



THIAGARAJAR COLLEGE MADURAI - 625009

(An Autonomous Institution, affiliated to Madurai Kamaraj
University)

(Re-Accredited with 'A' Grade by NAAC)

Department of Computer Science

**B.Sc., Computer Science
(Aided & SF)**

M.Sc., Computer Science

M.Phil., Computer Science

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

I SEMESTER								
	Code No.	Title of the paper	Hrs /wk.	Crd.	Total Hrs.	Marks		
						CIA	SE	TOT
Part 1	P111	Tharkkala Ilakkiyam	5	3	45	25	75	100
Part 2	P211	English	3	-	45	-	-	-
EVS	ES	Environmental Studies	2	2	30	15	35	50
Core 1	MS11	Digital Principles & Applications	5	4	75	25	75	100
Core 2	MS12	Programming in C	4	4	75	25	75	100
Allied I	AS11	Title will be given by Dept. of Mathematics	5	5	90	25	75	100
Core Lab1	MSL11	C – Lab	6	2	45	40	60	100
Total			30	20				650

II SEMESTER								
	Code No.	Title of the paper	Hrs /wk.	Crd.	Total Hrs.	Marks		
						CIA	SE	TOT
Part 1	P121	Tamil	5	3	45	25	75	100
Part 2	P221	English	3	6	45	25	75	100
AECC	AESS21	English Writing	2	2	30	15	35	50
Core 3	MS21	Object Oriented Programming with C++	4	4	75	25	75	100
Core 4	MS22	Web Designing	4	4	60	25	75	100
Allied II	AS21	Title will be given by Dept. of Mathematics	5	5	75	25	75	100
Core Lab2	MSL21	C++ Lab	4	2	60	40	60	100
Core Lab3	MSL22	Web Designing Lab	3	2	60	40	60	100
Total			30	28				

III SEMESTER								
	Code No.	Title of the paper	Hrs /wk.	Crd.	Total Hrs.	Marks		
						CIA	SE	TOT
Core 5	MS31	Fundamentals of Data structure	4	4	60	25	75	100
Core 6	MS32	System Software	5	4	75	25	75	100
Core 7	MS33	Database Management System	4	4	60	25	75	100
Allied III	AS31	Title will be given by Dept. of Mathematics	5	5	75	25	75	100
NME	MSNME31	Software Development	2	2	30	15	35	50
Core Lab4	MSL31	Data Structure Lab	5	2	75	40	60	100
Core Lab5	MSL32	Database Management Lab	5	2	75	40	60	100
Total			30	23				

IV SEMESTER								
	Code No.	Title of the paper	Hrs /wk.	Crd.	Total Hrs.	Marks		
						CIA	SE	TOT
Core 8	MS41	Java Programming	4	4	60	25	75	100
Core 9	MS42	Computer Architecture	4	4	60	25	75	100
Core 10	MS43	Computer Graphics	5	4	75	25	75	100
Allied IV	AS41	Title will be given by Dept. of Mathematics	5	5	75	25	75	100
SEC – I	MSSEC41	Options given	2	2	30	15	35	50
Core Lab6	MSL41	Java Programming Lab	5	2	75	40	60	100
Core Lab7	MSL42	Graphics Lab	5	2	75	40	60	100
Total			30	23				

V SEMESTER								
	Code No.	Title of the paper	Hrs /wk.	Crd.	Total Hrs.	Marks		
						CIA	SE	TOT
Core 11	MS51	Fuzzy Logic	5	4	75	25	75	100
Core 12	MS52	Software Engineering	5	4	75	25	75	100
Core 13	MS53	Advanced Java	5	4	75	25	75	100
Elective – I	EMS51	Core Elective - I	5	5	75	25	75	100
NME	MSNME51	Internet Applications	2	2	30	15	35	50
VE	VE-I	Value Education	2	1	30	15	35	50
Core Lab8	MSL51	Advanced Java Lab	6	2	90	40	60	100
Total			27	22				

VI SEMESTER								
	Code No.	Title of the paper	Hrs /wk.	Crd.	Total Hrs.	Marks		
						CIA	SE	TOT
Core 14	MS61	Data mining and Warehousing	5	4	75	25	75	100
Core 15	MS62	Data Communication & Networking	5	4	75	25	75	100
Core 16	MS63	Operating System	5	4	75	25	75	100
Core 17	MS64	Cloud Computing	5	4	75	25	75	100
SEC – II	MSSEC61	Options given	2	2	30	15	35	50
Elective – II	PJ	Project	8	5	120	25	75	100
Total			30	23				

List of Electives

Core Electives

- Mobile Applications
- Project
- E-Commerce Technologies
- Artificial Intelligence
- Multimedia Technology

Skill Enhanced Electives

- PHP Programming
- Android Programming
- XML Programming
- Python Programming
- Linux Programming
- PC Troubleshooting

A. Consolidation of contact hours and Credits: UG

Semester	Contact Hrs/Week	Credits
I	30 Hrs.	20
II	30 Hrs.	28
III	30 Hrs.	23
IV	30 Hrs.	23
V	30 Hrs.	22
VI	30 Hrs.	23
Part – V	--	1
Total	180	140

B. Curriculum Credits: Part wise

Part I	Tamil	1X6 = 06 Credits
Part II	English	2X3 = 06 Credits
Part III	core	1X90 = 84 Credits
(11+12+16+16+17+18)		

Allied	4X5 = 20	
Core elective	2X5 = 10	Q

	AECC	1X2 = 02
Part IV	Value Education	1X1 = 01
	Environmental Studies	1X2 = 02
	Skill Enhanced Elective	2X2 = 04
	Non – Major Electives	2X2 = 04

Part V		1X1 = 01
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Total	140
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DEPARTMENT OF COMPUTER SCIENCE
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Course	: B.Sc. Computer Science (Core 1)	Int. Marks	: 25
Class	: I Year	Ext. Marks	: 75
Semester	: I	Max. Marks	: 100
Sub. Code	: MS11	Hours/Week	: 5
Title of the Paper:	Digital Principles and Applications	Credits	:4

Course Outcomes:

1. This course deals with the design of digital system.
2. It presents the basic idea about number systems and logic circuits
3. It also provides a number of methods suitable for designing digital circuits for designing modern digital computers.

Unit-I

Digital Logic

Basic gates-NOT, OR, AND- Universal logic gates- NOR, NAND-AND, OR invert gates- Positive and negative logic.

Combinational logic circuits

Boolean Laws and Theorems - Sum of Products method - Truth table to Karnaugh Map - Pairs, Quads, and Octets –Karnaugh simplifications - Don't care condition- Product of sums method - product of sums simplification.

Unit-II

Data Processing circuits

Multiplexers - Demultiplexers - 1 of 16 Decoder – BCD to decimal Decoders - Seven segment Decoders - Encoders - Exclusive OR gates - Parity Generators and Checkers- Magnitude Comparator.

Unit-III

Number systems and codes

Binary Number System- Binary to decimal conversion - Decimal to binary conversion - Octal numbers - Hexadecimal numbers - The ASCII code - The Excess-3 code - The Gray code.

Arithmetic circuits

Binary Addition - Binary Subtraction - Unsigned Binary Numbers - sign magnitude Numbers - 2's complement Representation - 2's complement Arithmetic - Arithmetic Building Blocks - The Adder - subtracter.

Unit-IV

Clocks and Timing circuits

Schmitt trigger - 555 Timer-Astable - 555 Timer-Monostable.

Flip-Flops

RS FLIP FLOPs - Gated FLIP-FLOPs - Edge-triggered RS FLIP-FLOPs - Edge-triggered D FLIP-FLOPs - Edge-triggered JK FLIP-FLOPs - FLIP-FLOP Timing.

Unit-V

Registers

Types of Registers - Serial-In - Serial-Out - Serial-In - Parallel- Out - Parallel-In- Serial-Out - Parallel-In -Parallel-Out.

Counters

Asynchronous Counters - Decoding Gates - Synchronous Counter - Changing the Counter Modulus - Decade counters.

Text Book

Albert Paul Malvino, Donald P. Leach, Gautamsaha, 5th reprinted 2013, Digital Principles and application, 7th edn, McGraw Hill Edition

Chapters:

Unit - I	: 2.1 to 2.4, 3.1 to 3.8
Unit – II	: 4.1 to 4.9
Unit - III	: 5.1 to 5.8, 6.1 to 6.8
Unit – IV	: 7.3 to 7.5, 8.1 to 8.6
Unit - V	: 9.1 to 9.5, 10.1 to 10.5

Reference:

1. M.Morris Mano, 2004, Digital Logic and computer design, Prentice - Hall of India.
2. Ronald J.Tocci, 2007, Digital System Principles and Application, Prentice - Hall of India.

Course designer

Mrs.SM.Valli

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DEPARTMENT OF COMPUTER SCIENCE

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Course	: B.Sc. Computer Science (Core 2)	Int. Marks	: 25
Class	: I Year	Ext. Marks	: 75
Semester	: I	Max. Marks	: 100
Sub. Code	: MS12	Hours/Week	: 4
Title of the Paper:	Programming in C	Credits	:4

Course Outcomes:

1. Introduce programming concepts
2. Develop programming skill in C Language.

Unit-I: Overview of C and Data types

History of C – Importance of C – Character set – C tokens – Keywords and identifiers – Constants – Variables – Data types – Declaration of variables – Declaring constants - Defining symbolic constants – Operators – Input and output statements

Unit-II: Decision Making and Branching statements

Introduction – Simple if – Else...if – Nested if – Ladder if – Switch statement – Conditional operators – Goto statements – While statement – Do...While statement – For statement

Unit-III: Arrays and String

Introduction – One dimensional array – Multi dimensional array – Declaring and initializing string variables – Reading and writing strings.

Unit-IV: Function and Structure

Introduction to functions – User defined function – Function declaration - Definition of function – Function calls — Categories of function– Function arguments – Recursion – String handling functions.

Introduction to structure – Declaring and defining a structure – Structure members – Arrays of structure – Structure and function.

Unit-V: Pointers and File

Introduction to Pointers – Understanding pointers – Declaring and initializing of pointer variables

Introduction to file – Opening a file – Closing a file – Input/output operations in file.

Text book

E.Balagurusamy, 2012, Programming in A NSI C, 6th edn, McGraw Hill Publishing Company Ltd, New York.

Chapters (Relevant Topics Only)

- | | |
|-----------|--|
| Unit -I | : 1.1, 1.2, 2.1 to 2.8, 2.11, 2.12, 3.1 to 3.8, and 4.1 to 4.3 |
| Unit –II | : 5.1 to 5.9, 6.1 to 6.4 |
| Unit –III | : 7.1 to 7.7, 8.1 to 8.4 |
| Unit –IV | : 9.1, 9.2, 9.5, 9.7, 9.8, 9.10, 9.16, 10.1 to 10.4, 10.8, 10.11 |
| Unit –V | : 11.1 to 11.5, 12.1 to 12.4 |

Reference

1. Byron Gottfried, 2005, Programming C, 28th reprint, Tata McGraw Hill Publishing Company Ltd, New York.
2. Stephen G.Kochen, 2005, Programming C, 3rd edn, Pearson Education, Inc., London.
3. Brian W. Kernighan, Dennis M.Ritchie, 1989, “The C Programming Language”, Prentice Hall of India Pvt. Ltd., New Delhi.

Course designer

Dr.K.Natarajan

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Course	: B.Sc. Computer Science (Core Lab - 1)	Int. Marks	: 40
Class	: I Year	Ext. Marks	: 60
Semester	: I	Max. Marks	: 100
Sub. Code	: MSL11	Hours/Week	: 6
Title of the Paper:	C Lab	Credits	:2

Simple programs:

1. Simple interest
2. Find the biggest from two numbers -ordinary /switch case/conditional operator methods
3. Find the biggest from three given numbers
4. Check a given no is odd or even –ordinary/switch case/conditional operator methods
5. Prime no checking
6. Print all prime numbers between any two given limit
7. Check a given character is vowels or not?
8. Perform various arithmetic operations using switch case
9. Find the sum of digits of a given no
10. Binary to decimal- Decimal to binary conversion

Arrays:

1. Arrange “n” numbers in ascending or descending order
2. Arrange “n” strings in alphabetical order
3. Palindrome checking
4. Matrix addition/ subtraction/multiplication

Function and structure:

1. Calculate the factorial value by recursion
2. Reverse a string by recursion
3. Mark list processing- Structure and call by value technique
4. Mark list processing - Structure and call by reference technique
5. EB bill calculation - Structure and call by value technique
6. EB bill calculation - Structure and call by reference technique

Files:

1. Create a data file to store ‘n’ numbers and separate odd and even numbers
2. Create a data file to store ‘n’ characters and separate vowel and non-vowels.

Course designer:

Dr.K.Natarajan

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Course	: B.Sc. Computer Science (Core 3)	Int. Marks	: 25
Class	: I Year	Ext. Marks	: 75
Semester	: II	Max. Marks	: 100
Sub. Code	: MS21	Hours/Week	: 4
Title of the Paper	: Object Oriented Programming with C++	Credits	: 4

Course Outcomes:

- 1, This course provides the basic concepts and techniques of object oriented programming.
- 2, It trains the students to develop skills in writing object oriented programs.

Unit-I

Principles of Object Oriented Programming(OOP): Procedure oriented programming - OOP Paradigm - Basic concepts of OOP - Benefits of OOP - Object Oriented Languages - Applications of OOP.

Beginning with C++: Simple C++ program - An example with Class - Structure of C++ program.

Unit-II

Introduction to C++: Tokens, Keywords, Identifiers, Variables, Operators, Manipulators, Expressions and Control Structures in C++.

Function in C++ - Main function - Function Prototyping - Call by reference - Return by reference - Inline functions - Default arguments - Function Overloading.

Unit-III

Classes and Objects: Specifying a class- member functions- Memory allocation of objects- Static data members- Static member functions- Objects as function arguments- Friendly functions- Pointers to members.

Constructors and Destructors - Operator overloading and type conversions.

Unit-IV

Inheritance: Single Inheritance - Multilevel Inheritance - Multiple Inheritance Hierarchical Inheritance - Hybrid Inheritance.

Polimorphism: Pointers to Objects - Virtual functions.

Unit-V

Working with files: Classes for file stream operations - Opening and closing a file - End-of-file detection - File pointers - Error handling during file operations - Command line arguments.

Text Book

E. Balagurusamy, 2013, Object Oriented Programming with C++, 6th edn, McGraw Hill Education, New Delhi

Chapters:

- Unit – I : Chapters 1, 2
- Unit - II : Chapters 3, 4
- Unit – III : Chapters 5, 6.1-6.5, 6.7, 6.11, 7
- Unit - IV : Chapters 8, 9.3 to 9.7
- Unit – V : Chapters 11.1 to 11.7, 11.9, 11.10

Reference:

1. Herbert Schildt, 2003, The Complete Reference C++, 4th edn, Tata McGraw Hill, New Delhi.

Course designers **Dr.U.Jeyasutharsan**

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Course	: B.Sc. Computer Science (Core 4)	Int. Marks	: 25
Class	: I Year	Ext. Marks	: 75
Semester	: II	Max. Marks	: 100
Sub. Code	: MS22	Hours/Week	: 4
Title of the Paper:	Web Designing	Credits	: 4

Course Outcomes:

1. Student gain the grounding knowledge about HTML5 features and CSS
2. Learn about CSS usage to style and layout the webpages
3. Student will explore their creativity to design complete social website
4. Presents leading-edge computing technologies for students

UNIT I :

Introduction to Computers and the Internet : Introduction - Evolution of the Internet and World Wide Web - Web Basics-Multitier Application Architecture - Client-Side Scripting versus Server - Side Scripting - World Wide Web Consortium (W3C) - Web 2.0: Going Social - Data Hierarchy - Operating Systems - Types of Programming Languages - Object Technology - Keeping Up - to - Date with Information Technologies.

Introduction to HTML5: Introduction - Editing HTML5 - First HTML5 Example - W3C HTML5 Validation Service - Headings-Linking – Images - Special Characters and Horizontal Rules-Lists - Tables - Forms-Internal Linking - meta Elements - HTML5 Form input Types - input and data list Elements and autocomplete Attribute-Page-Structure Elements

UNIT II:

Introduction to Cascading Style Sheets: Introduction-Inline Styles-Embedded Style Sheets-Conflicting Styles-Linking External Style Sheets-Positioning Elements: Absolute Positioning, z-index-Positioning Elements: Relative Positioning, span-Backgrounds-Element Dimensions-Box Model and Text Flow-Media Types and Media Queries-Drop-Down Menus-(Optional) User Style Sheets - Text Shadows-Rounded Corners -Color-Box Shadows -Linear Gradients; Introducing Vendor Prefixes-Radial Gradients-(Optional: WebKit Only) Text Stroke-Multiple Background Images-(Optional: WebKit Only) Reflections-Image Borders-Animation; Selectors-Transitions and Transformations-Downloading Web Fonts and

the @font-face Rule-Flexible Box Layout Module and :nth-child Selectors-Multicolumn Layout-Media Queries.

JavaScript: Introduction to Scripting: Introduction-Your First Script: Displaying a Line of Text with JavaScript in a Web Page-Modifying Your First Script-Obtaining User Input with prompt Dialogs-Memory Concepts-Arithmetic-Decision Making: Equality and Relational Operators.

UNIT III:

JavaScript: Control Statements: Introduction-Algorithms-Pseudocode-Control Statements-if Selection Statement-if...else Selection Statement-while Repetition Statement-Formulating Algorithms: Counter-Controlled Repetition-Formulating Algorithms: Sentinel-Controlled Repetition-Formulating Algorithms: Nested Control Statements-Assignment Operators-Increment and Decrement Operators - Essentials of Counter-Controlled Repetition-for Repetition Statement-Examples Using the for Statement-switch Multiple-Selection Statement-do...while Repetition Statement-break and continue Statements-Logical Operators – Functions.

UNIT IV:

Arrays: Introduction-Arrays-Declaring and Allocating Arrays-Examples Using Arrays-Random Image Generator Using Arrays-References and Reference Parameters-Passing Arrays to Functions-Sorting Arrays with Array Method sort-Searching Arrays with Array Method index Of-Multidimensional Arrays

Objects : Introduction-Math Object-String Object-Date Object-Boolean and Number Objects-document Object-Favorite Twitter Searches: HTML5 Web Storage-Using JSON to Represent Objects

Document Object Model (DOM): Objects and Collections: Introduction-Modeling a Document: DOM Nodes and Trees-Traversing and Modifying a DOM Tree-DOM Collections-Dynamic Styles-Using a Timer and Dynamic Styles to Create Animated Effects

UNIT V:

JavaScript Event Handling: A Deeper Look: Introduction-Reviewing the load Event-Event mousemove and the event Object-Rollovers with mouseover and mouseout-Form Processing with focus and blur-More Form Processing with submit and reset-Event Bubbling-More Events

HTML5: Introduction to canvas: Introduction-canvas Coordinate System-Rectangles-Using Paths to Draw Lines-Drawing Arcs and Circles-Shadows-Quadratic

Curves-Bezier Curves-Linear Gradients-Radial Gradients-Images-Image Manipulation: Processing the Individual Pixels of a canvas-Patterns-Transformations-Text-Resizing the canvas to Fill the Browser Window-Alpha Transparency-Compositing-Cannon Game-save and restore Methods-A Note on SVG-A Note on canvas 3D

Text Book

Paul J.Deitel - Harvey M.Deitel - Abbey Deitel, 2012, Internet and World wide web
How to Program, 5th edn, Prentice Hall, New Delhi

Chapters

UNIT – I : 1, 2, 3
UNIT – II : 4, 5, 6
UNIT – III : 7, 8, 9
UNIT – IV : 10, 11, 12
UNIT – V : 13, 14

Reference Book

1. N.P.Gopalan and J.Akilandeswari,2010, Web Technology A Developer's – Perspective,4th edn, PHI Learning Pvt.Lt, New Delhi
2. Robin Nixon, 2012, Learning PHP, MySQL, Javascript and CSS , A step by step Guideto creating Dynamic Web Sites,2nd edn, O'Reilly Media, New Delhi
3. Faithe Wempen, 2011, HTML5 Step by Step, Microsoft Press

Web Resources:

<http://www.tutorialspoint.com/html5/>

http://www.w3schools.com/html/html5_intro.asp

<http://www.html-5-tutorial.com/>

Course designers

Mrs.A.M.Hema

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Course	:B.Sc. Computer Science (Core lab - 2)	Int. Marks	: 40
Class	: I Year	Ext. Marks	: 60
Semester	: II	Max. Marks	: 100
Sub. Code	:MSL21	Hours/Week	: 4
Title of the Paper:	C++ Lab	Credits	:2

1. Arithmetic operations
2. Simple and compound interest
3. Default arguments
4. Reference variables
5. Nested functions
6. Function overloading
7. Static member function
8. Object as function argument - Add two times
9. Using friend function-swap
10. Function returning objects - Complex number addition
11. Multiple constructors in a class
12. Copy constructor
13. Unary operator overloading - member function
14. Unary operator overloading - friend function
15. Operator overloading - Complex no.addition
16. Operator overloading - Matrix addition
17. Operator overloading - Matrix multiplication
18. Constructors in derived classes
19. Class to basic conversion
20. Basic to class conversion
21. Class to class conversion
22. Single Inheritance - Private mode
23. Multilevel Inheritance
24. Multiple Inheritance
25. Hybrid inheritance
26. Virtual base class
27. Array of objects - Mark process, EB, Pay process
28. Pointer to objects
29. This pointer
30. Virtual functions
31. File creation

Course designer

Dr.U.Jeyasutharsan

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Course	:B.Sc. Computer Science (Core lab - 3)	Int. Marks	: 40
Class	: I Year	Ext. Marks	: 60
Semester	: II	Max. Marks	: 100
Sub. Code	:MSL22	Hours/Week	: 3
Title of the Paper	: Web Designing Lab	Credits	: 2

1. Program to illustrate List tags and its attributes.
2. Program to illustrate Table tag and its attributes.
3. Program to illustrate Form tag and its attributes.
4. Program to illustrate transition and transformation.
5. Program to illustrate CSS embedded style settings.
6. Program to illustrate CSS colors and positioning elements.
7. Program to demonstrate box model and layout.
8. Program to illustrate JavaScript array objects.
9. Program to demonstrate JavaScript String objects.
10. Program to illustrate JavaScript functions using control flow statements.
11. Program to illustrate JavaScript event handling features.

Course designer :

Mrs.A.M.Hema

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Course	: B.Sc. Computer Science (Core 5)	Int. Marks	: 25
Class	: II Year	Ext. Marks	: 75
Semester	: III	Max. Marks	: 100
Sub. Code	: MS31	Hours/Week	: 4
Title of the Paper	: Fundamentals of Data Structure	Credits	: 4

Course Outcomes:

- 1, Understanding data structure concept with different ways of organizing data.
- 2, Developing algorithms for various operations and applications on data structures.

Unit - 1

Introduction to Data Structure and SPARKS Language

Overview - SPARKS - Statements - Create programs - Analyze programs.

Array

Axiomatization - Ordered Lists - Sparse Matrices Representation of Arrays.

Unit - II

Stacks and Queues

Fundamentals -Evaluation of Expressions - Multiple Stacks and Queues.

Linked Lists

Singly Linked lists - Linked Stacks and Queues - Storage pool - More on linked lists.

Unit -III

Doubly Linked lists - Dynamic storage Management -Generalized lists.

String: A Case Study - Data Representations for String - Pattern Matching in String

Unit - IV

Trees and Application

Basic Terminology - Binary Trees - Binary Tree Representation-Binary Tree Traversal - More on Binary Trees - Threaded Binary Trees Applications Of Trees: Set representation - Decision Trees.

Unit - V

Graphs and Application

Terminology and Representation: Introduction - Definitions and Terminology - Graph representation - Traversals - Connected Components and Spanning Trees - Shortest Paths and Transitive Closure.

Text Book

Ellis Horowitz, SartajSahni, 2013, Fundamentals of Data Structures, 4thedn, Galgotia Book source

Chapters (Relevant Topics Only)

Unit – I	:1,2
Unit – II	:3.1,3.3,3.4,4.1,4.2,4.3,4.5
Unit-III	: 4.8,4.9,4.11
Unit - IV	: 5.1 to 5.6, 5.8.1, 5.8.2
Unit – V	: 6.1 to 6.3

Reference

1. SartajSahni, 2000, Data Structures, Algorithms and Applications in C++, McGraw Hill International Edition
2. A.A.Puntambekar, 2009, Data Structures, Technical Publications Pune

Course designers**Dr.U.Jeyasutharsan**

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Course	: B.Sc. Computer Science (Core 6)	Int. Marks	: 25
Class	: II Year	Ext. Marks	: 75
Semester	: III	Max. Marks	: 100
Sub. Code	: MS32	Hours/Week	: 5
Title of the Paper	: System Software	Credits	:4

Course Outcomes:

1. Introducing System Programming concepts
2. Understand their importance in Computing Environment.

UNIT - I Assemblers

Elements of Assembly language - Pass structure of Assemblers - Design of a two pass Assembler.

UNIT - II Macros and Macro Processors

Introduction - Macro Definition and Call - Macro Expansions - Nested Macro calls - Advanced Macro Facilities - Design of a Macro Preprocessors.

UNIT - III Compilers and Interpreters

Introduction to Compiler - Semantic gap - Scope rules - Memory allocation - Compilation of Control structures - Code optimization - Interpreter

UNIT – IV Linkers

Introduction to Linker - Relocation and linking concepts - Design of a linker - Self Relocating Program.

UNIT –V Software Tools

Introduction - Software tools for programming development - Editors – Debug monitors - User Interface.

Text book

D.M. Dhamdhere, 2012, Systems Programming and operating system, 2nd edn, Tata McGraw Hill Education Pvt., Ltd, New Delhi

Chapters (Relevant topics only)

Unit I	: 4.1 to 4.4
Unit II	: 5.1 to 5.5
Unit III	: 6.1, 6.2, 6.4 to 6.6
Unit IV	: 7.1, 7.2, 7.3
Unit V	: 8.1,8.2, 8.3, 8.5

Reference

1. John J Donovan, 2009, System Programming, 46th edn, Tata McGraw Hill Education Pvt. Ltd, New Delhi
2. Leland L. Beck, 1997, System Software: An Introduction to Systems Programming, 3rd edn, Addison-Wesley
3. I.A.Dhotre, A.A.Puntambekar, 2008, System Programming, 3rd edn, Technical Publications, Pune

Course designers Dr.K.Natarajan

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(For those who join in 2017 and after)

Course	: B.Sc. Computer Science (Core 7)	Int. Marks	: 25
Class	: II Year	Ext. Marks	: 75
Semester	: III	Max. Marks	: 100
Sub. Code	: MS33	Hours/Week	: 4
Title of the Paper:	Database Management System	Credits	: 4

Course Outcomes:

1. Be aware of basic concepts of data bases and data base management systems.
2. Be aware of concepts of relational data bases.
3. Know to normalize relational data bases.
4. Develop skills to write database queries.

Unit-I: Introduction to Database Systems and Structure: 12 Hours

Database System Applications-Purpose of Database System-View of Data-Database Languages-Relational Databases -Database design-Data Storage and Querying-Transaction Management-Database Architecture -Data Mining and Information Retrieval-Specialty Databases-Database users and administrators.

Unit-II: Relational Databases:

Introduction to relational model: Structure of Relational databases -Database schema-Keys-Schema Diagrams-Relational Query Languages-Relational operations.

Introduction to SQL: Overview of SQL language-SQL Data Definition-Basic Structure of SQL Queries-Additional Basic Operations.

Unit-III: SQL:

Set Operations-Null Values-Aggregate Functions-Nested Sub Queries-Modification of the Database. Intermediate SQL: Join Expressions- Views.

Unit-IV: Intermediate SQL:

Transactions-Integrity Constraints -SQL Data types and Schemas-Authorization.

Advanced SQL: Accessing SQL from a Programming Language-Functions and Procedures-Triggers-Recursive Queries.

Unit-V:

Database Design:

Database Design and The ER Model: Overview of the Design process-The Entity -Relationship Model-Constraints -Removing redundant attributes in Entity sets-Entity Relationship Diagrams-Reduction to Relational Schema.

Relational Database Design

Features of Good Relational Designs-Atomic Domains and First Normal Form - Decomposition Using Functional Dependencies - Functional-Dependency Theory - Algorithms for Decomposition - Decomposition Using Multivalued Dependencies - More Normal Forms - Database-Design Process - Modelling Temporal Data.

Text Books:

Abraham Silberschatz, HenryF.Korth, S.Sudarshan, 2013. Database Systems Concepts, 6th Edn, MC Graw Hill Education, New Delhi

Chapters:

UNIT – I	: 1.1 - 1.12
UNIT – II	: 2, 3.1 - 3.4
UNIT – III	: 3.5 - 3.9, 4.1 - 4.2
UNIT – IV	: 4.3 - 4.6, 5.1 - 5.4
UNIT – V	: 7.1 - 7.6, 8.1 – 8.9

Reference:

1. John Garmany, 2005, Easy oracle PL/SQL programming : Get started fast with working PL/SQL code Example, Easy oracle series
2. Ragu Rama Krishnan, Johannes Gehrke, 3rd Edn, Database Management Systems, MC Graw Hill Education, New Delhi.
3. Shio Kumar Singh, 2nd Edn, Database system: Concepts Design and application, Pearson Education.

Web resources:

<http://www.db-book.com/>

https://www.tutorialspoint.com/dbms/dbms_tutorial.pdf

http://www.tutorialspoint.com/sql/sql_tutorial.pdf

Course designer

Mrs.A.M.Hema

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc. Computer Science (NME)	Int. Marks	: 15
Class	: II Year	Ext. Marks	: 35
Semester	: III	Max. Marks	: 50
Sub. Code	: MSNME31	Hours/Week	: 2
Title of the Paper:	Software Development	Credits	: 2

Unit - I

Flowchart - Purpose - Examples - Problem solving with computers.

Unit - II

Application of computers - Home computers -Education- Word processing - Database Management System - Spreadsheet.

Textbook

Dharma Rajaraman, V. Rajaraman, 1996, Computer Primer, 2ndedn, Eastern Economy

Chapters:

Unit – I	: 5&6
Unit – II	: 16.1 to 16.5

Course designers

Mrs.SM.Valli

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc. Computer Science (Core Lab - 4)	Int. Marks	: 40
Class	: II Year	Ext. Marks	: 60
Semester	: III	Max. Marks	: 100
Sub. Code	: MSL31	Hours/Week	: 5
Title of the Paper	: Data structure Lab	Credits	: 2

1. Sorting numbers and strings.
2. Searching: Sequential and Binary
3. Sparse Matrix Transpose..
4. Recursion: GCD, Fibonacci.
5. Polynomial addition using ordered lists.
6. Stack using Array: Inserting and deleting an element (PUSH & POP)
7. Using Stack infix to postfix conversion.
8. Evaluation of an expression using stack.
9. Queue - using Array :Inserting and deleting an element.
10. Circular Queue implementation.
11. Linked List - Inserting and deleting an element.
12. Stack - using Linked List
13. Queue using Linked list
14. Doubly Linked List - Inserting and deleting an element.

Course designer:

Dr.U.Jeyasutharsan

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc. Computer Science (Core Lab - 5)	Int. Marks	: 40
Class	: II Year	Ext. Marks	: 60
Semester	: III	Max. Marks	: 100
Sub. Code	: MSL32	Hours/Week	: 5
Title of the Paper:	Database Management Lab	Credits	: 2

1. Performing DDL, DML operations in a table.
2. Creating and dropping Views/ Synonyms / Sequence.
3. Writing procedures and passing values.
4. Setting predefine Exception
5. Creating User defined Exception
6. Writing Function
7. Creating Package
8. Creating Triggers
9. Splitting a table values and stores them into multiple tables.
10. Simple PL/SQL programs (Non-database problems).
11. Writing program in PL/SQL using aggregate function.
12. Performing Join & Set operations.

Course designer:

Mrs.A.M.Hema

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc. Computer Science (Core 8)	Int. Marks	: 25
Class	: II Year	Ext. Marks	: 75
Semester	: IV	Max. Marks	: 100
Sub. Code	: MS41	Hours/Week	: 4
Title of the Paper	: Java Programming	Credits	: 4

Course Outcomes:

1. This course deals with Java language fundamentals, classes, objects, Overloading, Inheritance, Packages, Multithreading, Exception handling.
2. It also deals with Java Applet and AWT Controls.

Unit-I

Introduction

Java's Lineage - The Creation of Java –Java Applets & Applications- Java's Magic: The Byte code - The Java Buzzwords.

An overview of JAVA

Object Oriented Programming - A First Simple Program.

Introducing classes

Class fundamentals - Declaring objects - Assigning object reference variables - Introducing methods - Constructors - The this Keyword - Garbage collection - The finalize() method.

Arrays

One-Dimensional Arrays - Multidimensional Arrays - Alternative Array Declaration Syntax.

Unit-II

A Closer look at Methods and Classes

Overloading methods - Using objects as parameters - A Closer look at Argument passing - Returning objects - Recursion - Introducing Access control - Understanding static - Introducing final - Arrays Revisited - Introducing Nested and Inner classes - Exploring the String class - Using command line Arguments.

Inheritance

Inheritance basics - Using super - Creating a Multilevel hierarchy - Method overriding - Dynamic method dispatch - Using Abstract classes - Using final with Inheritance - The Object class.

Unit-III

Packages and Interfaces

Packages - Access protection - Importing packages - Interfaces.

Exception Handling

Exception Handling fundamentals - Exception types -Uncaught

Exceptions - Using try and catch - Multiple catch clauses - Nested try statements - throw - throws - finally - Java's Built-in Exceptions - Creating your own exception Subclasses.

Unit-IV

Multithreaded Programming

The Java Thread Model - The Main Thread - Creating a Thread - Creating Multiple Threads - Using is Alive() and join() - Thread priorities

Applet fundamentals

Applet Basics: Applet Class - Applet Architecture -Applet Skeleton - Simple Applet display method - Requesting repainting - HTML-Applet tag - Passing parameter to Applet - Improving the Applet

Unit-V

Introducing the AWT

AWT classes –Window Fundamentals - Working with Frame windows - Creating a frame window in an applet - Creating a windowed program - Displaying Information within a window.

Working with Graphics and Text

Working with graphics - Working with color - Setting the paint mode
Working with fonts - Managing Text Output using Font Metrics.

Using AWT Controls, Layout Managers, and Menus

Control fundamentals - Labels - Using buttons - Applying check boxes - CheckBoxGroup - choice controls - Using lists - Managing scroll bars - Using a TextField - Using a Text Area - Understanding Layout Managers - Menu Bars and Menus.

Text Book

Herbert Schildt, 54th reprint 2013, The Complete Reference Java 2, 5thedn, McGraw Hill Edition

Chapters: (Relevant Topics only)

Unit – I	: 1,2,3,6
Unit - II	: 7,8
Unit-III	: 9,10
Unit-IV	: 11,19
Unit-V	: 21,22

Reference:

1. CAY S.Horstmann Gary Cornell, 2005, Core JAVA 2 Volume-1 Fundamental, 7thedn, Pearson Education
2. E.Balagurusamy, 2010, Programming with JAVA A Primer, 4thedn, Tata McGraw Hill

Course designer

Mrs.SM.Valli

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
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Course	: B.Sc. Computer Science (Core 9)	Int. Marks	: 25
Class	: II Year	Ext. Marks	: 75
Semester	: IV	Max. Marks	: 100
Sub. Code	: MS42	Hours/Week	: 4
Title of the Paper:	Computer Architecture	Credits	: 4

Course Outcomes:

- 1, Acquiring knowledge about computer hardware basics and organisation.
- 2, Understanding the function and design of individual units in a computer and interaction among these components.

Unit-I -Basic Computer Organization:

Instruction codes - Computer Registers - Computer Instructions - Timing and control - Instruction cycle - Memory reference instructions - Input, Output and Interrupt - Complete Computer Description.

Unit -II - CPU

General register organization - Design of arithmetic logic shift unit - Stack organization - Instruction formats - Addressing modes - Data transfer and manipulation - Program control.

Unit-III - Computer Arithmetic:

Hardware implementation and Algorithm for Addition, Subtraction, Multiplication, Division - Booth multiplication algorithm - Floating point Arithmetic operations - Decimal Arithmetic unit and Operations.

Unit-IV - I/O and Memory Organisation:

Input-output interface - Direct memory access - Input-Output processor – Memory Hierarchy - Main memory - Associative memory - Cache memory - Virtual memory.

Unit-V -Advanced Processing:

RISC, CISC characteristics - Parallel Processing - Pipelining - Arithmetic pipeline - Instruction pipeline - Vector Processing - Array processors - Multiprocessors - Interconnection structures.

Text Book:

M.Morris Mano, 2013, Computer System Architecture, 3rdedn, PearsonPrintice Hall

Chapters:

Unit - I	: 5.1 to 5.8
Unit - II	: 8.1 to 8.7,4.7
Unit – III	: 10.1 to 10.7
Unit – IV	: 11.2 , 11.6, 11.7, 12.1, 12.2, 12.4 to 12.6
Unit – V	: 8.8, 9.1 to 9.4, 9.6, 9.7, 13.1, 13.2

Reference:

1. V.CarlHamacher, ZvoknoG.Vranesic, SafwatG.Zaky,2008, Computer organization, 4th edn, Tata Mc-Graw Hill

Course designers

Dr.U.Jeyasutharsan

THIAGARAJAR COLLEGE, MADURAI – 9.
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Course	: B.Sc. Computer Science (Core 10)	Int. Marks	: 25
Class	: II Year	Ext. Marks	: 75
Semester	: IV	Max. Marks	: 100
Sub. Code	: MS43	Hours/Week	: 5
Title of the Paper:	Computer Graphics	Credits	: 4

Course Outcomes:

1. Understanding the necessity and need of representing data in pictorial/image format
2. Learn to create and manipulate an image with the help of Computer.

Unit-I Line Generation and Graphics Primitives

Line Generation: Overview of Graphics concept- Line segment - Vector- Pixels and Frame buffer - Vector Generation algorithm - Bresenham’s algorithm - Character Generation.
Graphics Primitives: Introduction - Display devices.

Unit-II Display File and Polygon

Display file: Concept - Display file primitive operations - Display file interpreter- Normalized device co-ordinates - Display file structure and routines.

Polygon: Introduction - Polygon Representation - Entering Polygons - Inside Test - Polygon interfacing algorithms

Unit-III Transformations

Transformations: Introduction - Scaling – Rotation - Homogeneous coordinates and Translation - Rotation about an arbitrary point.

Unit-IV Segments

Segments : Introduction- Segment Table - Segment Creation - Closing a Segment- Deleting a Segment - Renaming a Segment - Saving and Showing a Segment - Other Display file Structure.

Unit-V Windowing and Clipping

Windowing: Introduction - Multiple Windowing

Clipping: Concepts - Cohen-Sutherland Outcode Algorithm - Sutherland-Hodgman Algorithm- Clipping a polygon.

Textbook

Steven Harrington, 1987, Computer Graphics (A Programming approach), 2nd edn, McGraw-Hill International Editions, New Delhi.

Chapters (Relevant Topics Only)

Unit-I	: 1,2
Unit-II	: 2,3
Unit-III	: 4
Unit-IV	: 5
Unit-V	: 6

Reference

1. DonaldHearn , M.PaulineBaker, 2001, Computer Graphics, 2nd edn, PHI Prentice Hall
2. Foley, VanDam, 1997, ComputerGrahics-Principles and Practices, 2nd edn, Addison Wesley
3. Jeffrey J. McConnell, 2005, Computer Graphics: Theory into Practice, Jones and Bartlett Publishers, Inc

Course designers : Dr.K.Natarajan

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc. Computer Science (Core Lab - 6)	Int. Marks	: 40
Class	: II Year	Ext. Marks	: 60
Semester	: IV	Max. Marks	: 100
Sub. Code	: MSL41	Hours/Week	: 5
Title of the Paper:	Java Programming Lab	Credits	:2

1. Program to demonstrate Multilevel Inheritance.
2. Program to demonstrate Method Overloading.
3. Program to demonstrate Method Overriding.
4. Dynamic Method dispatch.
5. Program to demonstrate interfaces.
6. Program to demonstrate packages.
7. Program to demonstrate user-defined exception.
8. Program to demonstrate Multi-threading concept.
9. Applet program to demonstrate basic controls i.e. Button, labels, checkbox etc.
10. Program to demonstrate font class.
11. Program to demonstrate Graphics class.
12. Program to demonstrate layout manager.
13. Program to create Menus.
14. Program to demonstrate animation.
15. Program to demonstrate mouse events and keyboard events

Course Designer:

Mrs.SM.Valli

THIAGARAJAR COLLEGE, MADURAI – 9.
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Course	: B.Sc. Computer Science (Core Lab - 7)	Int. Marks	: 40
Class	: II Year	Ext. Marks	: 60
Semester	: IV	Max. Marks	: 100
Sub. Code	: MSL42	Hours/Week	: 5
Title of the Paper:	Graphics Lab	Credits	: 2

Line Segment

1. Creating a line segment - Using Vector generation algorithm
2. Creating a line segment - Using Bresenham's algorithm.

Polygon

1. Draw a Polygon - Using Vector generation algorithm
2. Draw a Polygon - Using Bresenham's algorithm.

Transformation

1. Scale a line segment.
2. Rotate a line segment.
3. Translate a line segment.
4. Rotate a line segment about an arbitrary point.
5. Scale a polygon.
6. Rotate a polygon.
7. Translate a polygon.
8. Rotate a polygon about an arbitrary point.
9. Animating an image.

Segment

1. Create a segment.
2. Delete a segment.
3. Scale a segment.
4. Rotate a segment.
5. Translate a segment.

Clipping

1. Clip a line segment.

Course Designer:

Dr.K.Natarajan

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc. Computer Science (Core 11)	Int. Marks	: 25
Class	: III Year	Ext. Marks	: 75
Semester	: V	Max. Marks	: 100
Sub. Code	: MS51	Hours/Week	: 5
Title of the Paper:	Fuzzy logic	Credits	: 4

Course Outcomes:

On the successful completion of the course, students will be able to

1. Remember some Classical set theory concepts.
2. Understand the basic principles of Fuzzy sets and Fuzzy Logic.
3. Solve some basic level practical problems using Fuzzy Logic.

UNIT I

Classical Sets and Fuzzy Sets

Classical Sets: Operations on Classical Sets – Properties of Classical (Crisp) Sets – Mapping of Classical Sets to Functions

Fuzzy Sets: Fuzzy Set Operations – Properties of Fuzzy Sets – Alternative Fuzzy Set Operations.

UNIT II

Classical Relations and Fuzzy Relations

Cartesian Product – Crisp Relations : Cardinality of Crisp Relations – Operations on Crisp Relations – Properties of Crisp Relations – Composition – Fuzzy Relations: Cardinality of Fuzzy Relations – Operations on Fuzzy Relations – Properties of Fuzzy Relations – Fuzzy Cartesian Product and Composition – Tolerance and Equivalence Relations : Crisp Equivalence Relation – Crisp Tolerance Relation – Fuzzy Tolerance and Equivalence Relations – Value Assignments : Cosine Amplitude – Max – Min Method – Other Similarity Methods - Other Forms of the Composition Operation.

UNIT III

Properties of Membership Functions, Fuzzification, and Defuzzification

Features of the Membership Function – Various Forms - Fuzzification – Defuzzification to Crisp Sets - λ - Cuts for fuzzy Relations – Defuzzification to Scalars.

UNIT IV

Logic and Fuzzy Systems

Part I Logic: Classical Logic - Proof -Fuzzy Logic – Approximate Reasoning –Other Forms of the Implication Operation.

Part II Fuzzy Systems: Natural Language – Linguistic Hedges – Fuzzy (Rule – Based) Systems – Graphical Techniques of Inference.

UNIT V

Development of Membership Functions

Membership Value Assignments: Intuition – Inference – Rank Ordering – Neural Networks – Genetic Algorithms – Inductive Reasoning.

Text Book:

Timothy J.Ross , 2011 , Fuzzy Logic with Engineering Applications , Third Edition , Wiley India Pvt. Ltd, New Delhi

CHAPTERS

Unit –I : Chapter 2

Unit –II : Chapter 3

Unit – III : Chapter 4

Unit –IV : Chapter 5

Unit –V : Chapter 6

Reference Books

1. Paul P.Wang , Da Ruan , Etienne E.Kerre , 2009, Fuzzy Logic A Spectrum of Theoretical and Practical Issues , Springer International Edition , New Delhi.
2. H.J.Zimmermann , 2010 , Fuzzy Set Theory and its Applications , Fourth Edition , Springer International Ed
3. ition , New Delhi.
4. S.N.Sivanandam, S.Sumathi, S.N. Deepa, 2013 , Introduction to Fuzzy Logic using MATLAB , Springer International Edition , New Delhi

Course Designer:

Dr.B.Arivazhagan

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc. Computer Science (Core 12)	Int. Marks	: 25
Class	: III Year	Ext. Marks	: 75
Semester	: V	Max. Marks	: 100
Sub. Code	: MS52	Hours/Week	: 5
Title of the Paper:	Software Engineering	Credits	: 4

Course Outcomes:

To orient towards becoming efficient programmers by learning best programming practices and testing techniques.

UNIT I: INTRODUCTION TO SOFTWARE ENGINEERING

Definitions - Size Factors - Quality and Productivity Factors - Managerial Issues.

UNIT II: PLANNING A SOFTWARE PROJECT

Defining the Problem - Developing a Solution Strategy - Planning the Development Process - Planning an Organizational Structure - Other Planning Activities.

UNIT III: SOFTWARE COST ESTIMATION

Software Cost Factors - Software Cost Estimation Techniques - Staffing Level Estimation - Estimating Software Maintenance Costs.

SOFTWARE REQUIREMENTS DEFINITION

Software requirement specification - Formal Specification Techniques.

UNIT IV: SOFTWARE DESIGN

Fundamental Design Concepts - Modules and Modularization Criteria - Design Notations - Design Techniques - Detailed Design Considerations - Real-time and Distributed System Design - Test Plans.

Implementation Issues: Structured Coding Techniques - Coding Style - Standards and Guidelines - Documentation Guidelines.

UNIT V: VERIFICATION AND VALIDATION TECHNIQUES

Quality Assurance - Walkthroughs and Inspections - Static Analysis - Symbolic Execution - Unit testing and Debugging - System Testing - Formal Verification - Software Maintenance: Introduction - enhancing maintainability during development, managerial aspects of software maintenance - configuration

Management - source code metrics - other maintenance tools and techniques.

Text Book:

1. Richard Fairley, 2013, Software Engineering, 39th reprint, Tata Mcgraw-Hill

Chapters:

Unit – I	: 1
Unit – II	: 2
Unit – III	: 3, 4.1, 4.2
Unit – IV	: 5.1-5.8, 6
Unit – V	: 8, 9

Reference Books:

1. Roger S. Pressman, 2007, Software Engineering Concepts, 7th edn, McGraw Hill
2. IAN SOMMERVILLE, 2010, Software Engineering, 10th edn, Pearson Education Asia

Course designers

Dr.U.Jeyasutharsan

THIAGARAJAR COLLEGE, MADURAI – 9.
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Course	: B.Sc. Computer Science (Core 13)	Int. Marks	: 25
Class	: III Year	Ext. Marks	: 75
Semester	: V	Max. Marks	: 100
Sub. Code	: MS53	Hours/Week	: 5
Title of the Paper:	Advanced Java	Credits	: 4

Course Outcomes:

1. To understand the advanced topics JSP, servlets and JDBC
2. Provide knowledge to develop dynamic web application products.
3. Develop Server Side Program in the form of servlets.
4. Students should be able to write sophisticated java web applications.

UNIT -I

Introduction to Servlets: Servlet lifecycle-Servlet classes-Threading models-HTTP sessions. The JSP development model- Component of a JSP page-A complete example

UNIT-II

Expressions – Scriptlets - Declarations: Expression – Scriptlets-Expression and scriptlet handling by the JSP container- implicit objects and the JSP environment- initialization parameter-Declaration: What is a declaration?-Primary uses for declarations-variable declarations-method definitions- Session Tracking-hidden fields –URL rewriting – cookies.

UNIT - III

JSP Tags Extensions: Introduction to custom tags-Developing your first custom tag-How tags handlers work-Tag Libraries -The tag handler API-The tag handler lifecycle-Defining tag attributes-The iteration tag interface-The body tag handler API.JSP Standard Tag Library [JSTL] –core tags – XML tags – SQL tags – formatting tags

UNIT-IV

Database Access with JDBC: Overview of JDBC-JDBC drivers-Connecting to a database with driver manager-Connecting to a database using a JNDI data source-The statement interfaces-Result sets-Using Meta data.

UNIT-V

JSP and XML: XML overview-the problem XML solves- XML syntax-The Document Type Definition -XML schema -XML processing models-DOM- SAX-Parsing XML-JAXP-parsing with DOM – parsing with SAX-XSL transformations with XSLT-XML syntax for JSP.

Text Book:

Phil Hanna,2010,The Complete Reference JSP 2.0, Tata McGraw Hill Education pvt,
New Delhi

Chapters:

UNIT I	: 3, 5
UNIT II	: 6, 8(162-174)
UNIT III	: 11, 13
UNIT IV	: 15
UNIT V	: 16

Reference Book:

1. Hansbergsten,2003, JAVA Server Pages, 3rd edn, O'reilly, New Delhi
2. Kanika Lakhani, 2012 2nd Edn, Advanced Java, Katson Books
3. Dreamtech press, 2016, Core and Advanced Java, Dreamtech press

Web Resources:

<http://www.javalearner.com/advanced.htm>

<http://www.javatpoint.com/jsp-tutorial>

<http://www.studytonight.com/jsp/>

<http://beginnersbook.com/jsp-tutorial-for-beginners/>

<http://www.sitesbay.com/jsp/index>

<http://www.javatpoint.com/servlet-tutorial>

<http://www.tutorialspoint.com/servlets/>

Course designers

Mrs.A.M.Hema

THIAGARAJAR COLLEGE, MADURAI – 9.
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Course	: B.Sc. Computer Science (NME)	Int. Marks	: 15
Class	: III Year	Ext. Marks	: 35
Semester	: V	Max. Marks	: 50
Sub. Code	: MSNME51	Hours/Week	: 2
Title of the Paper:	Internet Applications	Credits	: 2

UNIT I:

Introduction to internet: Internet- Growth of Internet and ARPANet - Owners of the Internet -Anatomy of Internet – History of WWW - Basic Internet Terminologies – Net etiquette - Internet Applications - Commerce on the Internet – Governance on the Internet - Impact of Internet on Society. TCP/IP Internet Technology and Protocols: Packet Switching Technology - Internet Protocols - TCP/IP – Router - Internet Addressing Scheme- Machine Addressing - E-mail Addresses – Resource Addresses.

UNIT II:

Browsers and Search engines: Browsers - What is a browser? – Parts of a browser window -Running a browser - working with a Browser. Search engines: What is search engine? - Types of search engines - Search and meta search engines.

E-mail: E-mail - E-mail Networks and Servers - E-mail Protocols - Structure of E-mail - Attachments – E-mail Clients - E-mail Clients - web based E-mail-Address book – Signature File.

Text book:

Internet Technology and Web design, Ramesh Bangia, Firewall Media, (An imprint of Lakshmi Publications Pvt. Ltd.), Third Edition, 2011.

UNIT I: Chapter 1.2

UNIT II: Chapter 5(5.1, 5.6), Chapter 6 Chapter 8(8.11 &8.13)

Reference Books:

1. The Internet Book, Douglas E. Comer, Fourth Edition, PHI Learning Pvt. Ltd. , New Delhi, 2009.
2. Using the Internet the Easy Way, Young Kai Seng, Minerva Publications, First Edition, 2000.
3. Fundamentals of Information Technology By Alexis Leon and Mathews Leon, Vikas Publishing House Pvt. Ltd., Revised Edition.

Course designer

Mrs.A.M.Hema

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
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Course	: B.Sc. Computer Science (Core Lab 8)	Int. Marks	: 40
Class	: III Year	Ext. Marks	: 60
Semester	: V	Max. Marks	: 100
Sub. Code	: MSL51	Hours/Week	: 6
Title of the Paper:	Advanced Java Lab	Credits	: 2

1. Program to illustrate Servlet session.
2. Expression evaluation using JSP.
3. Illustrating JSP tags libraries.
4. Session tracking using JSP.
5. Program to illustrate the concept of JDBC connectivity.
6. Program to illustrate the concept of JDBC statement interfaces.
7. XML usage within JSP.
8. Illustrate JSP custom tags.
9. Simple programs using JSP.
10. Page directive illustration using JSP.

Course Designer :

Mrs.A.M.Hema

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
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Course	: BSc Computer Science (Core 14)	Int. Marks	: 25
Class	: III Year	Ext. Marks	: 75
Semester	: VI	Max. Marks	: 100
Sub.Code	: MS61	Hours /Week	: 5
Title of the Paper:	Data Mining and Warehousing	Credits	: 4

Course Outcomes:

On the successful completion of the course, students will be able to

- Remember some basic Database Management principles.
- Understand the various Data Mining techniques.
- Carryout some Data analysis for some sample data sets using WEKA software.

UNIT – I

DATA MINING: Introduction - Data Mining - Success Stories - Main Reason for Growth of Data Mining Research - Recent Research Achievements – Graphical Models and Hierarchical Probabilistic Representations – New Applications – Trends that Effect Data Mining - Research Challenges - Testbeds and Infrastructure.

DATA MINING FROM A BUSINESS PERSPECTIVE: Introduction – From Data Mining Tools to Solutions – Evolution of Data Mining Systems – Knowledge Discovery Process - Data Mining Supporting Technologies Overview – Data Mining Techniques

UNIT – II

DATA TYPES, INPUT AND OUTPUT OF DATA MINING ALGORITHMS:

Introduction - Instances and Features - Different Types of Features (Data) – Concept Learning and Concept Description - Output of Data Mining – Knowledge Representation.

DECISION TREES – CLASSIFICATION AND REGRESSION TREES:

Introduction -Constructing Classification Trees - CHAID (Chi-square Automatic Interaction Detection) -CART (Classification and Regression Trees) – Regression Trees - General Problems in Prediction of Classes for Data with Unknown Class Value – Pruning – Introduction - Model Estimation

UNIT – III

PREPROCESSING AND POSTPROCESSING IN DATA MINING:

Introduction - Steps in Preprocessing- Discretization - Feature Extraction, Selection and Construction – Missing Data and Methodological Techniques for dealing it - Example of Dealing Missing Data in Decision Tree Induction – Post processing.

ASSOCIATION RULE MINING: Introduction - Automatic Discovery of Association Rules in Transaction Databases -The Apriori Algorithm - Shortcomings.

UNIT – IV

ALGORITHMS FOR CLASSIFICATION AND REGRESSION: Introduction - Naive Bayes - Multiple Regression Analysis – Logistic Regression - k-Nearest Neighbour Classification - GMDH (Group Method of Data Handling) - Evolutionary Computing and Genetic Algorithms

UNIT – V

CLUSTER ANALYSIS: Introduction – Partitional Clusterings - k-medoids - Modern Clustering Methods – Birch- DBSCAN

Text Book:

K.P.Soman, Shyam Diwakar , V.Ajay, 2006 , Insight into Data Mining Theory and Practice, Prentice Hall of India Private Limited , New Delhi

Chapters:

Unit –I : Chapters 1 and 2

Unit –II : Chapters 3 and 4

Unit – III : Chapters 5 and 7

Unit –IV : Chapter 9

Unit –V : Chapter 11- Sections 11.1 – 11.6

Reference Books:

1. Jiawei Han , Micheline Kamber , Jian Pei , 2011, Data Mining Concepts and Techniques , Third Edition, Morgan Kaufmann Publishers, An Imprint of Elsevier , New Delhi.
2. Ian H.Witten & Eibe Frank, 2008, Data Mining Practical Machine Learning Tools and Techniques, Second Edition, Morgan Kaufmann Publishers, Imprint of Elsevier , New Delhi.
3. Arun K Pujari , 2013, Data Mining Techniques , Second Edition , University Press, Hyderabad

Course designer :

Dr.B.Arivazhagan

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc. Computer Science (Core 15)	Int. Marks	: 25
Class	: III Year	Ext. Marks	: 75
Semester	: VI	Max. Marks	: 100
Sub. Code	: MS62	Hours/Week	: 5
Title of the Paper:	Data communication & Networking	Credits	: 4

Course Outcomes:

1. This course help the students to understand the concepts and mechanisms of tele-communication and networking.

Unit-I

Introduction - Data communications - Networks **.Network models** - Layered tasks - The OSI model-Layers in the OSI model- TCP/IP protocol suite.

Unit-II

Transmission media: Guided Media - Unguided media.

Error detection and correction: Introduction - Block coding - Linear Block codes - Cyclic Codes - Checksum.

Unit-III

Data Link control: Framing-Flow and Error control-Protocols-Noiseless channels- Noisy channels

Wired LANs: Ethernet: IEEE standards-Standard Ethernet.

Unit-IV

Network layer: IPv4 Addresses - Internetworking-IPv4.

Routing protocols: Distance vector Routing & Link state Routing

Unit-V

Transport layer: Process-to-process delivery-User Datagram Protocol (UDP)-TCP.

Application layer: Domain Name Space - Remote Logging - Electronic Mail and File Transfer.

Text Book

Behrouz A.Forouzan, 22th reprint 2011, Data Communications and Networking, 4thedn, McGraw Hill Publishing Company Limited

Chapters:

Unit-I	: 1.1 to 1.2, 2.1 to 2.4
Unit-II	: 7.1 to 7.2, 10.1 to 10.5
Unit-III	: 11.1 to 11.5, 13.1 to 13.2
Unit-IV	: 19.1, 20.1,20.2 22.3 (Page no:660-674).
Unit-V	: 23.1 to 23.3, 25.2, 26.1 to 26.3

Reference:

1. Andrew S.Tanenbaum, 2004, Computer Networks, 4thedn, Prentice Hall of India Pvt Ltd
2. Prakash C.Gupta, 2006, Data Communications and Computer Networks, Prentice Hall of India Pvt Ltd

Course designer

Mrs.SM.Valli

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc. Computer Science (Core 16)	Int. Marks	: 25
Class	: III Year	Ext. Marks	: 75
Semester	: VI	Max. Marks	: 100
Sub. Code	: MS63	Hours/Week	: 5
Title of the Paper:	Operating System	Credits	: 4

Course Outcomes:

1. Understanding the importance of OS.
2. Know how it makes a system alive.

Unit-I Introduction and Operating System Structure

Introduction : OS Concepts- Batch Systems- Multiprogrammed Systems- Time sharing Systems- Desktop systems – Multiprocessor Systems - Distributed Systems.

System Structure: System Components- System Calls.

Unit-II Process and CPU Scheduling

Process: Process concept- Process Scheduling- Operations on Process- Co-operating Processes- Interprocess Communication

CPU Scheduling: Basic Concepts- Scheduling Criteria-Scheduling Algorithms.

Unit-III Process Synchronization and Deadlock

Process Synchronization: Background- Critical Section Problem

Deadlock: Deadlock characterization-Methods for handling Deadlocks-Deadlock Prevention-Deadlock Avoidance-Deadlock Detection and Recovery.

Unit-IV Memory Management and Virtual Memory

Memory Management: Background-Swapping-Contiguous Memory Allocation- Paging-Segmentation.

Virtual Memory: Background- Demand Paging-Page Replacement- Allocation of Frames-Thrashing.

Unit-V File System and Disk Scheduling

File System: File Concepts–Access Methods-Allocation Methods- Free Space Management.

Disk Scheduling: Disk Structure-Disk Scheduling- FCFS Scheduling- SSTF Scheduling- SCAN and CSCAN Scheduling- LOOK and CLOOK Scheduling.

Textbook

Silberschatz Galving Gange,2008, Operating System Concepts,6th edn, Wiley India (P) Ltd.,New Delhi

Chapters (Relevant Topics only)

Unit-I	: 1.1 to 1.5, 3.1, 3.3
Unit-II	: 4.1 to 4.5, 6.1 to 6.3
Unit-III	: 7.1, 7.2, 8.2 to 8.7
Unit-IV	: 9.1 to 9.5, 10.1, 10.2, 10.4 to 10.6
Unit-V	: 11.1, 11.2, 12.4, 12.5, 14.1,14.2

Reference

1. William Stallings,2000, Operating Systems,2nd edn, PHI Prentice Hall,New Delhi
2. Achyut S Godbole, Operating systems, McGraw-Hill, 3rd edn
3. Harvey M Deitel, 1984, “An Introduction to operating system” Addison - Wesley Publishing Co. New York.

Course designers

Dr.K.Natarajan

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc. Computer Science (Core 17)	Int. Marks	: 25
Class	: III Year	Ext. Marks	: 75
Semester	: VI	Max. Marks	: 100
Sub. Code	: MS64	Hours/Week	: 5
Title of the Paper:	Cloud Computing	Credits	: 4

Course Outcomes:

1. Understanding the key dimensions of the challenge of Cloud Computing
2. Assessment of the economics, financial and technological implications for selecting cloud computing for own organization
3. Identify various cloud services.

Unit-I:

Introduction: Cloud Computing at a Glance-Historical Developments-Building Cloud Computing Environments-Computing Platforms and Technologies

Principles of Parallel and Distributed Computing: Eras of Computing-Parallel vs. Distributed Computer-Elements of Parallel Computing-Elements of Distributed Computing-Technologies for Distributed Computing

Unit-II:

Cloud Computing Architecture: Introduction-Cloud Reference Model-Types of Clouds-Economics of the Cloud-Open Challenges

Aneka-Cloud Application Platform: Framework Overview-Anatomy of the Aneka Container-Building Aneka Clouds-Cloud Programming and Management

Unit-III:

Concurrent Computing: Thread Programming: Introduction Parallelism for Single Machine Computation-Programming Applications with Threads-Multithreading with Aneka-Programming Applications with Aneka Threads. **High-Throughput Computing: Task Programming:** Task Computing-Task-based Application Models-Aneka Task-Based Programming

Unit-IV:

Data Intensive Computing: Map-Reduce Programming: What is Data-Intensive Computing? –Technologies for Data-Intensive Computing-Aneka Map Reduce

Programming

Cloud Platforms in Industry: Amazon Web Services-Google App Engine-Microsoft Azure

Unit-V:

Cloud Applications: Scientific Applications-Business and Consumer Applications

Advance Topics in Cloud Computing: Energy Efficiency in Clouds-Market Based Managements of Clouds-Federated Clouds/Inter Clouds-Third Party Cloud Services

Text Books:

Rajkumar Buyya, Christian Vacchiola, S.Thamarai Selvi, 2016, Mastering Cloud Computing, 6th edn, McGraw Hill Education Private Limited, India

Chapters:

UNIT – I : 1, 2
UNIT – II : 4, 5
UNIT – III : 6, 7
UNIT – IV : 8, 9.1-9.3
UNIT – V : 10, 11

References Books:

1. M.N.Rao, 2015, Cloud Compting, 1st Edn, PHI Learning PrivateLimited, India.
2. Aravind Doss, Rajeev Nanda, 1st Edn, McGraw Hill Education Private Limited,

India

Web resources:

<http://nptel.ac.in/courses/106106129/28>

<https://azure.microsoft.com/en-in/overview/what-is-cloud-computing/>

<https://aws.amazon.com/what-is-cloud-computing/>

<https://journalofcloudcomputing.springoprn.com/articles/10186/313677-014-0021-5>

Course Designer:

Mrs.A.M.Hema

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc. Computer Science (Core elective)	Int. Marks	: 25
Class	: III Year	Ext. Marks	: 75
Semester	: V/VI	Max. Marks	: 100
Sub. Code	: EMS51(A)	Hours/Week	: 5
Title of the Paper:	Mobile Applications	Credits	: 5

Course Outcomes:

- Be exposed to technology and business trends impacting mobile applications
- Be competent with the characterization and architecture of mobile applications.
- Be competent with understanding enterprise scale requirements of mobile applications.
- Be competent with designing and developing mobile applications using one application development framework.

UNIT-I:

Introduction: What is Mobility? - Portability- Usability- Functionality- connectability- Developing Mobile Applications- Umbrella Considerations- Fallacies About Mobile Application Development-Business Context- Who is Going Mobile?- Workers- Consumers- What Do People Want To Do?- Communication- Work-Entertainment- Education- Location-Why Mobilize Your Enterprise?- Pros- Cons.

UNIT – II:

Mobile Application Architectures : Client-Server - Layers - Tiers - Client - Thin Clients - Fat Clients -Web Page Hosting -Server - One-Tier Architecture-Two-Tier architecture- Three-Tier -Architecture - Connection Types- Always Connected- Partially Connected- Never Connected- Synchronization- Continuous Communication- Store-and-Forward Synchronization- Interesting Architectural Patterns- Pattern Matrix- Zero-Layer, Three-Tier, Always Connected Architecture- Three-Layer, Three-Tier, Partially Connected Architecture- Good Architectural Design Tenets- Requirements- Technology Independence- High Performance and Availability- Scalability- User System Requirements- Mobile Infrastructure- Mobile Device Types- Pagers/RIM -Devices - Cellular Telephones - PDAs- Tablet PCs- Laptop PCs-Hybrids- Capability and Cost Considerations - Mobile Device Components- Connection Methods.

UNIT – III:

Mobile Client User Interface- User Interface - Application Content - User Experience - Best Practices for Developing a User Interface- Mobile Client Applications - Thin Client - Fat Client - Web Page Hosting- Best Practices.

UNIT – IV:

Client-Server Data Transfer - HTTP and HTML - WAP and WML - Synchronization Software- RDA and Merge Replication- SOAP and WEB Services - Message Queues - TCP/IP- Mobilizing Existing Application Architectures- Evolution of Enterprise Architectures- Client-Server Architecture- Web-Enabled Service-Centric Architecture- User-Centric, Single Sign-On Web Architecture- Anatomy of an

Enterprise Web Architecture- Architecture- Logical View- Considerations When Mobilizing Existing Applications- Architecture- Users, Roles, and Entitlements- Presentation Tier- Application Tier- Database Tier- Existing Back-end Systems- Authentication- Enrollment- Administration- High Availability and Performance- Scalability- Security.

UNIT – V:

Security- Mobilized Enterprise Web Architectures- Vulnerabilities- Threats- Mitigation- User-To-Mobile Client Security Issues- Authentication- Smart Cards- Biometric Authentication- Mobile Client Security Issues- Automatic Logout and Credentials Re-Entry- Data Destruction- Database Encryption- Code-Embedded Usernames and Passwords- Client-Server Communications Security Issues- Communication Encryption- Existing Web Architectures and Back-End Systems Security Issues- Firewalls and Tier Separation- Application Services and Port Lockdown- Communication Encryption- Database Authentication- Database Encryption- Mobile Application Development Management- Project Management- Management Models- Planning- Team Resources- Status Reports and Status Meetings- Financials- Environment- Version and Change Management- Training- Common Managerial Headaches- Requirements- Requirement Types- Gathering Requirements- Documenting Requirements- Design- Design Documentation- Design Considerations- Code Development and Integration- Coding-Unit Testing- Integration and System Testing- Testing Process- Testing Documentation- Testing Considerations- Deployment and Release Management- Mobile Client Production Releases- Server Production Releases- Re-Evaluation and Reiteration- Re-Evaluation- Reiteration- Operations and Maintenance- Day-to-Day Operations- Monitoring- Backup and Restoration.

Text book:

Valentino Lee, Heather Schneider, and Robbie Schell, 2004, Mobile Applications: Architecture, Design, and Development, Prentice Hall.

Chapters:

Unit- I: chapter 1, 2
Unit –II: chapter 3, 4
Unit- III: Chapter 5, 6
Unit –IV: Chapter 7, 8
Unit-V; Chapter 9, 10

Reference book:

1. Brian Fling, 2009, Mobile Design and Development, O'Reilly Media, Maximiliano.
2. Firtman, 2010, Programming the Mobile Web, O'Reilly Media.
3. Christian Crumlish and Erin Malone, 2009, Designing Social Interfaces, O'Reilly Media.

Course Designer :

Mr.G.Reegan Prabhu

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc. Computer Science (Core elective)	Int. Marks	: 25
Class	: III Year	Ext. Marks	: 75
Semester	: V/VI	Max. Marks	: 100
Sub. Code	: EMS51(B)	Hours/Week	: 5
Title of the Paper	: E-Commerce Technologies	Credits	: 5

Course Outcomes:

- Provide basic knowledge on E-commerce technologies
- Provide knowledge on internet security and transactions.
- Students are able to write web-based e-commerce applications.

UNIT I

An introduction to Electronic commerce: What is E-Commerce (Introduction And Definition), Main activities E-Commerce, Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of E-Commerce, Electronic Commerce Applications, Electronic Commerce and Electronic Business(C2C)(C2G,G2G, B2G, B2P, B2A, P2P, B2A, C2A, B2B, B2C)

UNIT II

The Internet: Evolution of Internet, Components of Internet world, Categories of Network, Internet Service Provider, Applications Service Providers ,World Wide Web, Internet Functions, Portals :Electronic Commerce Portals ,B2B Portals, Building own website: Reasons for building your own website - Cost, Time, Reach, Registering a Domain Name, Feedback -Web promotion -Target email, Banner Exchange, Shopping Bots

UNIT III

Internet Security: Secure Transaction, Computer Monitoring, Privacy on Internet, Corporate Email privacy, Computer Crime(Laws , Types of Crimes), Specific Threats, Attack on Computer System, Software Packages, Hacking, Computer Viruses(How it spreads, Virus problem, virus protection), Encryption and Decryption, Secret key Cryptography, DES, Public Key Encryption, RSA, Internet Security, Firewall, Digital Signature(How it Works)

UNIT IV

Electronic Data Exchange: Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model, Electronic Payment System: Introduction, Types of Electronic Payment System, Payment Types, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash.

UNIT V

E-Security: Introduction – Electronic Security –Attacking Methods- Security Practices – Secure Electronic Transaction (SET)- Security Tools –Network Security – Electronic Commerce Act-Virtual Private Network.

Text book:

C.S.V.Murthy, 2016, E-Commerce Concepts –Models- Strategies, Himalaya Publishing House.

Chapters:

UNIT – I	: 2, 3
UNIT – II	: 4, 5, 9
UNIT – III	: 10
UNIT – IV	: 20, 21
UNIT – V	: 22

Reference book:

1. Gray P. Schneider, 2011, Electronic commerce, International Student Edition.
2. Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, 2011, E-Commerce, Fundamentals and Applications, Wiely Student Edition

Course Designer :

Ms.R.Sindhu

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc. Computer Science (Core elective)	Int. Marks	: 25
Class	: III Year	Ext. Marks	: 75
Semester	: V/VI	Max. Marks	: 100
Sub. Code	: EMS51(C)	Hours/Week	: 5
Title of the Paper	: Artificial Intelligence	Credits	: 5

Course Outcomes:

- To introduce the basic concepts of Artificial Intelligence.
- To impart search techniques for AI problems.
- Students attain ability to create logics and rules for AI problems.

UNIT I

Understanding AI

Introduction to AI – The problem, assumption, AI technique, level of the model, criteria for success, Defining the problem as a state space search, production systems, problem characteristics, production systems characteristics, issue in the design of search programs.

UNIT II

Heuristic Searching Techniques

Generate and test, Hill climbing, Best – first search, problem reduction, constraint satisfaction, Means – Ends analysis

UNIT III

Knowledge Representation issues and predicate logic

Representation and mappings – approaches, issue in knowledge representation, frame problem.
Representation of simple facts in logic, instance and ISA relationship, computable function and predicates, resolution, natural deduction.

UNIT IV

Representing Knowledge using rules

Procedural versus declarative knowledge, logic programming, forward versus backward reasoning, matching, control knowledge.

UNIT V

Symbolic reasoning under uncertainty

Introduction and logic for non monotonic reasoning, implementation issues, augmenting a problem-solver, implementation of Depth -First Search, Breadth – First search.

Text Book:

Elaine Rich, Ninth reprint 2012, Artificial Intelligence, 3rd edition, Tata McGraw Hill Ltd.

CHAPTERS

Unit –I	: 1.1 - 1.5, 2.1- 2.5
Unit –II	: 3.1 - 3.6
Unit – III	: 4.1 - 4.4, 5.1 - 5.5
Unit –IV	: 6.1 - 6.5
Unit –V	: 7.1 - 7.6

Reference Books

1. N. J. Nilsson. Artificial Intelligence : A New Synthesis, Elsevier India, 2010
2. Dan W. Patterson, “Introduction to AI and ES”, Pearson Education, 2007.
3. Stuart Russel, Peter Norvig “AI – A Modern Approach”, 2nd Edition, Pearson Education 2007.

Course Designer:

Mrs.A.M.Hema

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc. Computer Science (Core elective)	Int. Marks	: 25
Class	: III Year	Ext. Marks	: 75
Semester	: V/VI	Max. Marks	: 100
Sub. Code	: EMS51(D)	Hours/Week	: 5
Title of the Paper	: Multimedia Technology	Credits	: 5

Course Outcomes:

- 1 Students understand the practical use of multimedia.
- 2 Provide knowledge for developing multimedia products by acquiring, integrating and producing the various multimedia elements

Unit-I

Introduction

Introduction to multimedia – Resources for multimedia developers – Types of products – Evaluations – Operating systems and software – Multimedia computer architecture.

Unit-II

Text and Graphics

Elements of Text – Text data files – Using text in multimedia applications – Hypertext – Elements of graphics – Images and color – Graphics file and application formats – Obtaining images for multimedia use – Using graphics in multimedia applications.

Unit-III

Digital Audio

Characteristics of sound and Digital Audio – Digital Audio systems – MIDI – Audio file formats – Using audio in Multimedia applications.

Unit-IV

Digital Video and Animation

Background on video – Characteristics of Digital Video – Digital Video data sizing– Video Capture and Playback Systems – Animation – Using Digital Video in Multimedia Applications.

Unit-V

Product Design and Authoring Tools

Building blocks – Classes of Products – Content Organizational Strategies – Story Boarding – Authoring Tools – Selecting the right authoring Paradigm.

Text Book

David Hillman, Multimedia Technology and Applications, Reprint 2013, Galgotia Publications Pvt. Ltd 1998.

CHAPTERS

Unit – I : 1,2,3

Unit – II : 4,5

Unit – III : 6

Unit – IV : 7

Unit – V : 8,9

Reference Books

1. Tay Vaughan, Multimedia making it work, McGraw Hill Company, Eighth Edition 2010.
2. James E.Suman, Multimedia in Action, Vikas Publishing House 1997

Course Designer:

Dr.U.Jeyasutharsan

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc.,	Int. Marks	: 15
Class	: II/III Year	Ext. Marks	: 35
Semester	: IV/VI	Max. Marks	: 50
Sub. Code	: MSSEC41/MSSEC61(A)	Hours/Week	: 2
Title of the Paper:	PHP Programming	Credits	: 2

1. Using HTML Form - To design a student mark database using HTML form and process using PHP.
2. Array Operations - To demonstrate all array operations
(array_search(),array_diff(),array_com bine(),array_match(),sort())
3. Control Statements - To demonstrate all control statements (find factorial of the given number using IF, While, Do-while)
4. Key & Value pairs
To display inventory table using key & value pairs.
To print student table using key & value pairs and search particular student number (whether it is present or not)
5. User Defined Functions
 - a. 1. To illustrate user defined function (define all function type
 1. Function without input argument and no return value.
 2. Function without input argument and return value.
 3. Function with input argument and no return value.
 4. Function with input argument and return value.
 5. Function with default argument.
 - b. To find factorial of the given number using recursion.
 - c. To calculate ‘nCr’ using include command to include the factorial function.
6. Cookie - Write a PHP program to store current date-time in a COOKIE and display the ‘ Last visited on’date-time on the web page upon reopening of the same page. To perform string manipulation.
7. File - To process personal details using File.

Text Book:

SAMS Teach Yourself PHP4 in 24 Hours, Matt Zandstra

Web Resources:

https://www.tutorialspoint.com/php/php_pdf_version.htm
www.w3schools.com/php

Course Designer:

Mrs.A.M.Hema

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc.,	Int. Marks	: 15
Class	: II/III Year	Ext. Marks	: 35
Semester	: IV/VI	Max. Marks	: 50
Sub. Code	: MSSEC41/MSSEC61(A)	Hours/Week	: 2
Title of the Paper:	PHP Programming	Credits	: 2

1. Using HTML Form - To design a student mark database using HTML form and process using PHP.
2. Array Operations - To demonstrate all array operations
(array_search(),array_diff(),array_com bine(),array_match(),sort())
3. Control Statements - To demonstrate all control statements (find factorial of the given number using IF, While, Do-while)
4. Key & Value pairs
 To display inventory table using key & value pairs.
 To print student table using key & value pairs and search particular student number (whether it is present or not)
5. User Defined Functions
 1. To illustrate user defined function (define all function type)
 2. Function without input argument and no return value.
 3. Function without input argument and return value.
 4. Function with input argument and no return value.
 5. Function with input argument and return value.
 6. Function with default argument.
 7. To find factorial of the given number using recursion.
 8. To calculate ‘nCr’ using include command to include the factorial function.
6. Cookie - Write a PHP program to store current date-time in a COOKIE and display the ‘ Last visited on’date-time on the web page upon reopening of the same page. To perform string manipulation.
7. File - To process personal details using File.

Text Book:

SAMS Teach Yourself PHP4 in 24 Hours, Matt Zandstra

Web Resources:

https://www.tutorialspoint.com/php/php_pdf_version.htm
www.w3schools.com/php

Course Designer:

Mrs.A.M.Hema

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
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Course	: B.Sc.,	Int. Marks	: 15
Class	: II/III Year	Ext. Marks	: 35
Semester	: IV/VI	Max. Marks	: 50
Sub. Code	: MSSEC41/MSSEC61(B)	Hours/Week	: 2
Title of the Paper:	Android Programming	Credits	: 2

1. BasicControls, Views and Layouts
 - a. Write a program to change the background using button control.
 - b. Write a program to createthe options menu (new window, bookmarks, refresh, windows, forward, more) in the browser.
 - c. Write a program to demonstrate scroll view.
 - d. Write a program to demonstrate various Layouts.

2. Dialog Controls
 - a. Write a program to demonstrate alert dialog box.
 - b. Write a program to demonstrate time picker dialog.
 - c. Write a program to demonstrate date picker dialog.
 - d. Write a program to demonstrate progress dialog with spinning wheel.

3. Contacts Contract Provider
 - a. Write a program to show contacts in your phone.
 - b. Write a program to show SMS in your phone.

4. AndroidLBS - GPS
 - a. Write a program to view google map.
 - b. Write a program to know the current location using GPS.
 - c. Write a program to toggle between map view and satellite view.

Text Book:

“Android A programmer’s guide” - Jerome (J.F.) Dimarzio

Web Resources:

<https://developer.android.com/develop/index.html>

<http://www.sanfoundry.com/java-android-programing-examples/>

Course Designer :

Ms.R.Sindhu

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
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Course	: B.Sc.,	Int. Marks	: 15
Class	: II/III Year	Ext. Marks	: 35
Semester	: IV/VI	Max. Marks	: 50
Sub. Code	: MSSEC41/MSSEC61(C)	Hours/Week	: 2
Title of the Paper:	XML Programming	Credits	: 2

1. XML document creation.

- a. Create XML file that contains the student assessment details (Roll no, Name and marks).
- b. Create XML file to contain the book details.

2. Importing and Exporting XML document in database

- a) Import XML data as a binary byte stream
- b) Import XML data in an existing row
- c) Importing XML data from a file that contains a DTD
- d) Specifying the field terminator explicitly using a format file
- e) Export XML data

3. XSL Transformation.

- a) Create a CSS stylesheet to display the XML data.
- b) Link the XSL Style Sheet to the XML Document

4. Internal and External DTD creation.

Create a DTD capturing the document type.

5. XML Schema creation.

6. Parsing XML document using DOM/SAX parser.

Text Book:

“Web Technology” – N.P.GOPALAN, J.AKILANDESWARI

Web Resources:

1. www.xmlmaster.org/en/article/d01/c04
2. www.xmlfiles.com/xml/

Course Designer :

Ms.R.Sindhu

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc.,	Int. Marks	: 15
Class	: II/III Year	Ext. Marks	: 35
Semester	: IV/VI	Max. Marks	: 50
Sub. Code	: MSSEC41/MSSEC61(D)	Hours/Week	: 2
Title of the Paper:	Python Programming	Credits	: 2

1. Control Statements

- a. Write a program to find out whether the given number is even or odd.
- b. Write a program to check whether the input is a leap year or not.
- c. Write a program to find out whether the given number is a prime number.
- d. Write a program to display the Fibonacci series.

2. Built in Function

i. MathFunction

- a. Write a program to display the result of one number raised to the power of another.
- b. Write a program to display the square root of a number.
- c. Write a program to find the roots of the quadratic equation.

ii. String Function

- a. Write a program to find the length of a string.
- b. Write a program to display the reverse of the given string.
- c. Write a program to determine whether a given string is a palindrome or not.

3. User Defined Function

- a. Write a program to find the factorial of a given number.
- b. Write a program to find the average of marks obtained by a student in three subjects.

Text Book:

“Introduction to computing and problem solving using python, First Edition” E. Balagurusamy

Web Resources:

<https://docs.python.org/3/tutorial/>
<https://www.python.org/about/gettingstarted/>

Course Designer:

Mr. G. Reegan Prabhu

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	:B.Sc.,	Int. Marks	: 15
Class	:II/III Year	Ext. Marks	: 35
Semester	:IV/VI	Max. Marks	: 50
Sub. Code	: MSSEC41/MSSEC61(E)	Hours/Week	: 2
Title of the Paper:	Linux Programming	Credits	: 2

1. Basic Commands
 - a. man, who,cd,ls,mv,rm,mkdir,rmdir,
 - b. date,time,kill,chmod,pwd,ps,echo
2. C – Program
 - a. Write a C – Program to emulate ls-l command
 - b. Write a C- Program to display largest of three numbers
 - c. Write a C- Program to create process.(fork)
 - d. Write a C – Program to find the factorial.
3. Shell - Scripts
 - a. Write a Shell script program to display list of user currently logged in
 - b. Shell script program to check given file is a directory or not.
 - c. Shell script program to implement read, write and execute permission
 - d. Shell program to count number of files in the directory
 - e. Shell program to copy one content in to another
4. AWK program
 - a. Write an AWK script to display files in the directory
 - b. Write an AWK program to display the content of the file in the given pattern.

Text Book:

1. “Gawk: Effective AWK Programming “ Arnold Robbins, Free Software Foundation (July 24, 2009); eBook (updated 2011)
2. “Linux : The complete Reference “, Sixth Edition by Richard Petersen November 2007

Web Resources:

1. <http://linux-training.be/linuxfun.pdf>

Course Designer :

Mrs.M.Ramalakshmi Praba

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: B.Sc.,	Int. Marks	: 15
Class	: II/III Year	Ext. Marks	: 35
Semester	: IV/VI	Max. Marks	: 50
Sub. Code	: MSSEC41/MSSEC61(F)	Hours/Week	: 2
Title of the Paper:	PC Troubleshooting	Credits	: 2

Course Outcomes:

On the successful completion of the course, students will be able to

1. Understand the basic concepts of PC and Hardware.
2. Develop techniques in PC assembling.
3. Train to Troubleshoot PC and Hardware components.

UNIT 1:

PC, Main Parts: CPU Box, Monitor, & Peripherals [Keyboard, Mouse, Speaker].
Inside CPU Box: Motherboard, I/O Cards, Cables, Floppy Drivers, HDD, CD-Drive.

UNIT2:

Observation of all parts of Floppy drives, HDD, CD, and SMPS. Identification of cables and computers. Mounting Motherboard in cabinet Installation of cards, devices and then connecting cables. Fitting of cabinet. CMOS – Setup Troubleshooting.

Text Books:

- (01) Hardware bible By: Winn L Rosch, Techmedia publications, Publisher: Que Publishing; 6 edition.
- (02) Trouble shooting, maintaining and repairing PCs By: Stephon J Bigelow Tata McGraw Hill Publication, 5 edition.

Course Designer :

Mr.G.Reegan Prabhu

M.Sc. Computer Science

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)
M.Sc. Computer Science
(2017 – 2019 Batch onwards)

Course Structure

Code No	Type of Paper	Subject	Contact hours /weeks	Credit	Total No of hours Allotted	Max. Marks CA	Max. Marks SE	Total
Semester –I								
S1PS1	Core 1	C++ and Data Structures	5	5	75	25	75	100
S1PS2	Core 2	Distributed Operating Systems	5	5	75	25	75	100
S1PS3	Core 3	Advanced RDBMS	5	5	75	25	75	100
S1PS4	Core 4	Discrete Mathematics	5	5	75	25	75	100
S1PSL1	Core lab 1	Lab in OOPS	5	2	75	40	60	100
S1PSL2	Core lab 2	Lab in RDBMS	5	2	75	40	60	100
			30	24	450	180	420	600

Semester –II								
S2PS1	Core 5	Dot Net Technology	5	5	75	25	75	100
S2PS2	Core 6	Network Security	5	5	75	25	75	100
S2PS3	Core 7	Advanced Java	5	5	75	25	75	100
S2PSE1	Elective -I	Elective Paper –I	4	5	60	25	75	100
S2PSL1	Core lab 3	Lab in Dot Net Programming	6	2	90	40	60	100
S2PSL2	Core lab 4	Lab in Advanced JAVA Programming	5	2	75	40	60	100
			30	24	450	180	420	600

Semester –III								
S3PS1	Core 8	Data Mining Techniques	5	5	75	25	75	100
S3PS2	Core 9	Web Technologies	5	5	75	25	75	100
S3PS3	Core 10	Software Project Management	5	4	75	25	75	100
S3PSE1	Elective -II	Elective-II	4	5	60	25	75	100
S3PSL1	Core lab 5	Lab in Open Source Technology	4	2	60	40	60	100
S3PSL2	Core lab 6	Lab in Web Technology	4	2	60	40	60	100
SPJ	SMPJ	Mini Project	3	2	45	40	60	100
			30	25	450	220	480	700

Semester –IV								
S4PS1	Core 11	Multimedia and its Applications	6	3	90	25	75	100
S4PS2	Core 12	Cloud Computing	6	3	90	25	75	100
S4PSE1	Elective-III	Elective-III	6	5	90	25	75	100
SPJ	SPJ	Project Work & Viva Voce	12	6	-	40	60	100
			30	17	270	115	285	400

A) Consolidation of Contact Hours and Credits : PG

Semester	Contact Hrs / Week	Credits
I.	30	24
II.	30	24
III.	30	25
IV.	30	17
Total	120	90

B) Curriculum Credits

Core	75 Credits
Major Elective	15 Credits

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)
Syllabus for M.Sc. Computer Science
Effect from 2017-2019 Batch onwards

First Semester

	Subjects	Elective
1.	C++ and Data Structures	
2.	Distributed Operating Systems	
3.	Advanced RDBMS	
4.	Discrete Mathematics	
5.	Lab in OOPS	
6.	Lab in RDBMS	

Second Semester

	Subjects	Elective
1.	Dot Net technology	Elective - I
2.	Network Security	
3.	Advanced JAVA	
4.	Lab in Dot Net Programming	
5.	Lab in Advanced JAVA Programming	

Third Semester

	Subjects	Elective
1.	Data Mining Techniques	Elective - II
2.	Web Technologies	
3.	Software Project Management	
4.	Lab in Open Source Technology	
5.	Lab in Web Technology	
6.	Mini Project	Elective-III

Fourth Semester	
Subject	Elective
1. Multimedia and Its Applications	Elective-IV
2. Cloud Computing Project)	Elective V (Major Project)
	(4 Months Industrial Project)

List of Electives

1. Computer Architecture and Parallel Processing
2. Artificial Neural Networks
3. Digital Image Processing
4. Bio-Informatics
5. Parallel Computing
6. Computer Simulation and Modeling
7. Distributed Systems
8. Real Time and Embedded Systems
9. Soft Computing
10. Mobile Computing
11. Pervasive Computing
12. Compiler Design
13. Bluetooth Technology
14. Wireless Sensor Networks
15. Virtual Reality
16. Big Data Analytics
17. Internet Of Things
18. Green Computing

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	:M.Sc(Core)	Int. Marks	: 25
Class	: I Year	Ext. Marks	: 75
Semester	: I	Max. Marks	: 100
Sub. Code	: S1PS1	Hours/Week	: 5
Title of the Paper	: C++ & Data Structures	Credits	: 5

Course Outcomes:

On the successful completion of the course, students will be able to

4. Understand the basic concepts and techniques of Object-Oriented Programming.
5. Develop Object-Oriented Programming skills.
6. Train to organize different data structures.

Unit – I:

OOPS

An Overview of Object Oriented Programming – OOPS Principles and Paradigms:
Encapsulation – Polymorphism – Inheritance – Overloading.

C++ Fundamentals

An overview of C++ - Data Types – Variables – Control Structures.

Unit – II:

Classes

Class and Objects – Constructor – Destructor – Function: Friend and Inline Function
– Arrays of Object – this Pointer – Pointer to Class – Function Overloading – Polymorphism
– Inheritance.

Unit – III:

C++ File and Exception Handling

File Concept – Opening and Closing a File – Text Files – Random Access File –
Exception Handling Fundamentals – Catching All Exceptions – Restricting an
Exception – Rethrowing an Exception.

Unit – IV:

Data Representation

Introduction – Linear Lists – Formula Based Representation – Linked
Representation.

Stacks

The Abstract Data Type – Derived Classes and Inheritance – Formula-Based
Representation – Linked Representation.

Queues

The Abstract Data Type – Formula-Based Representation – Linked Representation.

Unit – V:

Hashing

Dictionaries – Linear List Representation – Hash Table Representation.

Binary and Other Trees

Trees – Binary Trees – Properties of Binary Trees – Representation of Binary Trees – Common Binary Tree Operations – Binary Tree Traversal – The ADT Binary Tree – The Class Binary Tree.

Text Books:

1. The Complete Reference C++ - Author:- Herbert Schildt (Tata McGraw Hill)
2. Data Structures, Algorithms and Applications in C++ - Author:- Sartaj Sahni
(McGraw-Hill International Edition)

Reference Books:

1. Object-oriented Programming in C++
- Robert Lafore (SAMS, Fourth edition, 2001)
2. Fundamentals of Data Structures
- Ellis Horowitz Sartaj Sahni (Computer Science Press, 1983)

Coursedesigners

1. Mr.V.Anand

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
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Course	: M.Sc (Core)	Int. Marks	: 25
Class	: I Year	Ext. Marks	: 75
Semester	: I	Max. Marks	: 100
Sub. Code	: S1PS2	Hours/Week	: 5
Title of the Paper	: Distributed Operating Systems	Credits	: 5

Course Outcomes:

On the successful completion of the course, students will be able to

1. provide an overview of the Distributed Operating Systems.
2. understand the various functionalities and resource management techniques.
3. provide a brief introduction to Linux.

Unit I:

Fundamentals: What is a Distributed Computer System? – Evolution of Distributed Computing Systems- Distributed Computing Systems Models-Why are Distributed Computing Systems Gaining Popularity?- What is a Distributed Operating System- Issues in Designing a Distributed operating System- Introduction to Distributed Computing Environment(DCE)

Message Passing: Introduction-Desirable Features of a Good Message-Passing System- Issues in IPC by Message Passing-Synchronization-Buffering-Multidatagram Messages-Encoding and Decoding of Message Data-Process Addressing-Failure handling-Group Communication-Case Study: 4.3 BSD UNIX IPC Mechanism.

Unit II:

Remote Procedure Calls: Introduction-The RPC Model-Transparency of RPC-Implementing RPC Mechanism-Sub Generation-RPC Messages-Marshaling Arguments and Results-Server Management-Parameter-Passing Semantics-Call Semantics-Communication Protocols for RPCs-Complicated RPCs-Client Server Binding-Exception Handling-Security-Some Special Types of RPCs-RPC in Heterogeneous Environments-Light weight RPC-Optimizations for Better Performance-Case Studies: Sun RPC,DCE,IPC.

Unit III:

Distributed Shared Memory: Introduction-General Architecture of DSM Systems-Design and implementation issues of DSM-Granularity-Structure of Shared Memory Space-Consistency Models-Replacement Strategy-Thrashing-Other Approaches to DSM-Heterogeneous DSM-Advantages DSM.

Unit IV:

Resource Management: Introduction-Desirable Features of a Good Global Scheduling Algorithm-Task Assignment Approach-Load-Balancing Approach-Load Sharing Approach.

Process Management: Introduction-Process Migration-Threads.

Unit V:

Distributed File System: Introduction-Desirable Features of a Good Distributed File System-File Models –File-Accessing Models-File sharing Semantics-File Caching Schemes-File Replication-Fault Tolerance-Atomic Transactions-Design Principles-Case Study: DCE Distributed File Service.

Text Book:

1. Distributed Operating Systems Concepts and Design,
Author: Pradeep.K.Sinha, PHI, First Edition.

References:

1. Distributed Operating Systems-Andrews S.Tanenbaum, I edition PHI
2. Distributed Operating System and Algorithms and Analysis-Randy chow,Theodore.Johnson,Pearson Education,Inc.-Addision Wesley.

Coursedesigner:

Mr.M.Muthalagu

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
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Course	: M.Sc (Core)	Int. Marks	: 25
Class	: I Year	Ext. Marks	: 75
Semester	: I	Max. Marks	: 100
Sub. Code	: S1PS3	Hours/Week	: 5
Title of the Paper	: Advanced RDBMS	Credits	: 5

Course Outcomes:

On the successful completion of the course, students will be able to

1. provide an overview of the RDBMS concepts.
2. understand the various SQL operations and PL/SQL in Oracle.

Unit - I:

Introduction

Purpose of Database Systems – View of Data – Data Models – Database Languages
Transaction Management – Storage Management – Database Administrator – Database Users
– Overall System Structure.

Entity-Relationship Model

Basic Concepts – Design Issues – Mapping Constraints – Keys – E-R Diagram –
Weak Entity Set– Extended E-R Features.

Unit - II:

Relational Model

Structure of Relational Databases – Relational Algebra – Tuple Relational Calculus –
Domain Relational Calculus – Extended Relational Algebra Operations.

Integrity Constraints_ Functional Dependencies.

Relational Database Design

Decomposition – Normalization using Functional Dependencies.

Unit - III:

SQL

The Basic Parts of Speech in SQL: Create Table – Select – Logic and Value –
Getting Text Information and Changing it – Playing with Numbers – Dates – Grouping
Things Together – Joins – Sub Queries – UNION – INTERSECT – MINUS – Changing

Data: INSERT – UPDATE – DELETE – Creating, Dropping and Altering Tables and Views – Users – Roles – Privileges – Indexes – Sequences.

Unit - IV:

An Introduction to PL/SQL

Declarations Section – Executable Commands Section – Conditional Logic – Loops
Cursors – Exception Handling Section.

Triggers

Types of Triggers – Trigger Syntax – Combining Trigger Types – Setting Inserted Values – Maintaining Duplicated Data – Customizing Error Conditions – Calling Procedures within Triggers – Naming Triggers – Enabling and Disabling triggers – Replacing Triggers – Dropping Triggers.

UNIT-V

Procedures, Functions and Packages

Executing Procedures – Procedures Vs. Functions – Procedures Vs. Packages – Creating Procedures – Creating Functions – Creating Packages – Initializing Packages – Compiling Procedures, Functions and Packages – Replacing Procedures, Functions and Packages – Dropping Procedures, Functions and Packages.

Text Books:

1. Database System Concepts
2. Author: Abraham Silberschatz, Henry F. Korth, S. Sudarshan (Tata McGraw-Hill),
3. 6th Edition.
4. Oracle 8: The Complete Reference
5. Author: George Koch, Kevin Loney (McGraw-Hill).

Reference Books:

- 1 An Introduction to Database Systems
 - a. C. J. Date (Addison-Wesley, Seventh Edition)
- 2 Understanding Oracle
 - a. James T. Perry, Joseph G. Lateer (BPB)
- 3 The Complete Reference SQL -James R. Groff and Paul N. Weinberg (McGraw-Hill)

Course designers

Mr.M.Muthalagu

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
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Course	:M.Sc(Core)	Int. Marks	: 25
Class	: I Year	Ext. Marks	: 75
Semester	: I	Max. Marks:	100
Sub. Code	: S1PS4	Hours/Week	: 5
Title of the Paper	: Discrete Mathematics	Credits	: 5

Course Outcomes:

To understand the concepts of mathematics which are essential for better understanding as well as development of the computer science subjects and its applications

Unit I: (Set theory, Relations)

Set theory: Introduction – Sets – Notation and Description of Sets – Subsets – Venn-Euler Diagram. Relations: Cartesian product – Relations– Operations on Relations – Equivalence Relation.

Unit-II: (Functions)

Functions: Functions and Operators – One-one, onto functions – Special types of functions.

Unit III: (Graph theory)

Basic concepts – Matrix representation of Graphs – Trees.

Unit IV: (Finite Automata)

Finite state systems (FA & NFA) – Basic Definitions – FA & NFA with ϵ – moves.

Unit-V : (Regular Expressions & Pumping Lemma)

Regular expressions – Moore and Mealy machines-The pumping Lemma for regular sets.

Text Books:

1. Discrete Mathematics by Dr. M.K. Venkataraman, Dr. N. Sridharan and Author: N. Chandrasekaran (The National Publishing Company,2003)
2. Introduction to Automata theory, Languages and Computation by John. E. Hopcroft, Author:Jeffery d. Ullman (Narosa Publications, 15th Reprint, 1997)

Reference Books:

1. Discrete Mathematics – Schaum’s outline series (second edition)
2. Graph theory with application to engineering and computer science by Narsingh Deo.
3. Discrete Mathematics by S. Sundaresan, K.S. Ganapathy Subramanian and K. Ganesan.
4. Invitation to Graph theory by S.Arumugam and Ramachandran.

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DEPARTMENT OF COMPUTER SCIENCE
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Course	:M.Sc (Major Core)	Int. Marks : 40
Class	: I	Ext. Marks : 60
Semester	: I	Max. Marks : 100
Sub. Code	: S1PSL1	Hours/Week :5
Title of the Paper:	Lab in OOPS	Credits : 2

C++

1. Program using Control Statements.
2. Program using Looping Statements.
3. Program with Classes and Objects.
4. Program using Constructor and Destructor.
5. Program using Function Overloading.
6. Program using Operator Overloading.
7. Program using Array of Objects.
8. Program using Passing Objects as Arguments and Returning Objects.
9. Program using Inheritance.
10. Program using Virtual Function and Dynamic Binding.
11. Program using File Handling.
12. Program using Exception Handling.

Data Structures

1. Stack Implementation – Arrays and Linked List.
2. Queue Implementation – Arrays and Linked List.
3. Circular Queue Implementation.
4. Ordered Linked List Implementation through Pointers
(Insert, Delete, Search and Print).
5. Circular Linked List (Insert, Delete, Search and Print).
6. Doubly Linked List (Insert, Delete, Search and Print).
7. Searching Program.
8. Sorting Program.
9. Hashing Techniques.
10. Tree Traversals.

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DEPARTMENT OF COMPUTER SCIENCE
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Course	: M.Sc (Core)	Int. Marks	: 40
Class	: I Year	Ext. Marks	: 60
Semester	: I	Max. Marks	: 100
Sub. Code	: S1PSL2	Hours/Week	: 5
Title of the Paper:	Lab in RDBMS	Credits	: 2

SQL

1. Creating the Database (DDL Commands).
2. Manipulating and Querying the Database (DML Commands).
3. Using Built-in Functions.
4. Processing of Sub Queries.
5. Applying Joins.
6. Sorting the Database.
7. Indexing the Database.
8. Creating and Manipulating Sequences.
9. Creating and Manipulating Views.
10. Creating Users and Roles.

PL/SQL

1. Programs using Control Statements.
2. Programs using Exception Handling.
3. Programs using Implicit Cursors.
4. Programs using Explicit Cursors.
5. Programs using Triggers.
6. Programs using Functions.
7. Programs using Procedures.
8. Programs using Packages.

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: M.Sc., (Core)	Int. Marks	: 25
Class	: I Year	Ext. Marks	: 75
Semester	: II	Max. Marks	: 100
Sub. Code	: S2PS1	Hours/Week	: 5
Title of the Paper:	Dot Net Technology	Credits	: 5

Course Outcomes:

On the successful completion of the course, students will be able to

1. Provide an overview of the ASP.NET programming concepts.
2. Understand the XML in Dot NET.

Unit I:

Introduction to .NET and ASP.NET: The DOS Paradigm - The GUI Paradigm - The .Net Paradigm - .Net framework - Types, Objects and Namespaces - Setting up ASP.Net and IIS.

Unit II:

ASP.NET Controls: Overview of dynamic web page-introduction & features of ASP.NET understanding ASP.NET controls-applications-web servers, installation of IIS. Web form, **web forms Controls** - server-controls-client controls-adding controls to web Form buttons-text box-labels-checkbox-radio buttons-list box. Adding controls a runtime. Running a web application- creating a multiform web project- **Form validation:** client side and server side validation- **Validation controls:** required field comparison range- Calendar control- Ad rotator control- Internet Explorer control.

Unit III:

ADO.NET: Overview of ADO.NET- from ADO to ADO.NET- ADO.NET Architecture- Accessing data using data adapters and datasets- using command and data Reader- binding data to data bind controls- displaying data in data grid.

Unit IV:

XML In .NET: XML Basics- Attributes- Fundamentals of XML Classes: Document-Text Writer- Text Reader- XML Validations- XML In ADO.NET,-Data Document.

Unit V:

Web Services: Introduction- State Management- View State- Session State- Application State- Service Description Language- Building & Consuming A Web Service. Web Application Development- Caching- Threading Concepts- Creating Threads In .NET Managing Threads- Thread Synchronization- Features Of .NET- Role Based Security & Code - Access Security- Permissions.

TEXT BOOKS

1. Mathew Macdonald - The Complete Reference ASP.NET - Tata McGraw Hill Publishing Pvt Ltd.,
2. Professional ASP.NET - Wrox publication PVT Ltd.
3. ASP.NET Developer's Guide - Greg Buczek - Tata McGraw Hill Edition.

REFERENCES

1. VB.NET Programming Black Book - Steven Holzner (Dreamtech pub.)
2. Introduction to .NET framework - Wrox publication.
3. ASP.NET Unleashed - BPB Publication.

Course designers

Mr.M.Muthalagu

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	:M.Sc (Core)	Int. Marks	: 25
Class	: I Year	Ext. Marks	: 75
Semester	: II	Max. Marks	: 100
Sub. Code	: S2PS2	Hours/Week	: 5
Title of the Paper:	Network Security	Credits	: 5

Course Outcomes:

On the successful completion of the course, students will be able to

1. Understand of various encryption techniques and web security.

Unit – I:

Overview

Services, Mechanisms and Attacks – The OSI Security Architecture – A Model for Network Security.

Encryption Techniques

Symmetric Cipher Model – Substitution Techniques – Transposition Techniques. Simplified DES – Block Cipher Principles – The Data Encryption Standard – The Strength of DES – Differential and Linear Cryptanalysis – Block Cipher Design Principles – Block Cipher Modes of Operations.

Unit – II:

Public Key Cryptography and RSA

Principles of Public Key Cryptosystem – The RSA Algorithm – Key Management – Diffie – Hellman Key Exchange – Elliptic Curve Arithmetic – Elliptic Curve Cryptography – Message Authentication and Hash Function – Authentication Requirements – Authentication Functions – Message Authentication Codes – Hash Function – Security of Hash Function and MACS.

Unit – III:

Hash Algorithm

MD5 Message Digest Algorithm – Secure Hash Algorithm – RIPEMD-160, HMAC - Digital Signatures and authentication protocols – Digital signature standard – Kerberos – X.509 Authentication Service – Pretty Good Privacy – S/MIME – Data Compression using ZIP – Radix-64 Conversion – PGP Random Number Generation.

Unit – IV:**IP Security and Web Security**

IP Security – Architecture – Authentication Header – Encapsulating Security Payload – Combining Security Association – Key Management – Internetworking and Internet Protocols – Web Security Consideration – Secure Sockets Layer and Transport Layer Security – Secure Electronic Transaction.

Unit - V:**System Security**

Intruders – Intrusion Detection – Password Management – Malicious Software – Viruses and Related Threats – Virus Counter – Measures – Firewalls – Design Principles – Trusted System.

Text Book:

1. Cryptography and Network Security: Principles and Practices
Author: William Stallings (Pearson Education, Third Edition)

Reference Book:

1. Cryptography Demystified - John E. Hershey (McGraw-Hill)
2. "Handbook of Applied Cryptography" by Alfred J. Menezes, Paul C. Van Oorschot and Scott A. Vanstone

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DEPARTMENT OF COMPUTER SCIENCE
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Course	:M.Sc(Core)	Int. Marks	: 25
Class	: I Year	Ext. Marks	: 75
Semester	: I	Max. Marks	: 100
Sub. Code	: S2PS3	Hours/Week	: 5
Title of the Paper	: Advanced JAVA	Credits	: 5

Course Outcomes:

On the successful completion of the course, students will be able to

1. Understand the advanced level of object-oriented programming through Core Java.
2. Deal with Applet, Networking, Beans, Servlets and JDBC.
3. Develop Internet Applications.

Unit I:

Java Fundamentals:

Data Types – Variables – Arrays – Operators – Control Statements.

Classes:

Class Fundamentals – Declaring Objects – Assigning Object Reference Variables – Methods – Constructors – The this Keyword – Overloading Methods – Using Objects as Parameters – Returning Objects – Inheritance Basics – Multilevel Hierarchy – Method Overriding.

Unit II:

Packages and Interfaces:

Defining a Package – Accessing a Package – Importing Packages – Defining an Interface – Implementing Interfaces – Applying interfaces.

Multithreaded Programming:

Thread Model – Main Thread – Creating a Thread – Creating Multiple Threads – Thread Priorities – Suspending, Resuming and Stopping Threads.

Unit III:

Applet:

Applet Basics – Applet Architecture – Applet Skeleton – Applet Display Methods – The HTML APPLET Tag.

Introducing the AWT:

AWT Classes – Window Fundamentals – Working with Frame Windows – Creating a Frame Window in an Applet – Creating a Windowed Program – Working with Graphics – Working with Color – Working with Fonts.

AWT Controls:

Control Fundamentals – Labels – Buttons – Check Boxes – Check Box Group – Choice Controls – Lists – Scroll Bars – Text Field – Text Area – Layout Managers – Menu Bars and Menus – Dialog Boxes – File Dialog.

Unit IV:

Networking:

Networking Basics – Java and the Net – InetAddress – TCP / IP Client Sockets – URL – URL Connection – TCP / IP Server Sockets – A Caching Proxy HTTP Server – Datagrams.

Java Beans:

Java Bean – Advantages – Application Builder Tools – Using the Bean Development Kit (BDK) – JAR Files – Introspection – Developing a Simple Bean using the BDK – Using Bound Properties – Using the BeanInfo Interface – Constrained Properties – Persistence – Customizers – The Java Beans API – Using Bean Builder.

Unit V:

Servlets:

Life Cycle – Using Tomcat – Create and Compile Servlet – Servlet API – Servlet Package – Servlet Parameters – Servlet HTTP Package – HTTP Requests and Responses – Session Tracking.

Database Connectivity – JDBC:

Design of JDBC – Basic JDBC Programming Concepts – Populating a Database – Executing queries – Scrollable and Updatable Result sets.

Text Books:

1. The Complete Reference Java 2
Author:Herbert Schildt (Tata McGraw-Hill, Fifth Edition)
2. Core Java 2 Volume II – Advanced Features
-Author:Cay S. Horstmann, Gary Cornell (Sun Microsystems Press)

Reference Books:

1. Core Java 2 Volume I – Fundamentals
- Cay S. Horstmann, Gary Cornell (Sun Microsystems Press)
2. Database Programming with JDBC and Java- George Reese (O'Reilly)

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: M.Sc (Core)	Int. Marks	: 40
Class	: I Year	Ext. Marks	: 60
Semester	: II	Max. Marks	: 100
Sub. Code	: S2PSL1	Hours/Week	: 6
Title of the Paper	: Lab in Dot Net Programming	Credits	: 2

ASP. NET PROGRAMMING LAB

1. Create web page for Course Registration
2. Create web pages for Banking
3. Create web pages for Shopping Cart
4. Create web pages for Airline reservation
5. Create web pages for Job portal
6. Create web pages for On-Line Telephone Billing System
7. Create web pages for On-Line Quiz.
8. Create web pages for Hospital Management System.

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DEPARTMENT OF COMPUTER SCIENCE
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Course	: M.Sc (Major Core)	Int. Marks: 40
Class	: I	Ext. Marks: 60
Semester	: II	Max. Marks: 100
Sub. Code	: S2PSL2	Hours/Week:5
Title of the Paper: Advanced Java Programming - Lab		Credits : 2

1. Programs to demonstrate Control Statements.
2. Programs to demonstrate Class Concepts.
3. Programs to demonstrate Packages.
4. Programs to demonstrate Interfaces.
5. Programs to demonstrate Multithreaded Programming.
6. Programs to demonstrate Applets.
7. Programs to demonstrate AWT Controls.
8. Programs to demonstrate Networking.
9. Programs to demonstrate Java Beans.
10. Programs to demonstrate Servlets.
11. Programs to demonstrate JDBC.

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DEPARTMENT OF COMPUTER SCIENCE
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Course	:M.Sc (Core)	Int. Marks	: 25
Class	: II Year	Ext. Marks	: 75
Semester	: III	Max. Marks	: 100
Sub. Code	: S3PS1	Hours/Week	: 5
Title of the Paper:	Data Mining Techniques	Credits	: 5

Course Outcomes:

On the successful completion of the course, students will be able to

1. Understand the various data mining functionalities and applications of data mining.
2. Integrate data from multiple databases.

Unit-I

Introduction – Data mining – Data mining functionalities – kinds of patterns can be mined – classification – Data mining task primitives-major issues. Data pre-processing – Data cleaning – Data Integration and Transformation – Data Reduction – Discretization and concept hierarchy generation

Unit-II

Data warehouse – A multidimensional data model – Data warehouse architecture – Data warehouse implementation – From data warehouse to data mining - Efficient methods for data Cube computation.

Unit-III

Mining Frequent Patterns, Associations and Correlations: Basic Concepts-Efficient and scalable Frequent Itemset Mining Methods-Mining various kinds of association rules-from association Mining to correlation analysis-constraint-based Association Mining. Classification and prediction – Issues regarding classification and prediction – classification by decision tree induction- Bayesian classification- Rule based classification.

Unit-IV

Cluster Analysis – Types of Data in cluster analysis- A categorization of Major clustering methods - Partitioning methods- Hierarchical methods – Density – based methods -Grid based methods -Model based clustering methods – outlier analysis.

Unit-V

Mining Data Streams-Mining Time-Series Data-Mining Sequence patterns in Transactional Data Bases-Multimedia Data Mining-Text Mining-Mining the World Wide Web.

Text Book

1. “Data Mining Concepts and Techniques”,
Author: Jiawei Han, Michelen Kamber, Morgan Kaufmann Publishers an Imprint of Elsevier, 2006.

Reference Book:

1. Data mining: Practical Machine Learning Tools and Techniques
- Ian H. Witten, Eibe Frank (Morgan Kaufmann, Second Edition)
2. Data mining: a knowledge discovery approach-Krzysztof J.Cios, Witold Pedrycz, W.Swiniarski, Lukasz A.Kurgan.
3. Data Mining Techniques - Arun K Pujari

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Course	:M.Sc (Core)	Int. Marks	: 25
Class	: II Year	Ext. Marks	: 75
Semester	: III	Max. Marks	: 100
Sub. Code	: S3PS2	Hours/Week	: 5
Title of the Paper	: Web Technologies	Credits	: 5

Course Outcomes:

On the successful completion of the course, students will be able to

1. Understand web programming using JavaScript and PHP
2. Develop dynamic web pages with JavaScript.
3. Get trained in Server side programming with PHP

Unit I:

Fundamentals of JavaScript:

Capabilities of JavaScript- Structures of JavaScript code - Data and Objects-Tokens, Operators, Expressions and Statements - The JavaScript math Objects - Comparison Operations and decision making Structures - Loop Structures.

Arrays in JavaScript:

Basic Array Properties-Some operations On Arrays-Creating Two Dimensional Arrays-Using Arrays to Access the Contents Of Forms-Hiding the Contents of a JavaScript Script.

Unit II:

JavaScript Functions:

The purpose of Functions - Defining JavaScript Functions-Using JavaScript Functions with HTML Forms-Some Global Methods and Event Handlers-Recursive Functions-Passing Values from One Document to Another.

Introduction to PHP:

Getting Started – Data Types – Variables – Constants - Documents- Operations- Arrays- Conditional Statements-Iterations.

Unit III:

Functions in PHP:

User Defined Functions -Built in Functions- PHP Server Variables- Working with Date and Time-Performing Mathematical operations-Working with string Functions.

Working With Forms:

Form Elements-Adding Elements to a Form

Unit IV:

Regular Expressions:

Regular Expressions Engine- Common Users of regular Expressions-Types Of regular Expressions-Regular Expressions Functions.

My SQL:

PHP My SQL Architecture - Creating Table - Connecting to My SQL -Selecting the Database - Inserting data - Extracting data - Updating data - Deleting data - Closing the database Connection - PHP and My SQL Interaction using a form.

Unit V:

Cookies and Sessions:

An Introduction to Cookies - Creating Cookies Using PHP - An Introduction to session-Sessions Variables - PHP Session Functions.

XML:

An Introduction to XML - What XML Does-Difference between XML and HTML.

Text Books:

1. An Introduction to HTML and JavaScript

Author: David R.Brooks (Springer International Edition,)

2. PHP 5.1 for Beginners

Author: Ivan Bayross and Sharanam Shah (Shroff Publishers and Distributors Pvt. Ltd.)

First edition,

References:

1. JavaScript – A Beginner’s Guide- Scott Duffy (DreamTech Press)
2. SAMS Teach Yourself PHP4 in 24 Hours- Matt Zandstra, Brian Schaffner (SAMS)
3. Web Standards Programmer's Reference: HTML, CSS, JavaScript, Perl, Python & PHP - Steven M. Schafer (Wiley Dreamtech)

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Course	: M.Sc (Core)	Int. Marks	: 25
Class	: II Year	Ext. Marks	: 75
Semester	: I	Max. Marks	: 100
Sub. Code	: S3PS3	Hours/Week	: 5
Title of the Paper	: Software Project Management	Credit	: 4

Course Outcomes:

On the successful completion of the course, students will be able to

1. Provide the study of various phases of software development.
2. Understand various Management concepts.

Unit I:

Introduction – Importance of Software Project Management – Project – Software project Vs Other types of Project – Contract Management and Technical Project Management – Activities covered by Software Project Management – Plans, Methods and methodologies – Categorizing Software Projects – Setting Objectives – Stake holders - Business Case – Requirement specification – Management control. Programme management and project evaluation: Introduction – Programme management – Managing the allocation of resources within programmes – Strategic Programme management – Creating a programme – Aids to Programme management – Benefits Management – Evaluation of individual projects – Technical Assessment – Cost Benefit Analysis – Cash Flow forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

Unit II:

Selection of an appropriate project approach: Introduction – Choosing technologies – Technical plan contents list – Choice of process models – Structure Vs Speed of delivery – The Waterfall model – The V-Process Model – The Spiral Model – Software prototyping – Other ways of categorizing prototypes – Incremental Delivery- Dynamic Systems Development method – Extreme programming – Managing iterative process – Selecting the most appropriate process model.

Software Cost Estimation: Introduction – Where are estimates done? – Problems with over and under estimates – Basis for software estimating – Software effort estimation

techniques – Expert Judgement – Estimating by analogy – Albrecht function point analysis – Function points Mark II - COSMIC Full function points – A Procedure code oriented approach – COCOMO: a Parametric model

Unit III

Activity Planning: An Introduction – Objectives of Activity Planning – When to plan – Project Schedules – Projects & Activities – Sequencing and scheduling activities – Network planning models – Formulating a network model – Adding the time dimension – The forward pass – The backward pass – Identifying the critical path – Activity float – Shortening the project duration – Identifying critical activities – Activity on arrow networks.

Risk Management: Introduction – Risk – Categories of Risk – A framework for dealing with this – Risk Identification – Risk Assessment – Risk Planning – Risk Management – Evaluating risks to the schedule – Applying the PERT Technique – Monte Carlo simulation – Critical chain concepts.

Unit IV:

Resource Allocation: Introduction – The Nature of Resource – Identifying resource requirements – Scheduling resources – Creating Critical paths – Counting the cost – Being specific – Publishing the resource schedule – Cost Schedule – The Scheduling Sequence.

Monitoring and Control: Introduction – Creating the framework – Collecting the data – Visualizing Progress – Cost Monitoring – Earned Value Analysis – Prioritizing monitoring – Getting the project back to target – Change control.

Unit V:

Managing Contracts: Introduction – ISO 12207 approach to the acquisition and supply of software – The supply process – Type of contract – Stages in Contract placement – Typical terms of a contract – Contract Management – Acceptance.

Managing people and Organizing teams: Introduction – Understanding Behavior – Organizational Behavior: a background – Selecting the right person for the job – Instruction in the best methods – Motivation – The Oldham-Hackman job characteristics model – Working in groups – Working in groups – Becoming a team – Decision making – Leadership

- Organizational Structures – Dispersed and Virtual team – The influence of culture – Stress
- Health & Safety.

Text Book:

1. Software Project Management,

Author: Bob Hughes and mike Cotterell, Tata Mc Grawhill Fourth edition.

References:

1. Software Project Management, A Concise Study, S.A. Kelkar, PHI.
2. Software Project Management, Robert Bruce measure for improving performance, PHI Kelsey, Ph.D.

Course designers

Mr.M.Muthalagu

THIAGARAJAR COLLEGE, MADURAI – 9.
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Course	:M.Sc (Major Core)	Int. Marks: 40
Class	: II	Ext. Marks: 60
Semester	: III	Max. Marks: 100
Sub. Code	: S3PSL1	Hours/Week: 4
Title of the Paper:	Lab in Open Source Technology	Credits : 2

1. OPEN SOURCE TOOL -1 : Data Mining Tool

- To check Preprocessing
- To check Seed ROI Selection and the time series extraction
- To Design PPI Model
- To Implement SEM in Neuroimage.

2. OPEN SOURCE TOOL-2 : Research Document Tool

3. OPEN SOURCE TOOL-3: S/w Testing Tool

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Course	: M.Sc., (Major Core)	Int. Marks: 40
Class	: II	Ext. Marks: 60
Semester	: III	Max. Marks: 100
Sub. Code	: S3PSL2	Hours/Week:4
Title of the Paper:	Lab in Web Technology	Credits : 2

JavaScript

1. Programs to demonstrate Control Statements.
2. Programs to demonstrate Built-In Functions.
3. Programs to demonstrate User-Defined Functions.
4. Programs to demonstrate Class Concepts.
5. Programs to demonstrate Arrays.
6. Programs to embed JavaScript in a Web Page.
7. Programs to manipulate Web Forms.
8. Programs to handle Browser Events.
9. Programs to handle Frames.
10. Programs to perform Animation.

PHP

1. Programs to demonstrate Control Statements.
2. Programs to demonstrate User-Defined Functions.
3. Programs to demonstrate Date Functions.
4. Programs to demonstrate String Functions.
5. Programs to demonstrate Arrays.
6. Programs to demonstrate Objects.
7. Programs to get user input from Forms and store in Database.
8. Programs to demonstrate cookies.
9. Programs to demonstrate Sessions.

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Course	:M.Sc (Major Core)	Int. Marks: 25
Class	: II	Ext. Marks: 75
Semester	: IV	Max. Marks: 100
Sub. Code	: S4PS1	Hours/Week:6
Title of the Paper	: Multimedia and Its Applications	Credits :3

Course Outcomes:

On the successful completion of the course, students will be able to

1. Understand the various elements of Multimedia
2. Deal with Animation fundamentals

Unit I

Introduction: Multimedia – Definition –Uses of multimedia.

Text: Using text in multimedia –Hypermedia and Hypertext

Unit II

Images: Creation -Color - Image File Formats Sound: Digital Audio – MIDI Audio – Multimedia System Sound -Audio File Formats.

Unit III : Animation: The power of Motion- Principles of Animation – Animation by Computer –Making Animations. Video: Using video – Analog - Digital Video - Shooting and Editing video.

Unit IV :Making Multimedia: The stages of a multimedia projects –Multimedia skills – Hardware-Software - Authoring System - Multimedia on the web.

Unit V : Mobile Multimedia: Digital Revolution world wide – Mobile Hardware - Connections- 3G vs 4G - Mobile operating systems. Delivering: Testing – Preparing for Delivery – Delivering on DVD - Delivering on the World Wide Web - Delivering Through an App Store.

Textbook:

Multimedia: Making It Work-Tay Vaughan, Mc Graw Hill Education (India) Private Limited, 9th Edition, 2016.

References

1. Anleigh P.K, and Takkar K, "Multimedia Systems Design", PHI.
2. Linda Tway, "Multimedia in Action", AP professional
3. Judith Jeffcoate, " Multimedia in practice - Technology and Applications", PHI.
4. Walterworth John A, " Multimedia Technology and Applications ", Ellis horowood Ltd,.
5. Arch C Luther, "Designing Interactive Multimedia ", bantam Books

Course designers:

1. **Mr.V.Anand**

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Course	:M.Sc (Major Core)	Int. Marks: 25
Class	: II	Ext. Marks: 75
Semester	: IV	Max. Marks: 100
Sub. Code	: S4PS2	Hours/Week:6
Title of the Paper: Cloud Computing		Credits :3

Course Outcomes:

On the successful completion of the course, students will be able to

1. Understand the Benefits of cloud Computing
2. Provide a sound foundation of the Cloud Computing
3. Start using and adopting Cloud Computing Tools and Services in real life Scenario

Unit I

Understanding cloud computing: An introduction to cloud computing- what it is & what it is not- History - The network is the computer: How cloud computing works. Companies in the cloud: cloud computing today. The pros and cons of cloud computing- benefits- how to develop cloud services.

Unit II

Cloud computing for the community- Cloud computing for the corporation- Using cloud services: collaborating on calendars, schedules, and Task management. Exploring online calendar applications- Exploring online schedule applications- Exploring online planning and task management.

Unit III

Collaborating on Event Management: Event Management applications - Exploring Event Management Applications – Collaborating on project Management: Exploring project Management Applications – Collaborating on databases: how it works Exploring Web-Based Databases.

Unit IV

Storing and sharing Files and other Online Content: Understanding Cloud Storage- Evaluating Online File-Storage and Sharing Services-Exploring Online Book marking Services. Sharing Digital Photographs: Exploring online photo-editing Applications – Exploring Photo- Sharing Communities. Controlling it all with Web Based Desktops.

Unit V

Collaborating via Web - Based Communication Tools: Evaluating Mail Services
Instant Messaging Services - Web Conferencing services. Collaborating via Social networks
and Groupware: creating groups on social networks – Evaluating online Groupware.

Text Book:

1 .Michael Miller “CLOUD COMPUTING Web-Based Applications That Change The Way
You Work and Collaborate Online”, Pearson Education, Edition.

References Books:

1. Velte T. Antony, Velte J. Toby., Elsenpeter Robert, “Cloud Computing: A Practical Approach”, Tata McGraw- Hill
2. Beard Haley, “Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs”, Emereo Pvt. Limited

Course designers:

1. **Mrs.N.Hemavathi**

LIST OF ELECTIVES

1. Computer Architecture and Parallel Processing
2. Artificial Neural Networks
3. Digital Image Processing
4. Bio-Informatics
5. Parallel Computing
6. Computer Simulation and Modeling
7. Distributed Systems
8. Real Time and Embedded Systems
9. Soft Computing
10. Mobile Computing
11. Pervasive Computing
12. Compiler Design
13. Bluetooth Technology
14. Wireless Sensor Networks
15. Virtual Reality
16. Big Data Analytics
17. Internet of Things
18. Green Computing

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DEPARTMENT OF COMPUTER SCIENCE
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Course	:M.Sc (Major elective)	Int. Marks: 25
Class	:I /II	Ext. Marks: 75
Semester	: II/III/IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1(A)	Hours/Week:4
Title of the Paper:	Computer Architecture and Parallel Processing	Credits : 5

Course Outcomes:

On the successful completion of the course, students will be able to

1. Understand basic structure of computer and perform computer arithmetic operations
2. Understand the concept of cache mapping techniques and the concept of I/O organization
3. Provide fundamental knowledge in the design principles for general-purpose parallel Computers.
3. To know about current practical implementations of parallel architectures

UNIT-I

Basic Structure of Computers: Functional Units - Basic Operational Concepts- Bus Structures

Machine Instructions and Programs:Numbers,Arithmetic Operations, and Characters-Number Representation- Addition of Positive Numbers – Addition and Subtraction of Signed Numbers –Overflow in Integer Arithmetic- Characters.

UNIT-II

Central Processing Unit: General Register and Stack Organization - Instruction formats - Addressing Modes - Data Transfer and Manipulation - Program Control - RISC - Pipelining - Arithmetic, Instruction and RISC Pipelining - Vector Processing - Array Processor.

UNIT-III

Input-Output organization - Peripheral devices - I/O Interface - Asynchronous Data Transfer - Modes of Transfer - Priority Interrupt - DMA - I/O Processor - Serial Communication - Memory Organization - Memory Hierarchy - Auxiliary Memory - Associative Memory and Virtual Memory

UNIT-IV

Introduction to Parallel Processing: Trends towards parallel processing –Parallel Processing Mechanisms –Parallel Computer Structures-Architectural Classification Schemes-Parallel Processing Applications

UNIT-V

Structures and Algorithms for Array Processors: SIMD Array Processors –SIMD Interconnection Networks-Parallel Algorithms for Array Processors.

Multiprocessor Architecture and Programming: Functional Structures-Parallel Memory Organizations-Multiprocessing Control and Algorithms: Inter process Communication Mechanisms-Parallel Algorithms for Multiprocessors

Text Books

1. V.C. Hamacher, G. Vranesic, S.G. Zaky - Computer Organisation, TMG
2. Kai Hwang ,Faye A.Briggs-Computer Architecture and Parallel Processing ,MGH

Reference Books

1. Nicholas Carter, “Computer Architecture”, TMG, 2006.
- 2.J.P.Hayes, Computer Architecture, McGraw Hill, 1988’
3. Selim G.AKL - The Design and Analysis of parallel Algorithms - PHI.

Course designers:

1. Mrs.N.Hemavathi

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Course	:M.Sc (Major elective)	Int. Marks: 25
Class	:I /II	Ext. Marks: 75
Semester	: II/III/IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1(B)	Hours/Week:4
Title of the Paper:	Artificial Neural Networks	Credits :5

Course Outcomes:

On the successful completion of the course, students will be able to

1. Understand of artificial neural networks algorithms and applications.

Unit I

INTRODUCTION: History of Neural Networks - Structure and Function of a single neuron - Neural Net Architectures – Neural Network Uses –Evaluation of Networks - Implementation

Unit II

SUPERVISED LEARNING: Preceptors – Linear Separability -Perception Training Algorithm –Support vector Classification. Multilevel Discrimination-Back propagation algorithm-Classification using backpropagation-Applications

Unit III

UNSUPERVISED LEARNING : Winner-Take-All Networks-Counter propagation Networks-Topologically Organized Networks-Distance-based Learning-Principal Component Analysis Networks

Unit IV

ASSOCIATIVE LEARNING: Non-iterative Procedures for Association-Hopfield Networks- Brain-State-in-a-Box Network – Hetero Associators

Unit V

EVOLUTIONARY OPTIMIZATION: Optimization and Search –Evolutionary Computation-Evolutionary Algorithms for Training Neural Networks-Learning the Architecture –Hybrid Evolutionary Approaches

Text Books:

- 1.Kishan Mehrotra , Chilukuri K.Mohan, Sanjay Ranka ,”Elements of Artificial Neural Networks”,RRI Penram International Publishing Pvt.Ltd.

Reference Books:

- 1.“Introduction to the theory of Neural Computation”, - J.Hertz, A.Krogh., and R.G. Palmer, Addison – Wesley

Course designers:

1. Mr.M.Muthalagu

THIAGARAJAR COLLEGE, MADURAI – 9.
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Course	:M.Sc (Major elective)	Int. Marks: 25
Class	:I /II	Ext. Marks: 75
Semester	: II/III/IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1 (C)	Hours/Week:4
Title of the Paper	: Digital Image Processing	Credits : 5

Course Outcomes:

On the successful completion of the course, students will be able to

1. Provide in detail about the various digital image processing techniques
2. Convert an image into digital form and perform some operations on it, in order to get an enhanced image

Unit – I:

Digital Image Fundamentals

Introduction – Digital Image Representation – Fundamental Steps in Image Processing – Element of Digital Image Processing Systems – Elements of Visual Perception – A Simple Image Model – Sampling and Quantization – Basic Relationships Between Pixels – Imaging Geometry – Photographic Film.

Unit – II:

Image Transformation And Enhancement

Image Transformations – Fourier Transform – Discrete Fourier Transform – Properties of Two Dimensional Fourier Transform – Fast Fourier Transform Spatial Domain Methods – Frequency Domain Methods – Enhancement by Point Processing – Spatial Filtering – Enhancement in Frequency Domain.

Unit – III:

Image Restoration And Compression

Degradation Model – Algebraic Approach to Restoration – Least Mean Square Filter – Restoration in Spatial Domain – Geometric Transformation.

Fundamentals of Image Compression – Image Compression Models – Error-free Compression – Lossy Compression – Image Compression Standards.

Unit – IV:

Image Segmentation And Representation

Detection of Discontinuities – Edge Linking and Boundary Detection – Thresholding
– Region Oriented Segmentation – Use of Motion in Segmentation – Representation
Schemes – Boundary Description – Regional Descriptors.

Unit –V:

Image Recognition And Interpretation

Elements of Image Analysis – Patterns and Pattern Classes – Neural Networks –
Structural Methods – Interpretation – Semantic Networks – Production (Expert)
Systems.

Text Book:

1. Digital Image Processing
- Rafael C. Gonzalez, Richard E. Woods (Addison–Wesley)

Reference Book:

1. Digital Image Processing
- Kenneth R. Castleman (PHI)

Course designers:

1. Mr.V.Anand

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Course	:M.Sc (Major elective)	Int. Marks: 25
Class	:I /II	Ext. Marks: 75
Semester	: II/III /IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1(D)	Hours/Week:4
Title of the Paper:	Bio Informatics	Credits : 5

Course Outcomes:

On the successful completion of the course, students will be able to

1. Provide an understanding of Bio Informatics concepts and applications.
2. Use Perl programming in implementing Bioinformatics applications.

Unit – I:

Introduction

Objectives – Kinds of Data – Multiplicity of Data & Redundancy – Databases – Data Integration & Analysis.

Molecular Biology & Bioinformatics

Molecular Biology – Systems Approach in Biology – Central Dogma of Molecular Biology – Definitions – Problems in Molecular & Bioinformatics Approach – Applications.

Unit – II:

Information Molecules & Information Flow

Basic Components – Basic Chemistry of Nucleic Acids – Structure of DNA – Structure of RNA – DNA Replication is Semi-Conservative – Denaturation & Renaturation of DNA – Functional Elements in DNA – Eukaryotic Chromosomes – Structure of Bacterial Chromosome – Analysis DNA – Cloning Methodology – DNA Sequencing & PCR.

Proteins – Profiles & Properties

Amino Acids – Protein Structure – Secondary Structure Elements – Tertiary Structure
– Quaternary Structure – Protein Folding – Protein function – Purification and Characteristics.

Unit – III:

Programming With Perl

Introduction – Programming – Illustrations – Associative Arrays – File Input and Output – Applications for Bioinformatics – Bioperl.

Understanding & Using Biological Databases

Introduction – Types of Databases – Networks and Databases – Introduction to Java Clients – CORBA – Using MYSQL – Introduction to Biostatistics.

Unit – IV:

Alignment Of Pairs Of Sequence

Sequence Analysis of Biological Data – Model & Biological Motivation – Methods of Alignment – Application of Dot Matrices – Methods of Optical Alignments – Using Gap Penalties and Scoring Matrices – Sensitivity and Specificity.

Tools for Sequence Alignment

FASTA – BLAST - Filtering and Gapped Blast – PSI – Blast – Comparison.

Alignment Of Multiple Sequences

Tools for MSA – Considerations – Applications – Viewing MSA.

Unit – V:

Phylogenetic Analysis

Concepts of Trees – Phylogenetic Trees & Multiple Alignments – Distance Matrix Methods – Character Based Methods – Evaluating Phylogenies.

Proteomics

Proteome Analysis – Tools – Metabolic Pathways – Genetic Networks – Network Properties & Analysis – Complete Pathway Simulation: E-Cell.

Text Book:

1. Bioinformatics Concepts, Skills & Applications -- S. C. Rastogi, Namita Mendiratta, Parag Rastogi (CBS Publishers & Distributors)

Reference Book:

1. Intelligent Bioinformatics
- Edward Keedwell, Ajit Narayanan (Wiley)

Course designers:

1. Mr.M.Muthalagu

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DEPARTMENT OF COMPUTER SCIENCE
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Course	:M.Sc (Major elective)	Int. Marks: 25
Class	:I /II	Ext. Marks: 75
Semester	: II/III /IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1(E)	Hours/Week:4
Title of the Paper: Parallel Computing		Credits : 5

Course Outcomes:

On the successful completion of the course, students will be able to

1. Provide a detailed understanding of the parallel computer architecture, processor and memory hierarchy.

Unit – I:

Parallel Computer Models

Multiprocessors and Multi computers – Multi vector and SIMD Computers – PRAM and VLSI Models.

Program and Network Properties

Program Flow Mechanisms – System Inter Connect Architectures.

Principles of Scalable Performance

Parallel Processing Application – Speedup Performance Laws.

Unit – II:

Processors and Memory Hierarchy

Advanced Processor Technology – Super Scalar and Vector Processors – Memory Hierarchy Technology – Virtual Memory Technology

Bus, Cache and Shared memory

Back Plane Bus Systems – Cache Memory Organizations – Shared Memory Organizations.

Unit – III:

Pipelining and Super scalar Techniques

Linear Pipeline Processors – Nonlinear Pipeline Processors – Instruction Pipeline Design – Arithmetic Pipeline Design – Super Scalar and Super Pipeline Design.

Unit – IV:

Parallel and Scalable Architecture

Multiprocessor System Interconnects – Cache Coherence – Message Passing Mechanisms.

Multivector and SIMD Computer:

Vector Processing Principles – Multivector Multiprocessors – Compound Vector Processing – SIMD Computer Organization.

Unit – V:

Scalable, Multithreaded and Data flow Architecture:

Latency Hiding Technique -Principles of Multithreading – Fine Grain Multi computers.

Text Book:

1. Advanced Computer Architecture Parallelism, Scalability, Programmability
- Kai Hwang (Tata McGraw-Hill, 2010)

Reference Book:

1. Parallel Processing: Principles and Practice
- E. V. Krishnamurthy (Addison-Wesley)

Course designers:

1. Mrs.N.Hemavathi

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	:M.Sc (Major elective)	Int. Marks: 25
Class	: I /II	Ext. Marks: 75
Semester	: II/III/IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1(F)	Hours/Week:4
Title of the Paper:	Computer Simulation and Modeling	Credits : 5

Course Outcomes:

On the successful completion of the course, students will be able to

1. Provide a detailed understanding of the system models and its various types of simulation procedures.

Unit – I: System Models:

Concepts of a System-system Environment-stochastic activities-continuous and discrete system-system modeling-types of models-static physical models –dynamic physical models-static mathematical models-principles used in modeling.

System Studies:

Subsystems-Corporate Model-environment segment-production segment-management segment-full corporate model-types of system study-system analysis-system design-system postulation.

Unit – II: System simulation:

Techniques of simulation-Monte Carlo Method-Comparison of simulation and analytical methods-experimental nature of simulation-types of system simulation-numerical computation technique for continuous models-numerical computation technique for discrete models-distributed log models-progress of simulation study.

Unit – III: Continuous system simulation:

Continuous System Models-Differential Equations-Analog Computers-Analog Methods-Hybrid Computers-Digital-Analog Simulators-Continuous System Simulation Languages-CSMP III-Hybrid simulation-Feedback Systems-Simulation of an Autopilot-Interactive Systems-Real-Time Simulation.

Unit – IV:

System Dynamics:

Historical Background-Exponential Growth Models-Exponential Decay Models-Modified Exponential Growth Models-Logistic Curves-Generalization of Growth Models-

System Dynamics Diagrams-Simple System Dynamics Diagrams-Multi-segment Models-Representation of Time Delays-Feedback in Socio-Economic Systems-Biological Example-World Models-Dynamo language.

Unit – V:

Discrete system simulation:

Discrete events-representation of time- Generation of Arrival patterns- simulation of a telephone system- delayed calls-simulation programming tasks- gathering statistics-counters and summary statistics-measuring utilization and occupancy- recording distributions and transit times-discrete simulation languages.

Text Book:

1. System Simulation-GEOFFREY GORDON, PHI, Second Edition,2001.

References:

1. Bernard Zeigler, Herbert Praehofer, Tag Gon Kim, .Theory of Modeling and Simulation., Academic Press
- 2.. Narsing Deo, .System Simulation with Digital Computer., PHI
3. Donald W. Body, .System Analysis and Modeling., Academic Press Harcourt India

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Course	:M.Sc (Major elective)	Int. Marks: 25
Class	:I /II	Ext. Marks: 75
Semester	: II/III/IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1(G)	Hours/Week:4
Title of the Paper:	Distributed Systems	Credits : 5

Course Outcomes:

On the successful completion of the course, students will be able to

1. Provides knowledge of Distributed Systems principles, communications, processes and security.
2. Deal with distributed object-based system, file system and document-based systems.

Unit – I:

Introduction

Definition of a Distributed System – Goals – Types of Distributed Systems.

Architectures: System Architectures-Architectures Vs MiddleWare- Self Management in distributed Systems.

Unit – II:

Processes

Threads – Clients – Servers – Code Migration.

Communication

Fundamentals– Remote Procedure Call – Message-Oriented Communication- Stream Oriented Communication.

Unit – III: **Naming** Names, Identifiers, And Address - Flat Naming –Structured Naming- Attribute Based Naming

Consistency and Replication

Introduction – Data-Centric Consistency Models – Client-Centric Consistency Models – Consistency Protocols.

Unit – IV:

Fault tolerance

Introduction to fault Tolerance – Process Resilience – Reliable Client-Server Communication – Reliable Group Communication – Distributed Commit – Recovery.

Security

Introduction to Security – Secure Channels – Access Control – Security Management.

Unit – V:

Distributed Object Based Systems (CORBA)

Architecture–Processes-Communication-Naming-Synchronization-Consistency and Replication-Fault Tolerance – Security.

Distributed Web-Based Systems (WWW)

Architecture–Processes-Communication-Naming-Synchronization-Consistency and Replication-Fault Tolerance – Security.

Text Book:

1. Distributed Systems Principles and Paradigms
- Andrew S. Tanenbaum, Maarten Van Steen (PEARSON)2013.

Reference Book:

1. Distributed Systems: Concept and Design
- George F. Coulouris, Jean Dollimore, Tim Kindberg (Addison Wesley)

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Course	:M.Sc (Major elective)	Int. Marks: 25
Class	:I /II	Ext. Marks: 75
Semester	: II/III /IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1(H)	Hours/Week:4
Title of the Paper: Real Time and Embedded Systems		Credits : 5

Course Outcomes:

On the successful completion of the course, students will be able to

1.Understand RTOS and Embedded Software Development Processes and Tools

Unit -I :

INTRODUCTION: Introduction to Embedded systems – Processor and memory organization

Unit- II :

Devices and Networks: Devices and buses for Device Networks – Device drivers and Interrupt servicing mechanism.

Unit-III :

Embedding and Modeling Concepts: Programming Concepts and Embedded Programming in C,C++ and java -
Program Modeling Concepts.

Unit-IV:

RTOS: Real-Time Operating Systems –Real time Operating System Programming-I: Microc/OS-II and VxWorks

Unit V

Embedded Software Development Process and Tools: Introduction to Embedded software development process and Tools –Host and Target Machines-Linking and Locating Software-Getting Embedded Software into the Target System-Issues in Hardware-software Design and Co-design.

Text Book(s)

1. Raj Kamal, 'Embedded Systems Architecture, Programming and Design', Tata Mc-Graw-Hill.2008.

References

1. R.J.A.Buhr, D.L.Bailey, "An Introduction to Real Time Systems: Design to networking with C/C++", Prentice- Hall, International, 1999.
2. Grehan Moore and Cyliax, "Real Time Programming: A guide to 32 Bit Embedded Development Reading: Addison- Wisley-Longman", 1998.

Course designers:

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Course	:M.Sc (Major elective)	Int. Marks: 25
Class	:I /II	Ext. Marks: 75
Semester	: II/III/IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1(I)	Hours/Week:4
Title of the Paper:	Soft Computing	Credits : 5

Course Outcomes:

On the successful completion of the course, students will be able to

1.Understand the knowledge of Soft Computing on Genetic Algorithms, Neural Networks and Fuzzy Logic along with its models.

UNIT I : INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT II : GENETIC ALGORITHMS

Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.

UNIT III: NEURAL NETWORKS

Machine Learning Using Neural Network, Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance architectures – Advances in Neural networks.

UNIT IV : FUZZY LOGIC

Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions- Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making.

UNIT V : NEURO-FUZZY MODELING

Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rulebase Structure Identification – Neuro-Fuzzy Control – Case studies.

TEXT BOOKS:

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India. 1996.
2. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
3. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn, 2003.

REFERENCES:

1. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall, 1998.
2. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 1997.
3. S. N. Sivanandam, S. Sumathi and S. N. Deepa, "Introduction to Fuzzy Logic using MATLAB", Springer, 2007.
4. S.N.Sivanandam · S.N.Deepa, " Introduction to Genetic Algorithms", Springer, 2007.
5. Jacek M. Zurada, "Introduction to Artificial Neural Systems", PWS Publishers, 1992.

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Course	:M.Sc (Major elective)	Int. Marks: 25
Class	:I /II	Ext. Marks: 75
Semester	: II/III/IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1(J)	Hours/Week:4
Title of the Paper:	Mobile Computing	Credits : 5

Course Outcomes:

On the successful completion of the course, students will be able to

1. Understand Recent Trend in Mobile Computing.
2. Adopt with WAP and Packet Radio Services.

Unit I:

Introduction – Mobility of Bits and Bytes -Wireless The beginning – Mobile computing –Dialogue Control – Networks – Middleware and Gateways – Applications and Services – Developing Mobile Computing Applications – Security in Mobile Computing

Mobile computing Architecture: History of computers – History of Internet – Internet - The Ubiquitous Network – Architecture for Mobile computing – Three-tier Architecture – Design consideration for mobile

Unit II:

Mobile Computing through Telephony – Evolution of Telephony – Multiple Access Procedures – mobile computing through telephone – Developing an IVR Application – voice XML – Telephony Application Programming Interface.

Emerging Technologies: Introduction – Bluetooth – radio Frequency Identification - wireless broadband – mobile IP – Internet Protocol version 6 – Java card.

Unit III:

Global System for Mobile communication – Global System for Mobile communication – GSM Architecture – GSM entities – call routing in GSM – PLMN Interfaces – GSM address and Identifiers – Network aspects in GSM

General Packet Radio Service: Introduction – GPRS and packet Data Network – GPRS Network Architecture – GPRS Network operations – Data Services in GPRS – Application for GPRS – Limitations of GPRS

Unit IV:

Wireless Application Protocol – Introduction – WAP – MMS – GRPS applications.
CDMA and 3G:Introduction – Spread spectrum technology – IS95 – CDMA versus GSM –
Wireless Data – Third Generation Networks – Application on 3 G

Unit V:

Wireless LAN: Introduction – wireless LAN advantages – IEEE 802.11 standards –
wireless LAN architecture – mobility in wireless - wireless LAN Security – WiFi versus 3G
Internet networks and Internetworking :Introduction – fundamentals of call processing –
Intelligence in the networks – soft switch – programmable networks – technologies and
Interfaces for IN 360.

Text Book:

1. Mobile computing, Technology applications and Service creation,
Asoke K Talukder Roopa R Yavagal, TMH publishing company New Delhi, 2005.

Reference Books:

1. Mobile computing-Tomasz imielinski, Henry F.Korthkluwer Academic Publishers.
2. Mobile Computing-CSR Prabhu, Universities Press,2002.

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Course	:M.Sc (Major elective)	Int. Marks: 25
Class	:I /II	Ext. Marks: 75
Semester	: II/III/IV	Max. Marks: 100
Sub. Code	:S2PSE1/S3PSE1/S4PSE1	Hours/Week:4
Title of the Paper:	Pervasive Computing	Credits : 5

Course Outcomes:

On the successful completion of the course, students will be able to

1. Understand Recent Trend in Pervasive Computing.
2. Enable with various device technology and connectivity ,WAP services and PDA Services for pervasive applications

Unit- I: Pervasive Computing: Past, Present and Future Pervasive Computing-Pervasive Computing Market-m-Business-Application examples: Retail, Airline check-in and booking-Sales force automation-Health care-Tracking-Car information system-E-mail access via WAP

Unit –II:Device Technology: Hardware-Human Machine Interfaces-Biometrics-Operating Systems-Java for Pervasive devices

Unit-III: Device Connectivity: Protocols-Security-Device Management Web Application Concepts: WWW architecture-Protocols-Transcoding-Client authentication via internet

Unit- IV :WAP and Beyond: Components of the WAP architecture-WAP infrastructure-WAP security issues-WML-WAP push-Products-i-Mode-Voice Technology: Basics of Speech recognition- Voice Standards-Speech applications-Speech and Pervasive Computing

Unit –V: PDA: Device Categories-PDA operation Systems-Device Characteristics-Software Components-Standards-Mobile Applications-PDA Browsers Pervasive Web Application architecture: Background-Scalability and availability-Development of Pervasive Computing web applications-Pervasive application architecture

Text Book(s)

1. Pervasive Computing, Technology and Architecture of Mobile Internet Applications, Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaech & Klaus Rindtorff, Pearson Education.

References Books:

1. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, McGraw Hill edition.

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Course	:M.Sc (Major elective)	Int. Marks: 25
Class	:I /II	Ext. Marks: 75
Semester	: II/III/IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1(L)	Hours/Week:4
Title of the Paper: Compiler Design		Credits : 5

Course Outcomes:

On the successful completion of the course, students will be able to

1. Understand a detailed understanding of data structures, the significance of sorting, searching techniques and how the files are maintained during compilation.

Unit I : Introduction

Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens

Unit II: Basic Data Structures

Role of the parser, Writing Grammars – Context – Free Grammars – Top Down parsing – Recursive Descent parsing – Predictive parsing – bottom –up parsing – shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser

Unit III: Advanced Data Structures

Intermediate Languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – procedure calls .

Unit IV: Sorting & Searching Techniques

Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next use Information – A simple Code generator – DAG representation of Basic Blocks – Peephole optimization

Unit V: Files

Introduction – Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing

Text Book:

1. Alfred Aho, Ravi Sethi, Jeffrey D.Ullman, “Compilers – Principles, Techniques and Tools”, Pearson Education Asia.

Reference Books:

1. Henk Alblas and Albert Nymeyer, “Practice and Principles of Compiler Building with C”, PHI.

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Course	:M.Sc (Major elective)	Int. Marks: 25
Class	:I /II	Ext. Marks: 75
Semester	: II /III/IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1(M)	Hours/Week:4
Title of the Paper:	Bluetooth Technology	Credits : 5

Course Outcomes:

On the successful completion of the course, students will be able

1. Understand an overview of Bluetooth Technology, the various profiles and the security mechanisms.

Unit – I: Introduction

Origin of Bluetooth – Advantage – Bluetooth Technology – PAN – Topology – Security – Applications – Java and Bluetooth – Jini and Bluetooth.

Basic Concepts

Serial Vs Parallel Transmission – Asynchronous Vs Synchronous – Spread Spectrum – Circuit and Packet Switching – TDD – Physical Links – Bluetooth Packets.

Unit – II: Bluetooth Protocol Architecture

Bluetooth Protocol Stack – Core Protocols – Cable Replacement Protocols– Adopted Protocols – Usage Models and Profiles.

Bluetooth General Profile

Generic Access Profile – Serial Port Profile – Service Discovery Application Profile – GOEP.

Unit – III: Bluetooth Profiles for Usage Model

Cordless Telephony Profile – Dialup Networking Profile – Fax Profile – LAN Access Profile – File Transfer Profile – Object Push Profile – Synchronization Profile.

Unit – IV: Bluetooth Security

Security Modes – Link Level Security – Flexible Access – Implementation – Architecture Overview – Security Level of Services – Connection Setup – Connectionless L2CAP – Interface to Other Multiplexing Protocols – Interface to ESCE – Interface to HCI / LINK Manager.

Unit – V: Bluetooth in the Global Scheme of 3G Wireless

The IMT-2000 Vision – Spanning the Generations – Current 2G Networks-Global 3G Initiative – Role of Bluetooth.

Text Book:

1. Bluetooth Demystified
- Nathan J. Muller (Tata McGraw-Hill.

Reference Book:

Getting Started With Bluetooth

- Madhushree Ganguli (Thomson Course Technology)

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Course	:M.Sc (Major elective)	Int. Marks: 25
Class	:I /II	Ext. Marks: 75
Semester	: II/III/IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1(N)	Hours/Week:4
Title of the Paper:	WIRELESS SENSOR NETWORKS	Credits : 5

Course Outcomes:

On Successful completion of the course the students to

1. Understand wireless sensor networks and their capabilities.
2. Enable providing wireless connectivity back to the wired world and distributed nodes.

UNIT I - OVERVIEW OF WIRELESS SENSOR NETWORKS: Challenges for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks.

UNIT II - ARCHITECTURES: Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes , Operating Systems and Execution Environments, Network Architecture - Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway Concepts.

UNIT III- NETWORKING SENSORS: Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC , The Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols- Energy-Efficient Routing, Geographic Routing.

UNIT IV - INFRASTRUCTURE ESTABLISHMENT: Topology Control, Clustering, Time synchronization, Localization and Positioning, Sensor Tasking and Control.

UNIT V -SENSOR NETWORK PLATFORMS AND TOOLS: Sensor Node Hardware – Berkeley Motes, Programming Challenges, Nodelevel software platforms, Node-level Simulators, State-centric programming.

TEXT BOOKS

1. Holger Karl & Andreas Willig, “Protocols And Architectures for Wireless Sensor Networks” , John Wiley.
2. Feng Zhao & Leonidas J. Guibas, “Wireless Sensor Networks- An Information Processing Approach”, Elsevier.

REFERENCES

1. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor Networks-Technology, Protocols, And Applications”, John Wiley.
2. Anna Hac, “Wireless Sensor Network Designs”, John Wiley.

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Course	: -M.Sc (Major elective)	Int. Marks: 25
Class	: I /II	Ext. Marks: 75
Semester	: II /III/IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1(O)	Hours/Week:4
Title of the Paper: Virtual Reality		Credits : 5

Course Outcomes: On Successful completion of the course the students to

1. Understand virtual reality in detail.
2. Enable familiarity with computer graphics, 3D Computer graphics, and simulation.

Unit – I Virtual Reality and Virtual Environments: Introduction – Computer Graphics – Real-time computer Graphics – Flight Simulation – Virtual Environment – Benefits of Virtual Reality – Historical Development of VR: Scientific Landmarks.

Unit - II 3D Computer Graphics: Virtual world Space – Positioning the Virtual Observer – The Perspective Projection – Human Vision – Stereo Perspective Projection – 3D Clipping – Color Theory – Simple 3D Modeling – illumination, reflection Models- Shading Algorithms – Radiosity – Hidden surface removal – realism- stereographic Images Geometric Modeling: 3D Space Curves – 3D boundary representation – other modeling strategies – Geometrical Transformations: Frames of reference – Modeling – Instances – Picking, Flying, scaling – Collision detection.

Unit - III Generic VR System: Virtual Environment – computer Environment – VR technology – Models of Interaction – VR Systems – Animating the Virtual Environment: The Dynamics of numbers – animation of objects – Shape and object i n between – Free-form deformation – Particle Systems

Unit - IV Physical Simulation: Objects Falling in a gravitational field – Rotating wheels – Elastic Collisions – Projectiles – Simple Pendulums – Springs – Flight dynamics of an aircraft. Human Factors: The eye – the ear – The Somatic senses – Equilibrium.

Unit - V VR Hardware: Sensor Hardware – Head-Coupled displays – Acoustic Hardware – Integrated VR Systems – VR Software: Modeling Virtual World – Physical Simulation – VR Tool Kits – VR Applications: Engineering – Entertainment – Science – training – The Future: Virtual Environments – Modes of Interaction.

Text Books:

1. John Vince - Virtual Reality Systems, Pearson Education Asia, 2001

Reference:

1. Tony Parisi - Learning Virtual Reality: Developing Immersive Experiences and Applications for Desktop, Web, and Mobile - 2015.
2. Howard Rheingold -Virtual Reality

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Course	: -M.Sc (Major elective)	Int. Marks: 25
Class	: I/II	Ext. Marks: 75
Semester	: II/III/IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1(P)	Hours/Week:4
Title of the Paper:	Big Data Analytics	Credits : 5

Course Outcomes:

On Successful completion of the course the students to

1. Process of collecting, organizing and analyzing large sets of data
2. Discover patterns and other useful information.

UNIT I -INTRODUCTION TO BIG DATA: Introduction to BigData Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

UNIT II -MINING DATA STREAMS Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

UNIT III- HADOOP History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFSJava interfaces to HDFS- Basics-Developing a Map Reduce Application- How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling- Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce Features

UNIT IV -HADOOP ENVIRONMENT Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance-Hadoop benchmarks- Hadoop in the cloud

UNIT V- FRAMEWORKS Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper - IBM InfoSphere BigInsights and Streams. Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications

Text Books:

1. Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer.
2. Tom White “ Hadoop: The Definitive Guide” Third Edition, O’reilly Media, 2012.

Reference Books:

1. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, McGrawHill Publishing, 2012
2. Anand Rajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.
3. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons, 2012.
4. Glenn J. Myatt, “Making Sense of Data”, John Wiley & Sons, 2007
5. Pete Warden, “Big Data Glossary”, O’Reilly, 2011.
6. Principles of Big Data – Jules J Berman – Morgan Kaufmann-2013
7. Big Data Analytics for beginners – Faraz Rabbani, Ali Roghani – Create space Independent Publishing Platform – 2014

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Class	:I /II	Ext. Marks: 75
Semester	: II/III/IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1(Q)	Hours/Week:4
Title of the Paper: Internet of Things		Credits :5

Course Outcomes:

On Successful completion of the course the students to

1. Understand the communication technologies in IoT
2. Know the IoT protocols and web of things
3. Know the various applications of IoT

Unit - I

Introduction : Internet Layers - Protocols - Packets - Services - Performance parameters - Peerto-peer networks - Sensor networks - Multimedia - IOT Definitions and Functional Requirements –Motivation – Architecture - Web 3.0 View of IoT– Ubiquitous IoT Applications – Four Pillars of IoT – DNA of IoT - The Toolkit Approach for End-user Participation in the Internet of Things. Middleware for IoT: Overview – Communication middleware for IoT –IoT Information Security.

Unit - II

IoT protocols : Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – point-to-point protocols - Ethernet protocols - cellular Internet access protocol - Machine-to-machine protocol - Modbus – KNX – Zigbee Architecture – Network layer – APS layer – Security.

Unit - III

Web of Things: Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence. Cloud of Things: Grid/SOA and Cloud Computing – Cloud Middleware – Cloud Standards – Cloud Providers and Systems – Mobile Cloud Computing – The Cloud of Things Architecture.

Unit - IV

Integrating IOT: Integrated Billing Solutions in the Internet of Things Business Models for the Internet of Things - Network Dynamics: Population Models – Information Cascades - Network Effects - Network Dynamics: Structural Models - Cascading Behavior in Networks - The SmallWorld Phenomenon.

Unit – V

Applications: The Role of the Internet of Things for Increased Autonomy and Agility in Collaborative Production Environments - Resource Management in the Internet of Things: Clustering, Synchronisation and Software Agents. Applications - Smart Grid – Electrical Vehicle Charging - Case studies: Sensor body-area-network and Control of a smart home.

Text Books:

1. The Internet of Things in the Cloud:A Middleware Perspective-Honbo Zhou–CRC Press 2012.
2. Architecting the Internet of Things - Dieter Uckelmann; Mark Harrison; Florian Michahelles- (Eds.) – Springer – 2011

Reference Books:

1. Networks, Crowds, and Markets: Reasoning About a Highly Connected World - David Easley and Jon Kleinberg, Cambridge University Press.
2. The Internet of Things: Applications to the Smart Grid and Building Automation by - Olivier Hersent, Omar Elloumi and David Boswarthick - Wiley -2012
3. Olivier Hersent, David Boswarthick, Omar Elloumi , “The Internet of Things – Key applications and Protocols”, Wiley, 2012.

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DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: -M.Sc (Major elective)	Int. Marks: 25
Class	: I /II	Ext. Marks: 75
Semester	: II /III/IV	Max. Marks: 100
Sub. Code	: S2PSE1/S3PSE1/S4PSE1 (R)	Hours/Week:4
Title of the Paper: Green Computing		Credits :5

Course Outcomes:

On the successful completion of the course, students will be able to

1. Provide graduate students with an understanding of the role of ICTs and impact on the global carbon footprint.
2. estimate the carbon footprint of the ICT operations of an organization and access ways to reduce the carbon footprint by changes to policies for procurement of ICT, changes.
3. Make ICT operations and revising business processes.

UNIT I Fundamentals of Green IT : Business, IT, and the Environment – Green computing: carbon foot print, scoop on power – Green IT Strategies: Drivers, Dimensions, and Goals – Environmentally Responsible Business: Policies, Practices, and Metrics - Approaches to green computing - Middleware Support - Compiler Optimization - Product longevity - Software induced energy consumption - its measurement and rating.

UNIT II Green Assets and Modeling : Green Assets: Buildings, Data Centers, Networks, and Devices – Green Business Process Management: Modeling, Optimization, and Collaboration – Green Enterprise Architecture – Environmental Intelligence – Green Supply Chains – Green Information Systems: Design and Development Models.

UNIT III Grid Framework : Virtualizing of IT systems – Role of electric utilities, Telecommuting, teleconferencing and teleporting – Materials recycling – Best ways for Green PC – Green Data center – Green Grid framework.

UNIT IV Green Compliance and Green Mobile : Socio-cultural aspects of Green IT – Green Enterprise Transformation Roadmap – Green Compliance: Protocols, Standards, and Audits – Emergent Carbon Issues: Technologies and Future - Green mobile - optimizing for minimizing battery consumption - Web, Temporal and Spatial Data Mining Materials recycling.

UNIT V Case Studies : The Environmentally Responsible Business Strategies (ERBS) – Case Study Scenarios for Trial Runs – Case Studies – Applying Green IT Strategies and Applications to a Home, Hospital, Packaging Industry and Telecom Sector.

Text Books:

1. Bhuvan Unhelkar, “Green IT Strategies and Applications-Using Environmental Intelligence”, CRC Press, June 2011.

2. Woody Leonhard, Katherrine Murray, “Green Home computing for dummies”, August 2009. **REFERENCES:**

1. Alin Gales, Michael Schaefer, Mike Ebbers, “Green Data Center: steps for the Journey”, Shoff/IBM rebook

2. John Lamb, “The Greening of IT”, Pearson Education.

3. Green Computing and Green IT Best Practices on Regulations and Industry Initiatives, Virtualization, Power Management, Materials Recycling and Telecommuting by Jason Harris, Emereo Publishing

4. Jason Harris, “Green Computing and Green IT- Best Practices on regulations & industry”, Lulu.com.

5. Wu Chun Feng (editor), “Green computing: Large Scale energy efficiency”, CRC Press.

Course designers:

1. Mrs.N.Hemavathi

M.Phil Computer Science

THIAGARAJAR COLLEGE, MADURAI – 9.**(Re-Accredited with ‘A’ Grade by NAAC)****DEPARTMENT OF COMPUTER SCIENCE****(For those who join in 2017 and after)****M.Phil. Programme in COMPUTER SCIENCE (SF)****Course Structure:**

Semester	Subject Code	Course	Subject title	Hrs/Week	Credit	Total number of hours Allotted/semester	Max Mark -CA	Max Mark-SE	Total
I	S1MS1	Core	Research Methodology	6	6	90	100	100	200
	S1MS2	Core	Information Security	6	6	90	100	100	200
	S1MS E1	Core-Elective	Elective	6	6	Nil*	100	100	200
II	S2MS1	Core	Dissertation And Viva-Voce		6		100	100	200

List of Elective Papers

1. Artificial neural networks
2. Digital image processing
3. Data mining
4. Mobile Computing
5. Advanced Networking.
6. Soft Computing.
7. Grid and Cloud Computing
8. Bioinspired Computing
9. Cryptography and Network Security
10. Advanced Technologies in Computer Science

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: Core	Int. Marks	: 100
Class	: M.Phil (CS)	Ext. Marks	: 100
Semester	: I	Max. Marks	: 200
Sub. Code	: S1MS1	Hours/Week	:6
Title of the Paper:	Research Methodology	Credits	:6

Course Outcomes:

On the successful completion of the course, the students are exposed to the principles, procedures and techniques of implementing a research project

1. To provide the basic skills required for carrying out the research in the field of computer science and applicable domains.
2. To acquire knowledge on research fields and thesis writing and to explore the data on design and analysis.
3. To select appropriate tools for their specific research domain.

Unit I:

Research Methods: Meaning of Research- Objectives of Research- Motivation in Research- Types of Research- Research Approaches- Significance of Research-research methods versus Methodology Research and Scientific Method- Importance of Knowing How Research is done- Research Process –Criteria of good Research –Problem Encountered by Researchers in India- What is Research Problem? Selecting the Problem- Necessity of Defining the Problem- Technique involved in Defining the Problem- Meaning of Research Design- Need for Research Design- Features of a Good Design- Important Concepts Relating to Research Design- Different research design- Basic principles of Experimental Designs- Significance of Report Writing- Different Steps in writing Report- Layout of the Research Report- Types of Reports- Computer Role in Research - Computer Technologies and Applications - Computers and Researchers.

Unit II:

Discrete Mathematics: Mathematical Logic Introduction - Normal Forms - Theory of Inference for the Statement Calculus - Predicate Calculus - Inference Theory of the Predicate Calculus –Functions –Algebraic Systems.**Probability and Statistical Analysis:** Probability – Fail time data analysis – Hazard models – Conditional probability – Bayes rule – System reliability

Unit III:

Soft Computing: Fundamentals of ANN - The Biological Neural Network, Artificial Neural Networks - Building Blocks of ANN and ANN terminologies: architecture, setting of weights, activation functions - McCulloch-pitts Neuron Model, Hebbian Learning rule, Perception learning rule, Delta learning rule.

Unit IV:

Algorithms and Analysis: Elementary data Structures, Greedy method: Knapsack problem-job sequencing with deadlines Optimal merge patterns, Dynamic Programming: Multistage graphs-Optimal binary search trees- 0/1 knapsack- Reliability design- The traveling salesperson problem- Flow shop scheduling, Basics search and traversal techniques: The techniques Code Optimization- Biconnected components and depth- first search. Backtracking: The 8 – Queen s problem- Sum of subsets – Hamiltonian cycles-Knapsack Problem.

Unit V:

Tools:SPSS: A first look at SPSS 160 - Tables and Graphs for One Variable - Tables and Graphs for Two Variables - One Variable Descriptive Statistics- Two Variable Descriptive Statistics- Analysis of Variance II - Linear Regression I - Linear Regression II - Multiple Regression – One Sample Hypothesis Tests – Two Sample Hypothesis Tests. MATLAB: Introduction to MATLAB programming – Selection statements – loop statements – vectorized code String Manipulation – File Input and output – Advance functions – Advance plotting functions – Matrix representations – Basis statistics ,sets, sorting and indexing,-Advance mathematics. LATEX :The Basics -The Document – Bibliography - Bibliographic Databases - Table of contents, Index and Glossary - Displayed Text - Rows and Columns - Typesetting Mathematics - Typesetting - Theorems - Several Kinds of Boxes – Floats - Cross References in LATEX - Footnotes, Margin pars, and Endnotes.

Text Books

1. C.R.Kothari,2013,2ndEdnResearch Methodology Methods and Techniques, New Age International Publishers, New Delhi,
2. J.P.Trembley, R.Manohar, 2004,24thReprint,Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw-Hill Edition.
3. R. S. Trivedi, 2002 “Probability and Statistics with Reliability Queuing and Computer Science Applications”, John Wiley & Sons, Inc, India.
4. S. N. Sivanandam, S.N. Deepa, 2008, “Principles of Soft Computing”, Wiley-India.
5. Ellis Harowitz, SartajSahini,1993, “Compute Algorithms”, Galgotia Publications (P) Ltd.
6. Stormy Attaway, 2011, 2ndEdn,Matlab : A Practical Introduction to Programming and Problem Solving||, Butterworth-Heinemann;
7. Robert H. Carver, Jane Gradwohl Nash, 2009, 4 th Edition, Doing Data Analysis with SPSS Version 16, Cengage Learning.
8. Leslie Lamport-, 2007,2ndEdn“Latex: A Document Preparation System”, Pearson education.

Reference Books

1. Robert V.Hogg, Allen T. Craig, 2013Introduction to Mathematical Statistics, Pearson Publishing.
2. S. N. Sivanandam, S. Sumathi, S.N. Deepa,2006, “Introduction to Neural Networks using MATLAB 6.0 “, Tata McGraw-Hill, New Delhi.
3. Alfre V. Aho, John E. Hpcroft, Jeffrey D. Ullman,1987" Data structures and Algorithms”, Addison- Wesley Publishing Company.
4. SPSS, 2007,SPSS Student Version 15.0: For Microsoft Windows XP or 2000, Inc. Prentice Hall.
5. RudraPratap, 2009, Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers||, Oxford University Press, USA.

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: Core	Int. Marks	: 100
Class	: M.Phil (CS)	Ext. Marks	: 100
Semester	: I	Max. Marks	: 200
Sub. Code	: S1MS2	Hours/Week	: 6
Title of the Paper:	Information Security	Credits	: 6

Course Outcomes:

To impart the knowledge on some of the advanced topics in Information Security such as Conventional Encryption, Network Security Practice, System Security and Web Security, Wireless Network Security and Cyber Crimes.

1. To understand the basic techniques of Information Security.
2. To introduce certain areas of applications of the same and to introduce research issues.
3. Understand techniques and apply for real time problems.

UNIT – I

Conventional Encryption : Classical Technique – Modern technique – Algorithms;
Public Key Cryptography : Public Key Cryptography – Introduction to Number Theory –
Message Authentication and Hash Function – HASH and MAC Algorithm – Digital
Signature and Authentication protocol.

UNIT - II

Network Security Practice: Authentication Application – Electronic Mail Security –
IP Security Program Security and System Security: Secure programs – Nonmalicious
program errors – viruses and Worms – Memory and address protection – control access to
general objects – File protection mechanism – user authentication – Trusted operating system
design and assurance – Intrusion Detection system.

UNIT - III

System Security and Web Security: Intruders,– Firewall - Managing Access –
Password management - Web Security requirements – SSL and TLS – SET; Client Side
Security : Using SSL – Active Content – Web Privacy. Database Security: The Database as a
Networked Server – Securing database-to-database communication – Reliability and Integrity
of database – sensitive data – inference – multilevel databases

UNIT - IV

Wireless Network Security: Mobile Security – Encryption Schemes in WLANs – Basic approach to WLAN security and Policy Development – WLAN intrusion process – WLAN security solutions. Digital Watermarking and Steganography: Models of Watermarking – Basic Message Coding – Watermark Security – Content Authentication – Steganography.

UNIT - V

Cyber Crimes: Introduction – computer crime and cyber crimes; Classification of cyber crimes, Cyber crime and Related Concepts: Distinction between cyber crime and conventional crimes, Reasons for commission of cyber crime, Cyber forensic : Cyber criminals and their objectives, Kinds of cyber crimes – cyber stalking; cyber pornography; forgery and fraud; crime related to IPRs; Cyber terrorism; computer vandalism, Regulation of cyber crimes: Issues relating to investigation, Issues relating to Jurisdiction, Issues relating to Evidence , Relevant provisions under Information Technology Act, 2000, Indian Penal Code, Pornography Act and Evidence Act etc.

Text Books:

1. Charles P. Pfleeger, Shari Lawrence Pfleeger, 2007, “Security in Computing”, Prentice Hall of India.
2. William Stallings, 5th Edn, “Cryptography and Network Security”, Pearson.
3. John W. Rittinghouse, James F. Ransome, 2004, “Wireless Operational Security”, Elsevier.

Reference Books:

1. Ron Ben Natan, 2005 “Implementing Database Security and Auditing”, Elsevier.
2. Lincoln D. Stein, , 1999, “Web Security”, Addison Wesley.
3. Ingemar J. Cox, Matthew L. Miller Jeffrey A. Bloom, Jessica Fridrich, Ton Kalker, 2nd Edn “Digital Watermarking and Steganography”, Elsevier.
4. Dr. R. K. Tiwari, P. K. Sastri, K. V. Ravikumar, 2002, 1st Edn, “ Computer Crime and Computer Forensics”

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
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Course	: Elective	Int.Marks	: 100
Class	: M.Phil (CS)	Ext. Marks	: 100
Semester	: II	Max. Marks	: 200
Sub. Code	: S1MSE1 (A)	Hours/Week	:6
Title of the Paper:	Digital Image Processing	Credits	:6

Course Outcomes:

On the successful completion of the course, students will be able to understand the concepts Digital Image Processing.

1. To understand the representation of digital images and apply the techniques in real time systems and applications
2. Analyze and implement Image processing algorithms
3. Hands on and analysis of software tools for image processing

UNIT I

Introduction: The origins of Image Processing –Fundamental steps in IP –components of Image Processing System. Digital Image Fundamentals: Elements of Visual Perception – Light and the Electromagnetic Spectrum Image Sensing and Acquisition –Image Sampling and Quantization –Basic Relationship Between Pixels –Linear and Nonlinear operations.

UNIT II

Image Enhancement in the Spatial Domain:Basic Gray Level Transformations – HistogramProcessing –EnhancementUsingArithmetic/Logic Spatial Filters –Combining Spatial enhancement Methods.ImageEnhancement in the Frequency Domain: Fourier Transform and the frequency Domain –Smoothing Frequency –domain Filters – Sharpening Frequency Domain filters –SharpeningFrequency Domain Filters – Homomorphic Filtering –Implementation.

UNIT III

Image Restoration:Model of the Image Degradation/Restoration Process –Noise Models –Restoration in the Presence of Noise Only –Spatial filtering –Periodic Noise Reduction by Frequency Domain Filtering –Linear, Position-Invariant Degradations –estimating the Degradations –Estimating the Degradation Function –Inverse Filtering –Minimum Mean square Error Filtering –Constrained Least Squares Filtering –Geometric mean Filter –

Geometric Transformations. Color Image Processing –Color models –Color Transformations –Smoothing and Sharpening –Color segmentation –Noise in Color Images –Compression.

UNIT IV

Wavelets and Multi-resolution Processing:Background –Multi-resolution Expansions – Wavelet Transforms in One Dimension –The Fast Wavelet Transform –Wavelet Transform in Two Dimensions –Wavelet Packets. Image Compression: Fundamentals – Image compression Models –Elements of Information Theory –Error-Free compression – Lossy compression –Image Compression Standards. Morphological Image Processing: Dilation and Erosion –The Hit-or-Miss Transformation –Algorithms –Extensions to Gray-Scale Images.

UNIT V

Image Segmentation: Detection of Discontinuities –Edge Linking and Boundary Detection –Thresholding –Region-Based Segmentation –Segmentation by Morphological Watersheds –The Use of Motion in Segmentation. Representation and Description: Representations –Boundary Descriptors –Regional Descriptors –Use of Principal components of Description –Relational Descriptors. Object Recognition: patterns and Pattern Classes –Recognition Based on Decision –Theoretic Methods –Structural Methods.

Text Books:

1. Anil K.Jain, , 2002, Fundamentals of Digital Image Processing, Pearson Education
2. RafaelC. Gonzalez and Richard E.woods, Digital Image Processing, Pearson Education, Third Edition, 2009.

Reference Books:

1. S. Nagabhushana, 2005, Computer Vision and Image Processing, New Age International Publishing.
2. B.Chanda and D.DuttaMajdumder, 2006 Digital Image Processing and Analysis Prentice-Hall of India.
3. Earl Gose, Richard Johnsonbaugh, Steve Jost, 1996, Pattern Recognition and Image Analysis, Prentice-Hall of India,
4. RafaelC.Gonzalez, StevenL.EddinsRichard, 2013, Digital Image Processing using MATLAB Woods, Tata McGraw-Hill Education.
5. Anil K.Jain, 2002, Fundamentals of Digital Image Processing, Pearson Education.

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
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Course	: Elective	Int. Marks	: 100
Class	: M.Phil (CS)	Ext. Marks	: 100
Semester	: II	Max. Marks	: 200
Sub. Code	: S1MSE1 (B)	Hours/Week	: 6
Title of the Paper:	Data Mining	Credits	: 6

Course Outcomes:

This course introduces the basic and advanced topics in data mining. Data mining is to analyze and understand data and discover new knowledge to take a better decision.

1. To understand the basic techniques of data mining
2. To introduce certain areas of applications of the same and to introduce research issues.
3. Understand basic data mining algorithms and techniques and apply for real time problems.

UNIT I

Introduction – Data Mining Functionalities – Classification of Data mining Systems – Major Issues- Data objects and Attributes – Data Preprocessing on Overview - Data Cleaning- Data Integration – Data Reduction – Data Transformation and Data Discretization - Data Warehouse and OLAP Technology for data mining.

UNIT II

Data Cube Technology – Data Cube Computation Methods - Mining Frequent Patterns –Associations and Correlations – Frequent Item set Mining Methods - Data Mining Primitives, languages, and system Architecture-concepts Description, Characterization and comparison

UNIT III

Mining Association Rules in Large Database-Classification and prediction – Decision Tree induction – Bayes Classification Methods – Rule-Based Classification – Model Evaluation and Selection – Techniques to improve Classification Accuracy – Bayesian Belief Networks – Classification by Backpropagation – Support Vector Machine – Other Classification Methods

UNIT IV

Cluster Analysis- Partitioning Methods – Hierarchical Methods – Density-Based Methods – Grid Based Methods – Evaluations of Clustering- Mining complex types of data – Other Methodologies of data mining – Data mining Applications – Data mining and Society – Data mining Trends

UNIT V

Outlier Detection – Outlier and Outlier Analysis – Outlier Detection Methods – Statistical Approaches – Proximity Based Approaches – Clustering Based Approaches – Classification Based Approaches – Mining Contextual and Collective Outliers – Outlier Detection in High Dimensional Data

Text Books:

1. Jiawei Han, Jian Pei, 2010, Data Mining: Concepts and Techniques, Micheline Kamber Elsevier Publishers.

Reference Books:

1. Michael Steinbach, Vipin Kumar, 2006, Introduction to Data Mining, Pang-Ning Tan Pearson Addison Wesley.
2. David Hand, Heikki Mannila, Padhraic Smyth, 2001, Principles of Data Mining (Adaptive Computation and Machine Tools), MIT press, USA.
3. Seidman Claude, 2010, Data Mining with Microsoft SQL Server TM 2000, Microsoft Press.

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: Elective	Int. Marks	: 100
Class	: M.Phil (CS)	Ext. Marks	: 100
Semester	: II	Max. Marks	: 200
Sub. Code	: S1MSE1 (C)	Hours/Week	: 6
Title of the Paper:	Mobile Computing	Credits	: 6

Course Outcomes:

This course introduces the basic and advanced topics in Mobile Computing. Mobile computing is to analyze and understand data and discover new knowledge to take a better decision.

1. To understand the basic techniques of Mobile Computing
2. To introduce certain areas of applications of the same and to introduce research issues.
3. Understand techniques and apply for real time problems.

UNIT I

Mobile computing: Components of wireless environment -Challenges in Mobile environment-Mobile devices -Middleware and gateways -Wireless Internet -Smart clients - Three-tier Architecture-Design considerations for mobile computing—Mobility and Location based services –Active transactions -Device Technology –Device Connectivity –Voice technology –Personal digital assistant.

UNIT II

Mobile computing through Internet -Mobile-enabled Applications -Developing mobile GUIs –VUIs and Mobile Applications –Multichannel and Multi modal user interfaces –Synchronization and replication of Mobile Data -SMS architecture -Java card –GPRS – Mobile Computing through Telephony -Synchronization protocol -Context-aware applications

UNIT III

Mobile Communication: Wireless Transmission –Medium Access Control – Telecommunication Systems –Satellite Systems –Broadcast system –Wireless AN –Mobile IP –Mobile TCP

UNIT IV

ADHOC Wireless Network: Ad Hoc Wireless Network –MAC protocol –Routing protocols -Transport Layer Protocol -QOS –Energy Management.

UNIT V

Wireless Sensor Network: Architecture and Design –Medium Access Control – Routing –Transport Layer –Energy model.

Textbooks:

1. William Stallings ,”Wireless Communications & Networks”, Pearson Education, 2005.
2. C.Siva Ram Murthy,B.S. Manoj, ”Ad Hoc Wireless Networks –Architectures and Protocols”, 2ndEdition, Pearson Education, 2006.
3. Ashok K Talukder, Roopa R Yavagal, “Mobile Computing”, TataMcGraw Hill, 2005.

Reference Books:

1. Jochen Burkhardt Dr.Horst Henn, Klaus Rintdoff,ThomasSchack, “Pervasive Computing”, Pearson, 2009.
2. FeiHu ,Xiaojun Cao, “ Wireless Sensor Networks Principles and Practice “ RC ress, 2010.

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: <u>Elective</u>	Int. Marks	: 100
Class	: M.Phil (CS)	Ext. Marks	: 100
Semester	: II	Max. Marks	: 200
Sub. Code	: S1MSE1 (D)	Hours/Week	: 6
Title of the Paper:	Advanced Networking	Credits	: 6

Course Outcomes:

This course introduces the basic and advanced topics in Advanced Networking. Advanced Networking is to analyze and understand data and discover new knowledge to take a better decision.

1. To understand the basic techniques of Advanced Networking.
2. To introduce certain areas of applications of the same and to introduce research issues.
3. Understand techniques and apply for real time problems.

UNIT - I

Interconnections: Digital Data Communication Techniques – Data Link control protocol – Multiplexing – Spread spectrum – Circuit switching and packet switching – routing in switched networks. Data Link Layer issues – Transparent and Source routing bridges – Network interface – generic connectionless service – network layer address – connectionless data packet formats – routing algorithm concepts – Fast packet forwarding.

UNIT - II

Framerelay – ATM – High- speed LANs - Congestion control in data networks and Internets – Link-level flow and error control – TCP traffic control – Integrated and differential services – protocols for QoS support.

UNIT - III

VPN - SDH and SONET networks – Operational aspects – evolution of the optical network – optical transport network – MPLS traffic engineering. Network Management: SNMP Basic Foundation – SNMPv2 – SNMPv3 –RMON.

UNIT - IV

Mobile Communication: Wireless Transmission – Medium Access Control – Telecommunication Systems – Broadcast Systems - Wireless LAN – Mobile IP. Adhoc Wireless Networks: Adhoc Wireless Networks – MAC Protocol – Routing Protocols – Multicast Routing - QOS – Wireless Sensor Networks – Energy Management.

UNIT - V

Network Security and System Security: Introduction to Network Security – Symmetric Encryption and Message Confidentiality – Public-key Cryptography and Message Authentication – Authentication Application – Electronic Mail Security – IP Security – Web Security – Network Management Security - Intruders – Malicious Software – Firewalls.

Text Books:

1. Jochen Schiller,2009,2ndEdn, Mobile Communication, PearsonEducation.
2. C.Siva Ram Murthy, B.S. Manoj,2005, “Adhoc Wireless Networks”, Pearson Education.
3. Radia Perlman,2000, “Interconnections”, Pearsons Education.

Reference Books:

1. William Stallings,2010, “High Speed Networks and Internets”, Pearson Education.
2. Jon C.Snader,2006” VPNs Illustrated Tunnels, VPNs and Ipsec”, Pearso Education.
3. Jean PjilippeVasseur, Mario Pickavet, Demeester, 2004 “Network Recovery”, Elsevier.
4. Mani Subramanian, 2006, “Network Management”, Pearson education.
5. William Stallings, 2007, “Data and Computer Communications”, Pearson education.

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	:_Elective	Int. Marks	: 100
Class	: M.Phil. (CS)	Ext. Marks	: 100
Semester	: II	Max. Marks	: 200
Sub. Code	: S1MSE1 (E)	Hours/Week	: 6
Title of the Paper:	Soft Computing	Credits	: 6

Course Outcomes:

To provide the basic skills required for carrying out the research in the field of Soft Computing.

1. To understand the basic techniques of Soft Computing
2. To introduce certain areas of applications of the same and to introduce research issues.
3. Understand techniques and apply for real time problems.

UNIT - I

Fundamentals of ANN: The Biological Neural Network, Artificial Neural Networks - Building Blocks of ANN and ANN terminologies: architecture, setting of weights, activation functions - McCulloch-pitts Neuron Model, Hebbian Learning rule, Perception learning rule, Delta learning rule.

UNIT - II

Models of ANN: Single layer perception, Architecture, Algorithm, application procedure - Feedback Networks: Hopfield Net and BAM - Feed Forward Networks: Back Propagation Network (BPN) and Radial Basis Function Network (RBFN) - Self Organizing Feature Maps: SOM and LVQ.

UNIT - III

Fuzzy Sets, properties and operations - Fuzzy relations, cardinality, operations and properties of fuzzy relations, fuzzy composition

UNIT - IV

Fuzzy variables - Types of membership functions - fuzzy rules: Takagi and Mamdani – fuzzy inference systems: fuzzification, inference, rulebase, defuzzification.

UNIT - V

Genetic Algorithm (GA): Biological terminology – elements of GA: encoding, types of selection, types of crossover, mutation, reinsertion – a simple genetic algorithm – Theoretical foundation: schema, fundamental theorem of GA, building block hypothesis.

Text Books:

1. S. N. Sivanandam, S. Sumathi, S.N. Deepa, 2006, “Introduction to Neural Networks using MATLAB 6.0 “, Tata McGraw-Hill, New Delhi.
2. S. N. Sivanandam, S.N. Deepa, 2008, “Principles of Soft Computing”, Wiley-India.

Reference Books:

1. D.E. Goldberg, ” Genetic algorithms, 2000, optimization and machine learning”, Addison Wesley.

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF COMPUTER SCIENCE
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Course	: Elective	Int. Marks	: 100
Class	: M.Phil (CS)	Ext. Marks	: 100
Semester	: II	Max. Marks	: 200
Sub. Code	: S1MSE1 (F)	Hours/Week	: 6
Title of the Paper:	Grid and Cloud Computing	Credits	: 6

Course Outcomes:

To provide the basic skills required for carrying out the research in the field of Grid and Cloud Computing

1. To understand the basic techniques of Grid and Cloud Computing
2. To introduce certain areas of applications of the same and to introduce research issues.
3. Understand techniques and apply for real time problems.

UNIT - I

Introduction to Grid Computing- Anatomy and Physiology of Grid – Early Grid Activities – Current Grid Activities– Grid Standards - Grid Business Areas – Grid Challenges and Applications- Grid Computing Organization and their roles.

UNIT - II

Service Oriented Architecture – Web Service Architecture – Grid Architecture – Implementing Grid Architecture- Globus Toolkit – Services - Open Grid Services Architecture - Grid Scheduling and Resource Management– Framework– Grid Resource Management Systems – Principles of Local Schedulers - Grid Scheduling with QoS – Data Management -Grid Security.

UNIT - III

Cloud Computing – Overview – Applications-Intranets and the Cloud – Companies in the Cloud Today- Cloud Computing Services- On Demand Computing – Discovering Cloud ServicesDevelopment Services and Tools.

UNIT - IV

Cloud hardware and infrastructure-clients-security-network-services-platforms-cloud storageCloud software architecture issues- Classification of Cloud Implementations.

UNIT - V

Operating System for the Cloud - Application Patterns and Architecture – Case Studies-
Cloud Computing services available under various platforms.

Text Books:

1. Joshy Joseph, Craig Fellenstein,2004, “Grid Computing”, IBM Press, Pearson Education.
2. Ian Foster, Carl Kesselman (eds.), 2004,”The Grid: Blueprint for a New Computing Infrastructure”, Morgan Kaufmann Publishers.
3. Ahmar Abbas, 2009, “Grid Computing: A Practical Guide to Technology and Applications, Firewall Media”,

Reference Books:

1. Anthony T.Velte, Toby J.Velte, Robert Elsenpeter,2010, “Cloud Computing –A Practical Approach”, Tata McGraw Hill Education Pvt. Ltd,
2. Michael Miller,2008,” Cloud Computing: Web based Applications that change the way you work and Collaborate online”, Que Publishing.
3. Haley Beard,2008, “Cloud Computing Best Practices for Managing and Measuring Processes for on demand computing, Applications and Data Centers in the Cloud with SLAs”, EmereoPvt. Ltd.
4. Prof (Dr.) Andreas Polze, “A Comparative Analysis of Cloud Computing Environments”. Cloud Economics.

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
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Course	: Elective	Int. Marks	: 100
Class	: M.Phil. (CS)	Ext. Marks	: 100
Semester	: II	Max. Marks	: 200
Sub. Code	: S1MSE1 (G)	Hours/Week	: 6 Hours/Week
Title of the Paper:	Bio inspired Computing	Credits	: 6

Course Outcomes:

To provide the basic skills required for carrying out the research in the field of Bio inspired Computing.

1. To understand the basic techniques of Bio inspired Computing
2. To introduce certain areas of applications of the same and to introduce research issues.
3. Understand techniques and apply for real time problems.

UNIT - I

Natural to Artificial Systems – Biological Inspirations in problem solving – Behavior of Social Insects: Foraging - Division of Labor - Task Allocation– Cemetery Organization and Brood Sorting – Nest Building- Cooperative transport.

UNIT - II

Ant Colony Optimization [ACO]: Ant Behavior - Towards Artificial Ants - Combinatorial Optimization - Ant Colony Optimization Metaheuristic – Problem solving using ACO Extensions of Ant Systems – ACO and Local search methods - ACO theoretical considerations and Convergence.

UNIT - III

Ant Colony Optimization algorithms for NP-hard problems- Routing problems- Assignment problems - Scheduling problems – Subset problems - Machine Learning Problems – ACO for Travelling Salesman problem.

UNIT - IV

Swarm Intelligence: Biological foundations of Swarm Intelligence – Swarm Intelligence in Optimization – Particle Swarms for dynamic optimization problems.

UNIT - V

Biological Inspired computing to Natural Computing – Integration of Evolutionary Computation Components in Ant Colony Optimization – Particle Swarm Optimization based on Sociocognition.

Text Books:

1. Marco Dorigo, Thomas Stutzle, 2004, “Ant Colony Optimization”, MIT Press.
2. Eric Bonabeau, Marco Dorigo, Guy Theraulaz, 2000, “Swarm Intelligence: From Natural to Artificial Systems”, Oxford University press.

Reference Books:

1. Christian Blum, Daniel Merkle (Eds.), 2008, “Swarm Intelligence: Introduction and Applications”, Springer Verlag.

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF COMPUTER SCIENCE
(For those who join in 2017 and after)

Course	: Elective	Int. Marks	: 100
Class	: M.Phil (CS)	Ext. Marks	: 100
Semester	: II	Max. Marks	: 200
Sub. Code	: S1MSE1 (H)	Hours/Week	:6
Title of the Paper:	Cryptography and Network Security	Credits	: 6

Course Outcomes:

This course explores various issues and solutions related with cryptography and network security.

1. Understand the principles and practices of Cryptography and Network Security.
2. Appreciate the role played by Cryptographic techniques in enhancing Network and system security.
3. Identify and explain the concepts, protocols and technologies associated with a secure communication across the Network.

Unit I:

Introduction to Cryptography: Cryptography Introduction - Breaking an Encryption Scheme - Types of Cryptographic Functions - Secret Key Cryptography - Public Key Cryptography - Hash Algorithms. Secret Key Cryptography: Introduction - Generic Block Encryption - Data Encryption Standard (DES) - International Data Encryption Algorithm (IDEA) - Advanced Encryption Standards (AES) – RC4.

Unit II:

Modes of Operation: Introduction - Electronic Code Book – Cipher Block Chaining – Kbit Cipher Feedback Mode – Kbit Output Feedback Mode – Counter Mode - Generating Macs - Multiple encryption DES. Public Key Algorithm: Introduction - Modular Arithmetic - RSA algorithm – Diffie Hellman - Digital Signature Standard (DSS) – How Secure RSA and Diffie Hellman – Elliptic Curve Cryptography – Zero Knowledge Proof System.

Unit III:

Overview of Authentication Systems: Password Based Authentication – Address Based Authentication – Cryptographic Authentication Protocols – Password as Cryptographic Key – Eavesdropping and Server Database Reading – Trusted Intermediaries – Session Key

Establishment – Delegation. Authentication of People :Passwords – Online Password Guessing – Offline Password Guessing – Eavesdropping – Password and Careless Users – Initial Password Distribution – Authentication Tokens – Physical Access – Biometrics.

Unit IV:

Security Handshake Pitfalls: Login Only – Mutual Authentication – Integrity / Encryption for Data – Mediated Authentication (With KDC) – Nonce Types – Picking Random Numbers – Performance Considerations – Authentication Protocol Checklist. Strong Password Protocols: Introduction – Lamport’s Hash – Strong Password Protocols – Strong Password Credential Download Protocols.

Unit V:

Firewalls: Firewall - Packet Filter – Application Level Gateway – Encrypted Tunnels – Comparisons – Denial of Service Attacks. More Security Systems: Netware V3 - Netware V4 – Krypto Knight – DASS/ SPX – Lotus Notes Security – DCE Security - Microsoft Windows Security – Network Denial of Service – Clipper.

Text Books:

- 1 Kaufman, Charlie, Radia Perlman, and Mike Speciner, 2002, Network security: private communication in a public world,.. Prentice Hall Press.
- 2 William Stallings, 2016, 7th Edn, Cryptography and Network Security: Principles and Practice, Pearson Education, New Delhi.

Reference Books:

1. William Stallings, 2016, 6th Edn, Network Security Essentials, Pearson Education Asia.
2. Richard Mollin, 2006, 2nd Edn, Introduction to Cryptography, Chapman & Hall/CRC Press.
3. Moshe Rozenblit, 2000 Security for Telecommunications Network Management, IEEE Press, PHI.

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DEPARTMENT OF COMPUTER SCIENCE
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Course	: Elective	Int. Marks	: 100
Class	: M.Phil. (CS)	Ext. Marks	: 100
Semester	: II	Max. Marks	: 200
Sub. Code	: SIMSE1 (I)	Hours/Week	: 6
Title of the Paper:	Advanced Technologies in Computer Science	Credits	: 6

Course Outcomes:

To impart the knowledge on some of the advanced Technologies in Computer Science such as Multimedia, TCP/IP, Client Server Technology, Web Technology and Distributed Computing.

1. To understand the basic techniques of Advanced Technologies in Computer Science
2. To introduce certain areas of applications of the same and to introduce research issues.
3. Understand techniques and apply for real time problems.

UNIT – I MULTIMEDIA & ITS APPLICATIONS

Multimedia - An Overview – Digital Representation – Visual Display Systems – Text – Image – Graphics – Audio – Video – Animation – Compression – CD Technology – Network Essentials – Multimedia Architecture – Multimedia Documents – Multimedia Application Development-Virtual Reality.

UNIT – II TCP/IP

TCP/IP Protocol suite – Addressing – Classful addressing – Addressing issues – Subnetting and Supernetting – Variable length blocks – Packet delivery – Forwarding – Routing – ARP and RARP – Internet Protocol – ICMP – IGMP – UDP – TCP – Flow Control – Error Control – Congestion Control – Intra and Inter Domain Routing – Distance Vector Routing – Link State Routing- Path Vector Routing – Multicast Routing – BOOTP – DHCP – DNS – Remote Login and Telnet – FTP and TFTP – Electronic Mail – Network Management – IPV6.

UNIT – III CLIENT/SERVER TECHNOLOGY

Client/Server Computing-What is Client/Server-Types of Servers-SQL Database server-The fundamentals of SQL and relational databases -What does a database server do-Stored procedures, Triggers and rules- SQL Middleware and federated databases-SQL middleware

will the real SQL API Please stand up? Open SQL gateways-data warehouses-Distributed Objects and components-From Distributed Objects to components-3Tier Client Server, Object Style-CORBA-Distributed Objects, CORBA style-OMG's object management architectureCORBA 2.0-CORBA.Object services-CORBA common facilities –CORBA business objects.

UNIT – IV ADAPTIVE WEB TECHNOLOGY

J2EE: Overview-Multi-tier Architecture-The Enterprise Application-Clients-Sessions management-Web Tier-EJB Tier-J2EE Web Services. .NET Framework -Common Language Runtime- Base Class Libraries-Interoperability-Networking- Remoting- Security, Building Web applications- Web Services, Overview of XML.

UNIT – V DISTRIBUTED COMPUTING

Distributed Systems: Fully distributed processing systems – Networks and Interconnection structures – Designing a distributed processing system – Distributed databases- challenge of distributed data – loading factors – managing the distributed resources – division of responsibilities.

Text Books:

Ranjan Parekh, 2008, 4thEdn, “Principles of Multimedia”, Tata McGraw-Hill Publishing Company Limited, New Delhi,

Behrouz A. Forouzan, 2008, 3rdEdn, “TCP/IP Protocol Suite, Tata McGraw –HillPublishing Company Limited, New Delhi.

Robert Orfali, Dan Harkey, Jerry, Edwards, “The Essential Client/Server SurvivalGuide”, Galgotia Publications.

Jim Keogh, 2002, " The Complete Reference J2EE", Tata McGraw-Hill Edition.James McGovern etal.2003, "J2EE1 .4 Bible", Wiley Publishing Inc.

Reference Books:

1. John A. Sharp,1987, “An Introduction to Distributed and Parallel Processing”, Blackwell Scientific Publications.
2. Uyles D. Black,1997 “Data Communications & Distributed Networks”, Prentice Hall.
3. Joel M. Crichlow,1988, “Introduction to Distributed & Parallel Computing”, Prentice Hall.
4. StefansCeri, GinseppePelagatti,1985, “Distributed Databases Principles and systems”, McGraw Hill Book Co., New York.
5. Visual studio .Net Walkthroughs- Microsoft Manual.
6. www.msdn.microsoft.com/netframework

