. Practical Hours: 52

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COURSE OBJECTIVES

1. To know about basic data types, operators in Python.
2. To understand Loops in Python.
3. To understand the concepts of Arrays.
4. To understand how to handle string.
5. To know about functions.

COURSE OUTCOMES:

1. After studied unit-1, the student will be able to write a program using operators.
2. After studied unit-2, the student will be able to develop a program using loops.
3. After studied unit-3, the student will be able to implement program using Arrays.
4. After studied unit-4, the student will be able to implement the concept of String functions.
5. After studied unit-5, the student will be able to build application with basic expressions.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXERCISES:

1. Write a Python program to find the area and perimeter of a circle.
2. Write a Python program to generate Fibonacci series.
3. Write a Python program to compute the GCD of two numbers.

4. Write a Python program to generate first n prime numbers.
5. Write a Python program to find the sum of squares of n natural numbers.
6. Write a Python program to find the sum of the elements in an array.
7. Write a Python program to find the largest element in the array.
8. Write a Python program to check if the given string is a palindrome or not.
9. Write a Python program to store strings in a list and print them.
10. Write a Python program to find the length of a list, reverse it, copy it and then clear it.

References

1. Core Python Programming, 2thEdition, Wesley J. Chun, Prentice Hall.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

a. Book review and research paper review, syllabus and curriculum review.
b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
c. Workshops, preparing technical term dictionaries from text books and reference books.
d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
e. Forming digital library: collecting text and reference books, course material.
f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
g. Extracurricular and cultural activities may be framed through the syllabus content.
h. Grouping students for self discussion, self learning process.
i. Following institution and intellectual and writing reports in the course field.
j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
l. Extracurricular activities may be framed through their syllabus content.
m. Bring the industries to the campus. Bring the students to the industry.
n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	M	S	S
CO2	S	S	M	M	S	M	S	M	S	S
CO3	S	M	M	M	S	M	S	M	S	S
CO4	S	S	S	M	S	S	S	S	M	S
CO5	S	M	S	S	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: VI Paper type: ELECTIVE II PAPER-2

Paper code Name of the Paper: Computer Organization And Architecture
Credit: 3

Total Hours per Week:3. Lecture Hours: 39. Tutorial Hours: ….. Practical Hours: …..

……

COURSE OBJECTIVES:

1. To acquaint students with the basic concepts of fundamental component, architecture, register organization and performance metrics of a computer.
2. To impart the knowledge of data representation in binary and understand implementation of arithmetic algorithms in a typical computer.
3. To teach students how to describe machine capabilities and design an effective data path design for instruction execution.
4. To introduce students to syntax and semantics of machine level programming.
5. To make students understand the importance of memory systems, IO interfacing techniques and external storage and their performance metrics for a typical computer. And explore various alternate techniques for improving the performance of a processor.

COURSE OUTCOMES

1. The student will be able to do understand the overview of computer architecture
2. The student will be able to understand the computer arithmetic
3. The student will be able to the basics of computer architecture
4. The student will be able to understand the memory architecture
5. The student will be able to recognize interface and communication architecture

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – IINTRODUCTION AND OVERVIEW OF COMPUTER ARCHITECTURE

Teaching Hours: 8Hrs

Introduction to computer systems - Overview of Organization and Architecture -Functional components of a computer -Registers and register files-Interconnection of components- Organization of the von Neumann machine and Harvard architecture-Performance of processor

UNIT – IIDATA REPRESENTATION AND COMPUTER ARITHMETIC

Teaching Hours: 8Hrs

Fixed point representation of numbers-algorithms for arithmetic operations: multiplication (Booths, Modified Booths) - division (restoring and non-restoring) - Floating point representation with IEEE standards and algorithms for common arithmetic operations- Representation of non-numeric data (character codes).

UNIT – III FUNDAMENTALS OF COMPUTER ARCHITECTURE

Teaching Hours: 8 Hrs

Introduction to ISA (Instruction Set Architecture)-Instruction formats-Instruction types and addressing modes- Instruction execution (Phases of instruction cycle)- Assembly language programming-Subroutine call and return mechanisms-Single cycle Data path design-Introduction to multi cycle data path-Multi cycle Instruction execution.

UNIT – IVMEMORY SYSTEM ORGANIZATION AND ARCHITECTURE

Teaching Hours: 8Hrs

Memory systems hierarchy-Main memory organization-Types of Main memory-memory inter- leaving and its characteristics and performance- Cache memories: address mapping-line size- replacement and policies - coherence- Virtual memory systems – TLB- Reliability of memory systems- error detecting and error correcting systems

UNIT – VINTERFACING AND COMMUNICATION: **Teaching Hours: 7Hrs**

I/O fundamentals: handshaking, buffering-I/O techniques: programmed I/O, interrupt-driven I/O, DMA- Interrupt structures: vectored and prioritized-interrupt overhead- Buses: Syn- chronous and asynchronous- Arbitration. External storage systems-organization and structure of disk drives: Electronic- magnetic and optical technologies- RAID Levels- I/O Performance

TEXTBOOKS

1. David A. Patterson and John L. Hennessy Computer Organization and Design-The Hardware/Software Interface 5th edition, Morgan Kaufmann, 2013.
2. Carl Hamacher, ZvonkoVranesic, SafwatZaky, Computer organization, McGraw Hill, Fifth edition, Reprint 2011.

REFERENCE BOOK:

1. W. Stallings, Computer organization and architecture, Prentice-Hall, 8th edition, 2013

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: VI Paper type: ELECTIVE II PAPER-2

Paper code Name of the Paper: SOFTWARE METRICS
Credit: 3

Total Hours per Week: 3 Lecture Hours: 39 Tutorial Hours: ….. Practical Hours: …..
……

COURSE OBJECTIVES:

1. To understand basic concepts of software metrics.
2. To learn about framework for software measurement

3. To know the basic knowledge of Software metric data collections
4. To understand the Analyzing Software Measurement Data
5. To know about Software Engineering Measurement

COURSE OUTCOMES

1. Students are able to understand basic concepts of software metrics.
2. Students are able to learn about framework for software measurement
3. Students are able to know the basic knowledge of Software metric data collections
4. Students are able to understand the Analyzing Software Measurement Data
5. Students are able to know about Software Engineering Measurement

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I INTRODUCTION TO SOFTWARE METRICS Teaching Hours: 8Hrs

Measurement in Software Engineering -Scope of Software Metrics -Representational Theory of Measurement -Measurement and Models -Measurement Scales and Scle Types -Meaningfulness in Measurement .

UNIT - II FRAMEWORK FOR SOFTWARE MEASUREMENT Teaching Hours: 8 Hrs

Classifying Software Measures: Processes -Products -Resources -Determining What to measure -Applying the Framework -Software Measurement Validation -Performing Software measurement Validation.

UNIT - III SOFTWARE METRICS DATA COLLECTION **Teaching Hours: 8Hrs**

Defining Good Data: The Problem with Problems -Failures -Faults - Challenges - How to Collect Data: Data Collection Forms -Data Collection Tools -Reliability of Data Collection Procedures.

UNIT –IVANALYZING SOFTWARE MEASUREMENT DATA **Teaching Hours: 8Hrs**

Statistical Distributions and Hypothesis Testing -Classical Data Analysis Techniques: Nature of the Data -Purpose of the Experiment -Decision Tree -Examples of Simple Analysis Techniques: Box Plots, Bar Charts, Control Charts, Scatter Plots, Measures of Association, Linear Regression and Multivariate Regression.

UNIT - V SOFTWARE ENGINEERING MEASUREMENT **Teaching Hours: 7Hrs**

Properties of Software Size -Code Size -Design Size -Requirements Analysis and Specification Size -Functional Size Measures and Estimators -Applications of Size Measures -Problem, Solution Size, Computational Complexity. Overview of Measures Internal Product Attributes and Overview of measuring External Product Attributes.

TEXTBOOK:

1. Software Metrics: A Rigorous and Practical Approach, Third Edition , Norman Fenton and James Bieman, Nov 2014

REFERENCE BOOKS:

1. **Metrics-Driven Enterprise Software Development , Datta and Sd , Cengage Learning** Books Publishers, January 2014.
2. Software Metrics A Complete Guide - 2019 Edition, Blokdyk Gerardus, 5starcooks Publishers.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	M	M	S	M	M	S	M	M
CO3	M	S	M	M	S	M	M	S	M	M
CO4	M	S	M	M	S	M	M	S	M	M
CO5	M	S	M	M	S	M	M	S	M	M

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: VI Paper type: ELECTIVE II PAPER-2

Paper code Name of the Paper: WIRELESS DATA COMMUNICATION
Credit:3

Total Hours per Week:3 Lecture Hours: 39 Tutorial Hours: ….. Practical Hours: …..

……

COURSE OBJECTIVES:

1. This course introduces the concepts and theories of networking
2. Toapplies them to various situations, classifying networks, analyzing performance and implementing new technologies.
3. To implement the various new wireless technologies.
4. To implement the various TCP/IP protocols.
5. To implement the various security threads.

COURSE OUTCOMES:

1. Students are able to understand the concepts of basic OSI layers.
2. Students are able to understand the concepts of signals and transmission media.
3. Students are able to understand the basic concepts of error detection and DLC
4. Students are able to understand the Characterize of wireless transmission technologies
5. Students are able to understand the concepts of Security

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT- IBASIC CONCEPTS OF OSI LAYERS **Teaching Hours:8Hrs**

Data Communication -Networks -Protocol and Standards -Line Configuration - Topology -Transmission Modes -Categories of Networks - Internetworks- OSI Models - Functions of OSI Layers.

UNIT-II SIGNALS AND TRANSMISSION MEDIA **Teaching Hours : 7Hrs**

Analog and digital -Periodic and Non Periodic signals -Analog Signals -Time And Frequency Domain - Composite Signals- Digital signals -Guided Media -UnGuided Media - Transmission Impairment -Performance.

UNIT-III ERROR DETECTION, CORRECTION AND DATA LINK CONTROL

Teaching Hours : 9Hrs

Type of errors - Detection-Vertical Redundancy Check (VRC) -Longitudinal Redundancy Check (LRC) Cyclic Redundancy Check (CRC) -check sum -Error Corrections - Flow Control -Error Control.) **SWITCHING & NETWORK DEVICES:** Circuit Switching-Packet Switching-Message Switching Repeaters -Bridges - Routers - Gateways-other Devices - Routing Algorithms-Distance Vectors Routing- Link State Routing.

UNIT- IV WIRELESS NETWORKS **Teaching Hours : 6Hrs**

Wireless LAN: Advantages and Disadvantages-Infrared Vs Radio Transmission - Infrastructure Networks- Ad hoc Networks -Bluetooth- Wireless ATM: Working GroupServices- Reference Model -Functions -Radio Access Layer - Handover- Handover reference model- Requirements and Types.

UNIT-V TCP/IP PROTOCOL SUITE: PART I, PROTOCOLS & NETWORK SECURITY

Teaching Hours : 9Hrs

Overview Of TCP/IP -Network Layer -Addressing -Subnetting -Other Protocols In The Network Layer -Transport Layer -Client/Server Model - BootStrap Protocol and DHCP - Domain Name System (DNS) -Tel Net - File Transmission Protocol (FTP) -Simple Mail Transfer Protocol (SMTP) -SNMP Protocol -Hyper Text Transmission Protocol (HTTP) - World Wide Web (WWW) - Four Aspects of Security -Privacy -Digital Signature -PGP - Access Authorization.

TEXTBOOKS:

1. Data Communication and Networking 2nd Edition Behrouz A. Forouzan, McGraw Hill Education 2014.
2. Stojmenovic and Cacute, Handbook of Wireless Networks and Mobile Computing, Wiley, 2002,

REFERENCE BOOKS:

1. Data and Communication Network, William Stalling PHI 2014.
2. Computer Networks, Andrew S. Tanenbaum , David J. Wetherall, 5th Edition,Prentice Hall. 2010

E References

1. http://nptel.ac.in/video.php?subjectId=117102062

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	M	M	S	S	M	M	M	M
CO2	M	M	M	M	S	S	M	M	M	M
CO3	M	M	M	M	S	S	M	M	M	M
CO4	M	M	M	M	S	S	M	M	M	M
CO5	M	M	M	M	S	S	M	M	M	M

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: VI Paper type: ELECTIVE III PAPER-3

Paper code Name of the Paper:WEB THECHNOLOGY Credit:3

Total Hours per Week: 3 Lecture Hours: 39 Tutorial Hours: ….. Practical Hours: …..

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COURSE OBJECTIVES

1. To understand the concepts of internet
2. To comprehend and analyze the basic concepts of web programming and internet protocols.
3. To describe how the client-server model of Internet programming works.
4. To demonstrates the uses of scripting languages and their limitations.

COURSE OUTCOMES

1. The student will be able to understand Internet architecture
2. The student will be able to do Web designing using HTML
3. The student will be able to develop client-side validation scripts
4. The student will be able to understand XML processing
5. The student will be able to develop server-side validation scripts

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – IINTRODUCTION TO INTERNET **Teaching Hours: 8Hrs**

Internet Overview- Networks - Web Protocols -Web Organization and Addressing - Web Browsers and Web Servers -Security and Vulnerability-Web System Architecture -URL - Domain Name -Client-side and server-side scripting

UNIT – IIWEB DESIGNING **Teaching Hours: 8 Hrs**

HTML5 -Form elements, Input types and Media elements, CSS3 - Selectors, Box Model, Backgrounds and Borders, Text Effects, Animations, Multiple Column Layout, User Interface.

UNIT – III SCRIPTS **Teaching Hours: 8 Hrs**

Client side scripting, What is Javascript, How to develop Javascript, simple Javascript, variables, functions, conditions, loops and repetition - Javascript and objects, Javascript ownobjects, the DOM and web browser environments, forms and validations -DHTML - Combining HTML, CSS and Javascript, events and buttons, controlling your browse

UNIT– IV XML **Teaching Hours: 8Hrs**

Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Well formed, using XML with application.XML, XSL and XSLT. Introduction to XSL, XML transformed simple example, XSL elements, transforming with XSLT

UNIT – VPHP **Teaching Hours: 7Hrs**

Starting to script on server side, Arrays, function and forms, advance PHP - Databases: Basic command with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP myadmin and database bugs.

Textbook:

1. Jeffrey C.Jackson, "Web Technologies-A Computer Science Perspective", PearsonEducation.

Reference books:

1. Robert. W. Sebesta, "Programming the World Wide Web", Fourth Edition, PearsonEducation, 2007.
2. Deitel, Deitel, Goldberg, "Internet & World Wide Web How To Program", Third Edition, Pearson Education, 2006.

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	S	M	S	M	S
CO2	M	S	M	M	S	S	M	S	M	S
CO3	M	S	M	M	S	S	M	S	M	S
CO4	M	S	M	M	S	S	M	S	M	S
CO5	M	S	M	M	S	S	M	S	M	S

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.Sc Software Computer Science) – 2022-2023 onwards

Semester: VI **Paper type: ELECTIVE III** **PAPER-3**

Paper code **Name of the Paper:SOFTWARE DESIGN**
Credit: 3

Total Hours per Week: 3 Lecture Hours: 39. Tutorial Hours: ….. Practical Hours: …..
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COURSE OBJECTIVES

1. To understand the concepts of object oriented modelling and UML
2. To comprehend and analyze the basic concepts of software design.
3. To describe the modelling and design of software.
4. To demonstrate the software design using use-cases

COURSE OUTCOMES

1. The student will be able to understand the overview of software modeling
2. The student will be able to model new software
3. The student will be able to design new software
4. The student will be able to practice various architectural styles for software design
5. The student will be able to demonstrate the software design using several use-cases

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT –I INTRODUCTION Teaching Hours: 8Hrs

Software Modelling -Object oriented Methods and UML- Software Architectural design -Method and Notation -Evolution of Software Modeling and Design Methods - Overview of UML Notations -Software Life cycles and UML Processes -Software Life cycle and Models -Design Verification and Validation - Software Design and Architectural Concepts Structured Design -Design Principles - Problem Partitioning and Hierarchy -Abstraction, Modularity -Top-down and Bottom-up Strategies -Transformation of a DFD to a Structure Chart -Transform Analysis - Transaction Analysis -Coupling - Cohesion -Multiple types of Cohesion in a module - Data Design -Normalization - Denormalization -Procedural Design - Design Patterns - Requirements analysis and Design Modeling -Designing Software Architectures.

UNIT –IISOFTWARE MODELING Teaching Hours: 8Hrs

Use case Modeling -Use case -Conceptual model -Behaviour -Class Analysis Patterns -Overview -Diagrams -Aggregation -UML -Diagrams -Collaboration - Sequence -Class -Design patterns and Frameworks -Static Modeling -Association between classes- Composition and Classification Hierarchies -Constraints -Static Modeling and the UML -Categorization of classes using UML stereotypes -Modeling External Classes -Static Modeling of Entity Classes -Object and class Structuring.

UNIT –IIIDETAILED DESIGN: Teaching Hours: 8Hrs

Dynamic Interaction Modeling -Object Interaction Modeling -Message Sequence Numbering on Interaction Diagram -Dynamic Interaction Modeling - Stateless Dynamic Interaction Modeling-Finite State Machines and State Transitions - Events, Guard Conditions and Actions -Hierarchical State charts -Guidelines for designing State Charts -Steps in State Dependent Dynamic Interaction Modeling - Modeling Interaction Scenarios using Interaction and State Chart Diagrams. Real-World Problems Design based on State Charts, Sequence Diagram,

UNIT –IVARCHITECTURAL DESIGN **Teaching Hours: 7Hrs**

Software Architecture and Component Based Software Architecture -Multiple views of Software Architecture and Patterns -Documenting Software Architecture -Interface Design -Designing Software Architecture -Software Sub system Architectural Design -Designing Object oriented Software Architecture -Designing Component Based Software Architecture

UNIT –VCASE STUDIES **Teaching Hours: 8Hrs**

Designing Concurrent and Real time Software Architectures -Designing Software Product Line Architectures -Software Quality Attributes -Case Studies - Client -Server Software Architecture Case Study - Component Based Software Architecture - Case Study -Real Time Software Architecture. Domain Name System - Email -World Wide Web (HTTP) -Simple Network Management Protocol -File Transfer Protocol -Security -Multimedia applications.

TEXTBOOKS

1. Hassan Gomma, “Software Modeling and design with UML”, Cambridge University Press, 1 edition, 2011.
2. Michael Bigrigg, “Software Design Specification with UML”, Addison-Wesley, 2007.

REFERENCES

1. David Budgen, “Software Design”, Addison-Wesley, 2007.
2. Christopher Fox, “Introduction to Software Engineering Design: Processes, Principles and Patterns with UML2”, Pearson, 2007.

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Semester: VI Paper type: ELECTIVE III PAPER-3

Paper code: Name of the Paper: SOFTWARE QUALITY ASSURANCE
Credit: 3

Total Hours per Week: 3 Lecture Hours: 39 Tutorial Hours: ….. Practical Hours: …..

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Course Objectives

1. To comprehend and analyze the basic concepts of software quality assurance.
2. To describe software. Project lifecycle together with SQA components
3. To describe software. Project lifecycle together with SQ Infrastructure components
4. To describe software. Project lifecycle together with SQmanagement components
5. To proficient with SQA standards and best practices

Course Outcomes

1. The student will be able to understand the concepts of software quality assurance
2. The student will be able to design software project lifecycle and devise SQ components
3. The student will be able todesign SQ Infrastructure components
4. The student will be able to design and demonstrate SQmanagement components
5. The student will be able to demonstrate best practices for software quality

Matching Table (Put Yes / No in the appropriate box)

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1	Yes	Yes	No	No	Yes	Yes
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3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I INTRODUCTION **Teaching Hours: 8Hrs**

Need for Software quality- Quality Challenge - Software Quality Factors - Components of the Software Quality Assurance (SQA). Pre-Project Quality Components - Contract Review - Development and Quality Plans

UNIT –IISOFTWARE PROJECT LIFE CYCLE& SQA COMPONENTS

Teaching Hours: 8Hrs

Identifying & Integrating Quality Activities in the Project Life Cycle - Verification & Validation - Reviews - Software Testing -Strategies -Software Testing Methods-Software Testing Implementation - Assuring the Quality of Software Maintenance - Assuring the Quality of External Participants' Parts - CASE Tools for software quality -Software maintenance quality.

UNIT –III SOFTWARE QUALITY INFRASTRUCTURE COMPONENTS:

Teaching Hours: 8Hrs

Procedures and Work Instructions - Supporting Quality Devices - Staff Training Instructing and Certification - Preventive and Corrective Actions - Configuration Management -Software Change Control -Configuration Management - Documentation and Quality Records Controls.

UNIT - IV SOFTWARE QUALITY MANAGEMENT COMPONENTS:

Teaching Hours: 8Hrs

Project Progress Control - components of project progress control- Progress control of internal projects and external participants- Implementation of project progress control. Total Quality Management(TQM) - Software Quality Metrics Analysis - Objectives of quality measurement- Process metrics- Product metrics.

Estimation of a Software Quality Program - Software Quality Costs - Objectives of cost of software quality metrics- classic model of cost of software quality.

UNIT –VSTANDARDS - CERTIFICATION AND ASSESSMENT Teaching Hours: 7Hrs

SQA Standards - ISO 9001 Certification - Software Process Assessment. Organizing for Quality Assurance -Capability Maturity Model -SEI CMM Level 5 - Comparison of ISO 9000 Model with SEI's CMM -Management and its Role in Quality Assurance - The Software Quality Assurance Unit - SQA Trustees and Committees

TEXTBOOKS:

1. Daniel Galin- "Software Quality Assurance: From Theory to Implementation" - Pearson Addison-Wesley, 2012.
2. Allen Gilles, "Software quality: Theory and management" - International Thomson - Computer press, 1997.

REFERENCES

1. Stephen H.Kan - "Metrics and models in software quality Engineering" - Addison -Wesley, 1955.
2. Roger S. Pressman - "Software Engineering-A Practitioner's Approach" - McGraw Hill pub, 2001.
3. Humphrey Watts - "Managing the Software process", Addison Wesley, 1986

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CO3	M	S	M	M	S	S	M	S	M	S
CO4	M	S	M	M	S	S	M	S	M	S
CO5	M	S	M	M	S	S	M	S	M	S