SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

(Affiliated to Bharathidasan University)

(Accredited by NAAC ; An ISO 9001:2015 Certified Institution)

SUNDARAKKOTTAI, MANNARGUDI- 614016.

TAMILNADU, INDIA.

M.Sc., COMPUTER SCIENCE COURSE STRUCTURE UNDER CBCS

(For the Candidates admitted in the academic year 2020–2021)

Eligibility : Candidates who have passed B.Sc. Computer Science/ B.Sc. Information Technology/ B.C.A/B.Sc. Software Development of this University or from a recognized University or an examination accepted by the Syndicate equivalent there to.

Sem.	Nature of the Course	Course Code	Title of the Course	Inst. Hours/ Week	Credit	Exam Hours	Marks		
							CIA	ESE	Total
I	Core Course–I(CC)	20PCS101	Mathematical Foundation for Computer Science	5	5	3	25	75	100
	Core Course–II(CC)	20PCS102	Web Technologies	5	5	3	25	75	100
	Core Course–III(CC)	20PCS103	Design and Analysis of Algorithms	5	5	3	25	75	100
	Core Course–IV(CC)	20PCS104	Distributed Operating Systems	5	5	3	25	75	100
	Core Practical–I(CP)	20PCS105P	Web Technologies Lab	6	5	3	40	60	100
	Elective Course –I(EC)	20PCSE1A/20PCSE1B	Web Services/ Human Computer Interaction	4	4	3	25	75	100
	TOTAL			**30**	**29**				**600**
II	Core Course–V(CC)	20PCS206	Open Source Technologies	5	5	3	25	75	100
	Core Course– VI(CC)	20PCS207	Distributed Technologies	5	5	3	25	75	100
	Core Course–VII(CC)	20PCS208	Big Data Analytics	5	5	3	25	75	100
	Core Course–VIII(CC)	20PCS209	Cloud Computing	5	4	3	25	75	100
	Core Practical –II(CP)	20PCS210P	Distributed Technologies Lab	3	3	3	40	60	100
	Elective Course–II(EC)	20PCSE2A/20PCSE2B	Embedded Systems /Digital Image Processing	4	4	3	25	75	100
	EDC-I	20PCSED1A/ 20PCSED1B	Basics of Computer and Office Automation/ Principles of Information Technology	3	2	3	25	75	100
	TOTAL			**30**	**28**				**700**
III	Core Course–IX(CC)	21PCS311	Data Mining and Data Ware housing	7	4	3	25	75	100
	Core Course–X(CC)	21PCS312	Compiler Design	5	3	3	25	75	100
	Core Practical–III(CP)	21PCS313P	Data Mining Lab	8	4	3	40	60	100
	Elective Course III(EC)	21PCSE3A/ 21PCSE3B	Network Security /Soft Computing	6	3	3	25	75	100

	EDC-II	21PCSED2A/ 21PCSED2B	Internet and its Applications/ Introduction to Web Design	4	2	3	25	75	100
			TOTAL	**30**	**16**				**500**
IV	Core Course –XI(CC)	21PCS414	Artificial Intelligence	6	4	3	25	75	100
	Core Course –XII(CC)	21PCS415	Advanced Computer Architecture	6	3	3	25	75	100
	Project	21PCSPW	Project	18	10	-	-	-	100
			TOTAL	**30**	**17**				**300**
			GRAND TOTAL	**120**	**90**				**2100**

CURRICULAM DESIGN

Courses	**No. of Courses**	**Total Credits**
Core course	12	53
Core Practical	3	12
Elective Course	3	11
Extra Disciplinary Course	2	4
Project	1	10
Total	21	**90**

Note:

1. Theory — Internal 25marks — External 75marks
2. Practical — Internal 40marks — External 60marks
3. Separate passing minimum is prescribed for Internal and External

a) The passing minimum for CIA shall be 40% out of 25 marks (i.e.10 marks)
b) The passing minimum for University Examinations shall be 40% out of 75 marks (i.e.30 marks)
c) The passing minimum not less than 50% in the aggregate.

ELECTIVE COURSES (EC) OFFERED BY THE DEPARTMENT

S.No.	**Semester**	**Course Code**	**Elective Courses(EC) (Anyone from the list)**
1.	I	20PCSE1A	Web Services
2.	I	20PCSE1B	Human Computer Interaction
3.	II	20PCSE2A	Embedded Systems
4.	II	20PCSE2B	Digital Image Processing
5.	III	21PCSE3A	Network Security
6.	III	21PCSE3B	Soft Computing

EXTRA DISCIPLINARY COURSES (EDC) OFFERED BY THE DEPARTMENT

S. No.	Semester	Course code	Extra Disciplinary Courses (EDC) (Any one from the list)
1.	II	20PCSED1A	Basics of Computer and Office Automation
2.	II	20PCSED1B	Principles of Information Technology
3.	III	21PCSED2A	Internet and its Applications
4.	III	21PCSED2B	Introduction to Web Design

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SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

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SUNDARAKKOTTAI, MANNARGUDI – 614016.

TAMILNADU, INDIA.

M.Sc., COMPUTER SCIENCE

COURSE STRUCTURE WITH SYLLABUS UNDER CBCS

(*For the candidates admitted in the academic year 2020–2021*)

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

(Affiliated to Bharathidasan University)

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SUNDARAKKOTTAI, MANNARGUDI- 614016.

TAMILNADU, INDIA.

M.Sc., COMPUTER SCIENCE COURSE SRUCTURE UNDER CBCS

(For the Candidates admitted in the academic year 2020 – 2021)

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2.	I	20PCSE1B	Human Computer Interaction
3.	II	20PCSE2A	Embedded Systems
4.	II	20PCSE2B	Digital Image Processing
5.	III	21PCSE3A	Network Security
6.	III	21PCSE3B	Soft Computing

EXTRA DISCIPLINARY COURSES (EDC) OFFERED BY THE DEPARTMENT

S. No.	Semester	Course code	Extra Disciplinary Courses (EDC) (Any one from the list)
1.	II	20PCSED1A	Basics of Computer and Office Automation
2.	II	20PCSED1B	Principles of Information Technology
3.	III	21PCSED2A	Internet and its Applications
4.	III	21PCSED2B	Introduction to Web Design

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TAMILNADU, INDIA.

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

(For the Candidates admitted in the academic year 2020 – 2021)

Question Paper Pattern (Theory)

Max time: 3 Hours **Max Marks: 75**

Section – A (10 x 2 = 20)

Answer all the questions

Answer in One or Two sentences each

1.	Unit I
2.	
3.	Unit II
4.	
5.	Unit III
6.	
7.	Unit IV
8.	
9.	Unit V
10.	

Section – B (5 x 5 = 25)

Answer all the questions

Each answer should not exceed 500 words

11.a (or)	Unit I
B	
12.a (or)	Unit II
B	
13.a (or)	Unit III
b	
14.a (or)	Unit IV
B	
15.a (or)	Unit V
B	

Section – C (3 x 10 = 30)

Answer any <u>THREE questions</u> in 1200 words

16. .....Unit I
17. .....Unit II
18. .....Unit III
19. .....Unit IV
20. .....Unit V

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SEMESTER I

Semester I: CC-I MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE

Ins. Hrs. /Week: 5 **Course Credit: 5** **Course Code:20PCS101**

OBJECTIVES:

- To learn about the Transportation Problem & Assignment Problem.
- To study about PERT, CPM and Network.
- To inculcate the basics of Graph Theory.

UNIT I

Transportation Problem: Northwest corner rule – Least cost method – Vogel's approximation method – MODI method - Assignment problem and its solution by Hungarian method.

UNIT II

Project Scheduling by PERT - CPM: Phases of project scheduling - Arrow diagram - Critical path method - Probability and Cost Considerations in project scheduling.

UNIT III

Correlation, Rank Correlation and Linear Regression.

UNIT IV

Testing of hypothesis: Applications of chi-square, chi-square Test - goodness of fit - Test based on correlation and regression coefficients.

UNIT V

Graph-Directed and undirected graphs-Sub graphs-Chains, Circuits, Paths, Cycles-Connectivity-Adjacency and incidence matrices-Elements of transport network.

COURSE OUTCOME:

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

Know about Assignment and Transportation Problems.
Understand PERT and CPM in Project scheduling.
Learn Correlation and Regression.
Study about testing of hypothesis.
Solve real life problems using graphs.

TEXT BOOK(S):

1. “Operations Research", KantiSwarup, P.K.Gupta and Man Mohan, Sultan Chand & Sons, New Delhi, 2011.
2. "Fundamentals of Mathematical Statistics", Gupta,S.C. and V.K.Kapoor, Sultan Chand & Sons, New Delhi, 11th Edn.2002.
3. “Graph Thoery”, NarsinghDeo, PHI Learning Private Limited, New Delhi,2011.

REFERENCE BOOKS:

1. “Operations Research", Fourth Edition, S. Kalavathy, Vikas Publishing House Pvt. Ltd., Noida, 2014.
2. "Probability and Statistics for Engineering and Computer Science", Milton, J.S. and J.C.Arnold, McGraw Hill, New Delhi, 1986.
3. “Graph Theory”, V. K. Balakrishnan, McGraw Hill Education(India)Pvt. Ltd., New Delhi, 2004.

E_RESOURCES:

1. https://bit.ly/3fptTpO
2. https://bit.ly/3o1vnd9

Semester I : CC- II WEB TECHNOLOGIES

Ins. Hrs. /Week: 5 **Course Credit: 5** **Course Code:20PCS102**

OBJECTIVES:

- To gain the skills and project-based experience needed for entry into web application and development careers.
- To get knowledge in client server architecture and able to develop a web application using java technologies.
- To analyze about ASP.NET Applications.

UNIT I

Internet Basics: Basic Concepts – Internet Domains – IP Address – TCP/IP Protocol– The WWW – The Telnet — Introduction to HTML: Web server - Web client / browser - Tags – Text Formatting – Lists – Tables – Linking Documents - Frames.

UNIT II

JavaScript: JavaScript in Web Pages – The Advantages of JavaScript – Writing JavaScript into HTML – Syntax – Operators and Expressions – Constructs and conditional checking–Functions– Placing text in a browser–Dialog Boxes – Form object's methods – Built in objects – user defined objects.

UNIT III

XML: Comparison with HTML – DTD – XML elements – Content creation – Attributes –Entities – XSL – XLINK – XPATH – XPOINTER – Namespaces – Applications – integrating XML with other applications.

UNIT IV

OVERVIEW OF ASP.NET - The .NET framework – Learning the .NET languages Data types – Declaring variables- Scope and Accessibility Variable operations- Object Based manipulation- Conditional Structures- Loop Structures- Functions and Subroutines. Types, Objects and Namespaces: The Basics about Classes- Value types and Reference types- Advanced class programming- Understanding name spaces and assemblies. Setting Up ASP.NET and IIS.

UNIT –V

Developing ASP.NET Applications - ASP.NET Applications: ASP.NET applications– Code behind- The Global .asax application file Understanding ASP.NET Classes- ASP.NET Configuration. Web Form fundamentals: A simple page applet improving the currency converter- HTML control classes- The page class- Accessing HTML server controls.

COURSE OUTCOME:

On completion of the course, students should be able to

1. To understand the concept of uses of internet, WWW and protocols
2. Develop a dynamic webpage by the use of HTML and JavaScript.
3. Create a well formed / valid XML document.
4. Describe the programming concepts of ASP.NET
5. Develop ASP.NET applications

TEXT BOOK(S):

1. "Web Enabled Commercial Application Development Using HTML, DHTML, JavaScript, Perl CGI", Ivan Bayross, BPB Publication. UNIT I & II
2. "XML Bible",Elliotte Rusty Harold, 2ndEdition,Wrox Publication.UNIT III
3. Mathew Mac Donald, "ASP.NET Complete Reference", TMH 2005. Unit IV & Unit V

REFERENCE BOOKS:

1. "Practical ASP", Ivan Bayross, BPB Publication.

E_RESOURCES:

1. https://bit.ly/3nLTgoI
2. https://bit.ly/3nNnEip
3. https://bit.ly/3fokIpA
4. https://bit.ly/3kTW9C1
5. https://g.co/kgs/dboiqp

Semester I: CC-III DESIGN AND ANALYSIS OF ALGORITHMS

Ins. Hrs. /Week: 5 **Course Credit: 5** **Course Code:20PCS103**

OBJECTIVES:

- To understand the paradigms and approaches used to analyze and design algorithms and to appreciate the impact of algorithm design in practice.
- To explain different computational models, order notation and various complexity measures to analyze the complexity/performance of different algorithms.
- To analyze various advanced design and analysis techniques.

UNIT I

Introduction: Algorithm Definition – Algorithm Specification – Elementary Data Structures: Stacks and Queues – Trees – Dictionaries – Priority Queues – Sets and Disjoint Set Union – Graphs

UNIT II

Divide and Conquer: The General Method–Defective Chessboard– Binary Search– Finding The Maximum And Minimum – Merge Sort – Quick Sort – Selection - Strassen's Matrix Multiplication.

UNIT III

The Greedy Method: General Method - Container Loading - Knapsack Problem - Tree Vertex Splitting – Job Sequencing With Deadlines - Minimum Cost Spanning Trees - Optimal Storage On Tapes – Optimal Merge Patterns - Single Source Shortest Paths.

UNIT IV

Dynamic Programming: The General Method – Multistage Graphs – All- Pairs Shortest Paths – Single-Source Shortest Paths - Optimal Binary Search Trees - String Editing - 0/1 Knapsack- Reliability Design - The Traveling Salesperson Problem - Flow Shop Scheduling. Basic Traversal and Search Techniques: Techniques for Binary Trees–Techniques for Graphs–Connected Components and Spanning Trees – Bi-connected Components and DFS.

UNIT V

Backtracking: The General Method – The 8-Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycles – Knapsack Problem Branch and Bound: The Method - 0/1 Knapsack Problem- Lower Bound Theory: Comparison Trees.

COURSE OUTCOME:

On completion of the course, students should be able to

1. Students understand specification of algorithms and elementary data structures.
2. Students learnt the concept of Divide and Conquer method.
3. Students can ability to understand the topic of Greedy Method.
4. Students can understand the dynamic programming algorithms and solving problems.
5. Understand the backtracking methods and algorithms.

TEXT BOOK(S):

1. Ellis Horowitz, Satraj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Universities Press, Second Edition, Reprint2009.

REFERENCE BOOKS:

1. Data Structures Using C - Langsam, Augenstien,Tenenbaum,PHI
2. Data structures and Algorithms, V.Aho, Hopcropft, Ullman,LPE
3. Introduction to design and Analysis of Algorithms - S.E. Goodman, ST. Hedetniem-TMH.

E_RESOURCES:

1. https://www.geeksforgeeks.org/divide-and-conquer-algorithm-introduction/
2. https://www.tutorialspoint.com/data_structures_algorithms/merge_sort_algorithm.html
3. https://www.tutorialspoint.com/data_structures_algorithms/spanning_tree.html
4. https://www.slideshare.net/Abrish06/graph-48747573

Semester I : CC- IV DISTRIBUTED OPERATING SYSTEMS

Ins. Hrs. /Week: 5 Course Credit: 5 Course Code:20PCS104

OBJECTIVES:

- To provide hardware and software issues in modern distributed systems.
- To explain about distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems.
- To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed.

UNIT I

Fundamentals: What is Distributed Operating System – Evolution of Distributed Computing System – Distributed Computing System Models – Why are Distributed Computing Systems gaining popularity – What is a Distributed Computing System– Issues in Designing Distributed Computing System – Introduction to Distributed Computing Environment- Comparison of DOS, UNIX Operating System and Windows Operating System

UNIT II

Message Passing: Introduction – Desirable features–Issues in PC Message Passing Synchronization – Buffering – Multi-datagram Messages – Encoding and Decoding– Process Addressing – Failure Handling – Group Communication

UNIT III

Distributed Shared Memory: Introduction – General Architecture of DSM system – Design and Implementation Issues of DSM – Granularity – Structure of Shared Memory –ReplacementStrategy – Thrashing –Heterogeneous DSM – Advantages. Synchronization: Introduction – Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock – Election Algorithm

UNIT IV

Distributed File System: Introduction – Desirable features – File Models – File Accessing Models – File Sharing Semantics – File Caching Schemes – File Replication – Fault Tolerance – Atomic Transactions – Design Principles

UNIT V

Security: Introduction – Potential Attacks to Computer System – Cryptography – Authentication – Access Control – Digital Signatures – Design Principles - Cipher Block Chaining.

COURSE OUTCOME:

On completion of the course, students should be able to

1. Provide hardware and software issues in distributed systems.
2. Understand about Message Passing Synchronization.
3. Learn the concept of distributed shared memory techniques and peer-to-peer (P2P) systems will also be analyzed.
4. Demonstrate about file access models.
5. Understand about security and cryptography.

TEXT BOOK(S):

1. Distributed Operating Systems – Concepts and Design, Pradeep K Sinha, PHI, 2003.
2. Advanced Concepts in Operating Systems Distributed, Database and Multiprocessor Operating systems-Tata Mc-Graw-Hill Edition2001.

REFERENCE BOOKS:

1. Distributed Operating Systems 1e, Andrew S Tanenbaum, PHI.

E_RESOURCES:

1. https://bit.ly/3kYYGeh
2. https://bit.ly/3pWfvtV
3. https://bit.ly/339vtHs

Semester I : CP- I WEB TECHNOLOGIES LAB

Ins. Hrs. /Week: 6 **Course Credit: 5** **Course Code:20PCS105P**

OBJECTIVES:

- To understand about the Webpage creation.
- To develop a web application using java technologies
- To create functional website/web application.

EXERCISE:

1. Write a HTML program to display a registration form for an intercollegiate function .The page should consist the following: Name of the student, College name, Department, Address of the college, Contact details, Participated Event, Payment mode.
2. Write a HTML program to create a Webpage in the format of front page of a newspaper using Text links. Align the text with colors.
3. Develop static pages of an online Book store using only HTML. The website should consist the following pages. Home page, Registration and user Login, User profile page, Books catalog, Shopping cart, Payment By credit card, order confirmation.
4. Write an XML file to display the Book information which includes the following: 1) Title of the book 2) Author Name 3) ISBN number 4) Publisher name 5) Edition 6) Price Write a Document Type Definition (DTD) to validate the XML file.
5. Develop a Document Type Definition (DTD) to validate the student XML file. Display the XML file as follows. The contents should be displayed in a table. The header of the table should be in color GREY and the student names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns. Use XML schemas XSL and CSS for the above purpose.
6. Write a JavaScript code that displays text "TEXT-GROWING" with increasing font size in the interval of 100ms in RED COLOR, when the font size reaches 50pt it displays "TEXT-SHRINKING" in BLUE color. Then the font size decreases to 5pt.
7. Write a JavaScript to design a simple calculator to perform the following operations: Sum, product, difference and quotient.
8. Develop a webpage in ASP using Response and Request Object.
9. Design a ASP webpage that makes uses of AdRotator Control for an Advertisement.
10. Develop a ASP.net Program to calculate the employee payroll using using Mysql database. It will contain Basic, TA, DA, HRA and Net_salary.

COURSE OUTCOME:

On completion of the course, students should be able to

1. Develop a webpage using DHTML.
2. Create a well formed / valid XML document.
3. Design a webpage using java script.
4. Design and create ASP programs.
5. Develop a webpage using ASP.Net with back end Mysql.

Semester I : EC- I(A) WEB SERVICES

Ins. Hrs. /Week: 4 **Course Credit: 4** **Course Code:20PCSE1A**

OBJECTIVES:

- To Understand Web Services standards and technologies.
- To explain about SOAP, WSDL ANDUDDI.
- To provide knowledge about XML and HTML.

UNIT I

Introduction-What are web services -Importance of Web Services- SOAP-WSDL- UDDI Basic web services standards, technologies and concepts: XML fundamentals: Documents- Namespaces-schema-processing XML-Simple API for XML (SAX)-Document object model (DOM)

UNIT II

SOAP and WSDL: The SOAP model-SOAP messages - SOAP with Attachments- WSDL: Structure-The types element-Managing WSDL descriptions-Using SOAP and WSDL Service implementation and Invoking web services.

UNIT III

UDDI: Introduction- UDDI specification - UDDI and lifecycle management. Conversation: Overview-web services conversation language-WSCL interface components. Quality of Service: Importantance QoS for web services- QoS metrics for web services.

UNIT IV

XML and HTML: The limits of HTML-The scope of HTML-Structure-Structure and Content-Structure and Synthesis-Structure and Presentation-Representing Structure. The XML Language: Markup languages-Defining Markup Languages in XML.

UNIT V

Linking in XML: Links(Information, Resources, and Hot Spots)-Link Management- Working with names-Choosing the linking methodology. XML Style: The publishing Process-Structuring data-Processing from one stage to the next- Conversion - Publishing data -Choosing a Client-side processing Application- Choosing a Server-side processing application.

COURSE OUTCOME:

On completion of the course, students should be able to

1. Understand the Web Services standards and technologies
2. Analyze about SOAP, WSDL
3. Describe about UDDI.
4. Understand about XML Concepts and HTML
5. Apply Links in XML.

TEXT BOOK(S):

1. "Developing Enterprise Web Services - An Architect's Guide" – Sandeep Chatterjee, James Webber, Pearson Education– Second Indian Reprint2005.

2. Rick Darnell "HTML 4 Unleashed" Techmedia Publication, Second Edition,

REFERENCE BOOKS:

1. "Web Services: An Introduction"- B.V Kumar, S.V Subrahmanya -January 2012 by McGraw Hill Education

E_RESOURCES:

1. https://rb.gy/lsmpnl
2. https://bit.ly/39ervBn
3. https://www.slideshare.net/gerardsylvester/webservices-presentation

Semester I : EC- I(B) HUMAN COMPUTER INTERACTION

Ins. Hrs. /Week: 4 **Course Credit: 4** **Course Code:20PCSE1B**

OBJECTIVES:

- To impart knowledge related to the various concepts, methods of Human Computer interaction.
- To explain about Interaction techniques with design basics.
- To provide knowledge design rules and evaluation techniques.

UNIT I

The Interaction Introduction – Models of interaction – Frameworks and HCI Ergonomics– Interaction styles – Elements of the WIMP interface – Interactivity – The context of the interactions. Paradigms: Introduction – Paradigms for interaction.

UNIT II

Interaction, Design basics Introduction – Design – User focus – Scenarios – Navigation design – Screen design and layout – Interaction and prototyping. HCL in the Software Process: Introduction – The software lifecycle – Usability engineering – interactive design and prototyping – Design rationate.

UNIT III

Design Rules Introduction – Principles to support usability – Standards – Guidelines – Golden rules and heuristics – HCI patterns. Implementation Support: Introduction – Elements of windowing systems – Programming the application Using toolkits – User interface management systems.

UNIT IV

Evaluation Techniques: Evaluation – Goals of evaluation – Evaluation through expert analysis – Evaluation through user participation – Choosing an evaluation method. Universal Design: Introduction – Universal design principles – Multi-modal interaction – Designing for diversity – Summary.

UNIT V

User Support Introduction Requirements of user support – Approaches to user support – Adaptive help systems designing user support systems.

COURSE OUTCOME:

On completion of the course, students should be able to

1. Learn the concepts, methods of Human Computer Interaction
2. Analyze about Interaction techniques with design basics
3. Describe about design rule and standards.
4. Analyze the evaluation techniques
5. Understand about user support

TEXT BOOK(S):

1.Human - Computer Interaction, Third Edition, "Alan Dix, Janet Finlay, Gregory D. Abowd and Russell Beale", Pearson Education, 2004.

REFERENCE BOOKS:

1.Human – Computer Interaction in the New Millennium, "John C. Carroll", Pearson Education"2002.

E_RESOURCES:

1. https://www.tutorialspoint.com/human_computer_interface/index.htm
2. https://www.slideshare.net/mobile/saianjaneya/human-computer-interaction-71754699

SEMESTER II

Semester II : CC - V OPEN SOURCE TECHNOLOGIES
Ins. Hrs. /Week: 5 Course Credit: 5 Course Code:20PCS206

OBJECTIVES:

- To understand Open Source Programming concepts
- To build applications based on Open Source Software
- To understand the basic concepts of PHP

Unit-1 Introduction to Open Source

Introduction- Getting started Open Source –Definition of Open Source Software- Advantages of Open Sources-Applications of Open Source Software. Introduction to Linux- Linux Advantages- Benefits of Linux-Difference between MS-DOS and Linux-Difference between Linux and Unix-Difference between Linux and Windows

Unit-II

Linux distributions – RedHat – Ubuntu – Debian – SuSEMandrake - Slackware-Other Installing-Red Hatlinux - Linux Essential Commands-Linux Basic Commands- File System Concepts-Types of File Systems-File System Structure-Commands for Navigating the Linux File Systems- Vi Editor-Getting Started-Modes of vi Editor- Partitions Creation

Unit –III Open Source Data Base: MySQL

Introduction-Definition of MySQL- MySQL Features-Advantages of MySQL-Benefits of MySQL-Using the My SQL Command-Line client Basic Database Terminology-Database Tables Fieldnames-Field Records-Cells-Data-Database Tables-RDBMS-Data Types in MySQL-Text Data Types-Number Data Types-Date Data Types-Working with Databases and Tables-Creating a Database and Tables-Show Databases and Tables-The USE Command- Deleting a Database-Describe Table-Classification of SQL statements

Unit-IV Open Source Programming Language: PHP

Introduction- Operators - Flow control: Decision Making and Looping Statements – Arrays – Array Functions – Types of Arrays – Function

Unit-V

Reading Data in web pages – PHP browser handling power – Accessing the Database in PHP – Updation, Insertion, Deletion

COURSE OUTCOME:

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

1. Develop codes in open source web applications.
2. Knowledge about basic of scripting language.
3. Ability to work with web database applications.
4. Learn the fundamentals of Open Source programming language.
5. Knowledge about arrays and User defined functions.

TEXT BOOK(S) :

1. The complete reference PHP, Tata Mac Graw Hill Edition,2008
2. LINUX FUNDAMENTALS Paul cobbaut, Publication,2015

REFERENCE BOOKS:

1. Open source software (Learning HTML, CSS, JavaScript, Linux, PHP MySQL Dr.P.Rizwan Ahmed

E_RESOURCES:

1. https://www.computer-pdf.com/
2. https://rb.gy/mnhgz5

Semester II : CC- VI DISTRIBUTED TECHNOLOGIES
Ins. Hrs. /Week: 5 Course Credit: 5 Course Code:20PCS207

OBJECTIVES:

- To understand the foundations of Distributed Technologies.
- To introduce the idea of distributed computing.
- To understand the advanced features for ASP.NET required for Distributed Technologies.

Unit I

Introduction to distributed Computing – Challenges involved in establishing remote connection – Strategies involved in remote computation – Current Distributed computing practices through DotNet and Java technologies.

Unit II

Advanced ADO, NET – Disconnected Data Access – Gridview, Details View, Form View controls – Crystal Reports – Role of ADO, NET in Distributed Applications.

Unit III

Advanced ASP, NET – AdRotator, Multiview, Wizard and Image Map Controls-– calendar control – Panel control– Master Pages – Site Navigation – Web Parts – Uses of these controls and features in Website development.

Unit IV

Advanced features of ASP.NET – Security in ASP, NET – State Management in ASP, NET – Mobile Application development in ASP, NET.

Unit V

Web services – Role of Web services in Distributed Computing – WSDL, UDDI, SOAP concepts involved in Web Services – Connected a Web Service to a Data Base – Accessing a Web Service through n ASP, NET application.

COURSE OUTCOME:

On completion of the course, students should be able to

1. Understand the basis of distributed computing.
2. Gain knowledge about basic concepts of .NET technologies.
3. Use the basic controls and features in Website development
4. Know the advanced features for ASP.NET required for Distributed Technologies.
5. To learn the role of web services in distributed computing

TEXT BOOK(S):

1. Walther, ASP, NET 3.5, SAMS Publication, Edition 2005.

REFERENCE BOOKS:

1. Stephen walther, Kevin Hoffman, Nate Dudek, ASP, NET 3.5, SAMS Publication, Edition2009.

E_RESOURCES:

1. https://www.tutorialspoint.com/Distributed-Systems
2. https://books.google.co.in/books/about/ASP_NET_4_Unleashed.html?id=3nmHmAE__ACAAJ &redir_esc=y
3. https://books.google.co.in/books?id=khkGoBK7kYoC&printsec=frontcover#v=onepage&q&f=false

Semester II :CC-VII BIG DATA ANALYTICS

Ins. Hrs. /Week: 5 **Course Credit: 5** **Course Code:20PCS208**

OBJECTIVES:

- To understand the overview of an exciting growing field of big data analytics.
- To explain the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability.
- To solve complex real-world problems in for decision support.

Unit I

Introduction to big data: Data, Characteristics of data and Types of digital data: Unstructured, Semi-structured and Structured, Sources of data, Working with unstructured data, Evolution and Definition of big data, Characteristics and Need of big data, Challenges of big data, Data environment versus big data environment.

Unit II

Big data analytics: Overview of business intelligence, Data science and Analytics, Meaning and Characteristics of big data analytics, Need of big data analytics, Classification of analytics, Challenges to big data analytics, Importance of big data analytics, Basic terminologies in big data environment

Unit III

Big data technologies and Databases: Introduction to NoSQL, Uses, Features and Types, Need, Advantages, Disadvantages and Application of NoSQL, Overview of NewSQL, Comparing SQL, NoSQL and New SQL, Introduction to MongoDB and its needs, Characteristics of MongoDB, Introduction of apache cassandra and its needs, Characteristics of Cassandra

Unit IV

Hadoop foundation for analytics: History, Needs, Features, Key advantage and Versions of Hadoop, Essential of Hadoop ecosystems, RDBMS versus Hadoop, Key aspects and Components of Hadoop, Hadoop architectures

Unit V

Hadoop Map Reduce framework: Introduction to Map Reduce, Processing data with Hadoop using Map Reduce, Map Reduce application, Data serialization and Working with common serialization formats, Big data serialization formats

COURSE OUTCOME:

On completion of the course, students should be able to

1. Identify the types and characteristics of Data Digital and its uses.
2. Analyze big data and its business implications.
3. Understand the types of SQL.
4. Understand the Hadoop Architecture and its Environment.
5. Implement MapReduce concepts.

TEXT BOOK(S):

1. Seema Acharya and Subhashini Chellappan, “Big Data and Analytics”, Wiley India Pvt. Ltd., 2016

REFERENCE BOOKS

1. “Big Data” by Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, Wiley Publications, 2014.

2. Big Data Imperatives : Enterprise Big Data Warehouse, BI Implementations and Analytics” by Soumendra Mohanty, Madhu Jagadeesh and Harsha Srivatsa, Apress Media, Springer Science + Business Media New York,2013

3. “Hadoop: The definitive Guide”, Tom White, O'Reilly Media,2010.

E_RESOURCES:

1. http://cdn.oreillystatic.com/oreilly/radarreport/0636920028307/Big_Data_Now_2012_Edition.pdf
2. https://www.ics.uci.edu/~cs237/lectures/cloudvirtualization/Hadoop.pptx

Semester II :CC- VIII CLOUD COMPUTING
Ins. Hrs. /Week: 5 Course Credit: 4 Course Code:20PCS209

OBJECTIVES:

- To understand the basics of cloud computing and Key concepts of virtualization.
- To describe the different Cloud Computing services
- To describe Cloud Implementation, Programming and Mobile cloud computing, Key components of Amazon Web Services, Cloud Backup and solutions

UNIT I: **FOUNDATIONS:**

Introduction to Cloud Computing: Cloud Computing in a Nutshell – Roots of Cloud Computing – Layers and types of Clouds – Desired features of a Cloud – Cloud Infrastructure Management – Challenges and Risks – Migrating into a Cloud: - Introduction – Broad Approaches – The Seven step model – Enriching the 'Integration as a Services' Paradigm for the Cloud Era: - New Integration Scenarios – The Integration Methodologies – SaaS Integration Services –Recent trends in Cloud Computing.

UNIT II: INFRASTRUCTURE AS A SERVICE:-

Virtual Machine Provisioning and Migration Services: Introduction – Background – Manageability – Migration Services – Management of Virtual Machines for Cloud Infrastructures: - Anatomy of Cloud Infrastructures – Distributed Management of Virtual Infrastructures – Scheduling techniques for Advance Reservation of Capacity – Secure Distributed Data Storage in Cloud Computing: - Introduction – Cloud Storage from LANs to WANs – Technologies for Data Security –Challenges.

UNIT III: PLATFORM AND SOFTWARE AS SERVICE (PAAS/IAAS):-

Aneka-Integration of Private and Public Clouds : Introduction– Technologies and Tools – Aneka Cloud Platform - Aneka Resource Provisioning Service – Hybrid Cloud Implementation – Comet Cloud: An Autonomic Cloud Engine: - Introduction – Comet Cloud – Architecture – Autonomic Behavior of Comet Cloud – Overview of Comet Cloud-based Applications – Implementation and Evaluation

UNIT IV PLATFORM AND SOFTWARE AS SERVICE (PAAS/IAAS):-

T-Systems Cloud-based Solutions for Business Applications: Introduction – Enterprise Demand of Cloud Computing – Dynamic ICT Service - Importance of Quality and Security in Clouds – Dynamic Data Centre- Producing Business-ready; Dynamic ICT Services–The Map Reduce Programming Model and Implementations: - Introduction – Map Reduce Programming Model – Map Reduce implementations for the Cloud.

UNIT V: MONITORING AND MANAGEMENT:-

An Architecture for Federated Cloud Computing: Introduction – A typical Use case – The Basic Principles of Cloud Computing – A Federated Cloud Computing Model – Security Considerations – Service Providers Perspective of SLA Management in Cloud Computing: - Traditional Approaches to SLO Management – Types of SLA – Life Cycle of SLA -SLA Management in Cloud –Automated Policy-based Management– Performance Prediction for HPC on Clouds: - Introduction – Background – Grid and Cloud – Performance related issues of HPC in the Cloud.

COURSE OUTCOME:

On completion of the course, students should be able to

1. Define Cloud Computing and different Cloud service and deployment models.
2. Describe importance of virtualization along with their technologies.
3. Use and Examine different cloud computing services
4. Analyze the components of open stack & Google Cloud platform and understand Mobile Cloud Computing
5. Describe the Federated Cloud Computing and the key concepts of SLA.

TEXT BOOK(S):

1. RajkumarBuyya, James Broberg, AndrzejGoscinsky, "Cloud Computing Principles and Paradigms", Wiley India Pvt.Ltd., 2011.

REFERENCE BOOKS:

1. Barrie Sosinsky, ***"Cloud Computing Bible"***, 1st Edition, Wiley IndiaPvt. Ltd., NewDelhi, 2011.
2. SMichael Miller, ***"Cloud Computing"***, 1st Edition, Pearson Education Inc.,New Delhi,2008.

E_RESOURCES:

1. https://rb.gy/e2qtgk
2. https://rb.gy/djm1qv
3. https://rb.gy/13hnuq

Semester II : CP-II DISTRIBUTED TECHNOLOGIES LAB

Ins. Hrs. /Week: 3 **Course Credit: 3** **Course Code:20PCS210P**

OBJECTIVES:

- To learn the fundamental concepts of Internet and to develop web pages
- To get knowledge about webpage using controls
- Ability to understand the web service

EXCERCISE:

1) Create a table and insert a few records using Disconnected Access.
2) Develop a project to update and delete few records using Disconnected Access.
3) Develop a project to view the records using Grid View, Details View, Form View Controls.
4) Develop a project to generate a crystal report from an existing database.
5) Design a web page for Advertisement that makes uses of Ad Rotator Control.
6) Design a web page to display five forest Images involving MultiView Control
7) Design a web page involving Wizard Control.
8) Make use of Image Control involving two hot spots in a webpage.
9) Design a simple web site for software companies that make use of Master Pages.
10) Create a website for a College to establish the security features with five pages.
11) Develop a web service that has an ASP.NET client.
12) Develop a web service to fetch a data from a table and send it across to the client.

COURSE OUTCOME:

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

1. Develop a project in scripting language.
2. Design a webpage using various controls.
3. Create a report using existing Database.
4. Implement a web service usingASP.NET
5. Demonstrate the fundamental concept of Internet, ASP.Net with a view to developing professional software development skills

Semester II : EC-II (a) EMBEDDED SYSTEMS

Ins. Hrs. /Week: 4 Course Credit: 4 Course Code:20PCSE2A

OBJECTIVES:

- To develop an understanding of the technologies behind the embedded computing systems.
- To explain the design issues of embedded systems to students.
- To analyze and develop software programs for embedded systems.

UNIT I

Introduction to Embedded systems – processor in the system – software embedded into a system – structural units in a processor – processor, memory selection, Memory devices - Allocation of memory to program segments and blocks and memory map of a system.

UNIT II

Device drivers – Interrupt servicing mechanisms – context and periods for context switching - Programming concepts and Embedded programming in C and C++: Software programming in ALP and in high level language 'C'–'C' program elements: Header source files and preprocessor directives–Macros and functions: Datatypes– data structures – modifiers – statements – loops and pointers – Embedded programming in C++ and Java.

UNIT III

Program modeling concepts in single and multiprocessor systems – software – development process: modeling process for software analysis – programming model for event controlled or response time constrained real time program- modeling of multiprocessor systems. Multiple processes – sharing data by multiple tasks and routines – inter process communications.

UNIT IV

Real time operating systems: OS services – IO sub systems – Real time and embedded operating systems – Interrupt routines in RTOS environment – RTOS task scheduling models, Interrupt latency and response times of the task as performance metrics – performance metrics in scheduling models.

UNIT V

Hardware Software code design: Embedded system project management – Embedded system design and Co-design Issues- Advantage and Disadvantage of Embedded Systems – Comparison between Embedded system and other Languages – Design Cycle – uses of target system – use of software tools for development – use of scopes and logic analysers for system hardware tests.

COURSE OUTCOME:

1. Students understand basics concept of embedded systems
2. Students should know about how to implement c, c++ and java program in embedded system
3. To learn about program models and multi processor system
4. Students should understand RTOS (real time operating systems)
5. Best understanding about embedded system design and issues in embedded systems.

TEXT BOOK(S):

1. Embedded systems – Architecture, Programming and Design By Raj Kamal – TMH,2007.

REFERENCE BOOKS:

1. Mohamed Ali Maszidi & Janice Gillispie Maszidi, "The 8051 Microcontroller and Embedded System", Pearson Publishers

E_RESOURCES:

1. http://oms.bdu.ac.in/ec/admin/contents/66_P16CSE2A_2020070410211220.pdf
2. https://www.tutorialspoint.com/embedded_systems/es_overview.html

Semester II : EC- II(b) DIGITAL IMAGE PROCESSING
Ins. Hrs. /Week: 4 Course Credit: 4 Course Code:20PCSE2B

OBJECTIVES:

- To study the various concepts, methods and algorithms of digital image processing.
- To understand image transformation and image enhancement.
- To understand image restoration and image compression techniques.

UNIT I CONTINUOUS AND DISCRETE IMAGES AND SYSTEMS:

Light, Luminance, Brightness and Contrast, Eye, The Monochrome Vision Model, Image Processing Problems and Applications, Vision Camera, Digital Processing System, 2-D Sampling Theory, Aliasing, Image Quantization, Lloyd MaxQuantizer, Dither, Color Images, Linear Systems And Shift Invariance, Fourier Transform, ZTransform, Matrix Theory Results, Block Matrices and Kronecker Products.

UNIT II IMAGE TRANSFORMS:

2-D orthogonal and Unitary transforms, 1-D and 2-DDFT, Cosine, Sine, Walsh, Hadamard, Haar, Slant, Karhunen-loeve, Singular value Decomposition transforms.

UNIT III IMAGE ENHANCEMENT:

Point operations - contrast stretching, clipping and thresholding density slicing, Histogram equalization, modification and specification, spatial operations - spatial averaging, low pass, high pass, band pass filtering, direction smoothing, medium filtering, generalized cepstrum and homomorphic filtering, edge enhancement using 2-D IIR and FIR filters, colorimage enhancement.

UNIT IV IMAGE RESTORATION:

Image observation models, sources of degradation,inverse and Wiener filtering, geometric mean filter, non linear filters, smoothingsplines and interpolation, constrained least squares restoration.

UNIT V IMAGE DATA COMPRESSION AND IMAGE RECONSTRUCTION FROM PROJECTIONS:

Image data rates, pixel coding, predictive techniques transform coding and vector DPCM, Block truncation coding, wavelet transform coding of images, color image coding – Lossy and Losslesss in prediction coding.

COURSE OUTCOME:

On completion of the course, students should be able to

1. Learn the concepts, methods and algorithms of digital image processing
2. Understand the concepts of image transformation
3. Analyze about image enhancement
4. Describe about image restoration
5. Understand the concept of image compression techniques

TEXT BOOK(S):

1. Anil K. Jain, “Fundamentals of Digital Image Processing”, PHI,1995.
2. Sid Ahmed M.A., “Image Processing”, McGraw Hill Inc,1995.
3. Gonzalaz R. and Wintz P., “Digital Image Processing”, Addison Wesley, 2nd Ed, 1987.

REFERENCE BOOKS:

1. S.Jayaraman, S.Easkkirajan, T.Veerakumar, “Digital Image Processing”, Tata McGraw Hill Education Pvt. Ltd.2009

E_RESOURCES:

1. https://rb.gy/yrt9vv
2. https://rb.gy/daglt2
3. https://rb.gy/jzzafz

Semester II :EDC- I(a) BASICS OF COMPUTERS AND OFFICE AUTOMATION

Ins. Hrs. /Week: 3 Course Credit: 2 Course Code:20PCSED1A

OBJECTIVES:

- To learn the fundamental concepts of computers and Office automation
- Office tools course would enable the students in crafting professional word documents, excel spread sheets, power point presentations using the Microsoft suite of office tools.
- To familiarize the students in preparation of documents and presentations with office automation tools.

UNIT-I

Introduction to Computers – Five Generations of Modern Computers – Classification of Digital Computer Systems – Anatomy of a Digital Computer – Memory UNITs – Input and Output Devices – Auxiliary Storage Devices

UNIT – II

Getting Started: Starting a Program – Identifying Common Screen Elements – Choosing Commands – Finding Common Ways to work – Getting Help with Office

UNIT-III

MS-Word: Learning Word Basics – Formatting a word Document – Working with Longer Document

UNIT-IV

MS-EXCEL: Creating a Simple Spreadsheet – Editing a Spreadsheet – Working with Function Formula – Formatting Worksheet – Completing your Spreadsheet- Creating charts

UNIT – V

MS-POWERPOINT: Creating and Viewing Presentation – Editing a Presentation – Working with Presentation Special Effects

COURSE OUTCOME:

On completion of the course, students should be able to

1. Understand the concepts of computer and its memory storage.
2. Know the work ways of MS Office.
3. Perform Documentation and format text in Microsoft Word.
4. Develop knowledge about creation of spreadsheet and uses of functions.
5. Perform with presentation skills.

TEXT BOOK(S):

1. "Introduction to Computers" – Alex Leon, Mathew Leon(UNIT-I).
2. "Microsoft Office XP – fast& easy "(UNIT II, III, IV & V) - DIANE KOERS Publisher : Prentice Hall of India Private Limited, New Delhi,2001

REFERENCE BOOKS:

1. "Computer Fundamentals" - Anita Goel, Pearson Edition2010

E_RESOURCES:

1. https://rb.gy/o0ljrj
2. https://www.docdroid.net/XoyHN0e/office-automation-pdf#page=4
3. http://library.lol/main/5F86C4B76995423C9335EFC379BF6819

SEMESTER II:EDC-I (b) PRINCIPLES OF INFORMATION TECHNOLOGY

Ins. Hrs. /Week: 3 **Course Credit: 2** **Course Code:20PCSED1B**

OBJECTIVES:

- The main objective is to introduce IT in a simple language to all the students, regardless of their specialization.
- It will help them to pursue specialized programs leading to technical and professional careers and certifications in the IT industry.
- The focus of the subject is on introducing skills relating to IT basics, computer applications, programming, interactive medias, Internet basics etc.

Unit I

Introduction to Computer – Classification of Digital Computer System – Computer Architecture – Memory Units – Auxiliary Storage Devices – Input and Output Devices.

Unit II

Introduction to Computer Software – Operating System – Programming Languages – General Software Features and trends.

Unit III

Database Management Systems – Data Processing – Introduction to Database Management System – database design.

Unit IV

Introduction to Telecommunication – Networking – Communication System – Distributed System – Internet – Intranet.

Unit V

Multimedia tools – Virtual Reality – E-Commerce – Data warehousing – Data Mining – Applications; Geographical Information System – Computer in Business, Industry, Home, Education and Training.

COURSE OUTCOME:

On completion of the course, students should be able to

1. Understand basic concepts and terminology of information technology.
2. Describe personal computers and their operations.
3. Learn to know the process of database creation.
4. Compare the functionalities of Internet and Intranet.
5. Develop knowledge in Multimedia, E-Commerce, – Data Mining and Data warehousing.

TEXT BOOK(S):

1. Fundamentals of Information Technology, Alexis Leon And Mathews Leon, Vikas Publishing House Pvt. Ltd, 2009

REFERENCE BOOKS:

1. Henry C.Lucas, Jr., Information Technology for Management – McGraw Hill (Part – III).
2. Williams, Sawyer, Hutchinson, Using Information Technology – McGraw Hill.

E_RESOURCES:

1. https://rb.gy/vvpic0
2. https://rb.gy/fmhh1b

SEMESTER III

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2020 – 2021)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

Semester: III-CC-IX: Data Mining and Data Warehousing

Ins. Hrs. /Week: 7 **Course Credit: 4** **Course Code:21PCS311**

OBJECTIVES:

- To understand the overview of an growing field of data mining
- To understand the fundamental techniques and algorithms of data mining
- To solve complex real-world problems in data mining

UNIT- I: Introduction to Data mining **(18 Hours)**

Overview of Datamining – Relational Databases-Data Warehouses –Transactional Databases-KDD vs Data Mining-Data Mining Functionalities–Classification of Data mining System-Basic Datamining tasks–Data Mining Issues. **Applications and Trends in Data Mining:** Data Mining Applications- Data Mining System Products and Research Prototypes-Additional Themes on Data mining -Social Implications of Data Mining.

UNIT- II: Data Preprocessing **(16 Hours)**

Need to preprocess the Data –Descriptive Data Summarization- Data Cleaning- Data Integration and Transformation – Data Reduction – Data cube Aggregation – Attribute Subset Selection-Data Discretization and Concept Hierarchy Generation. **Classification**: Introduction – statistical based algorithms – Bayesian Classification-Distance Based Algorithms–Decision Tree Based algorithms–ID3.

UNIT- III: Clustering **(15 Hours)**

Introduction- A Categorization of Major Clustering Methods -Hierarchical algorithms–Partitional algorithms–Minimum spanning Tree – K Means Clustering - Nearest Neighbour algorithm. **Association Rules:** Definition of Association rule – Methods to discover an association rule–MiningVarious kinds of Association Rules-APRIORI algorithm–Partitioning algorithm.

UNIT-IV: Data Warehouse and OLAP Technology **(13 Hours)**

An Overview-Definition of Data Warehouse-A Multidimensional Data Model-Schemas for Multidimensional databases-OLAP Operations in the Multidimensional Data Model-Data Warehouse Architecture-Metadata Repository-Types of OLAP Servers-Data Warehouse Implementation-Efficient Computation of Data Cubes-Indexing OLAP Data-Efficient Processing of OLAP Queries-From Data Warehousing to Data Mining-Data Warehouse Usage.

UNIT- V: Mining of Complex Data Objects **(13 Hours)**

Multidimensional Analysis and Descriptive Mining of Complex data objects-Generalization of Structured Data-Aggregation and Approximation in Spatial and Multimedia Data Generalization-Construction and Mining of Object Cubes- Generalization Based Mining of Plan Databases by Divide and Conquer-Spatial Data Mining-Multimedia Data Mining-Text Mining- Mining the World Wide Web-Web Usage Mining.

Total Lecture Hours- 75

COURSE OUTCOME

The students will be able to,

1. Understand the datamining techniques
2. Know the usage of data preprocessing
3. Understand the Concept of market basket Analysis and its real world uses
4. Understand the data warehouse Architecture and its Environment
5. Implement datamining concepts in real world

TEXTBOOK(S)

1. Jiawei Han and Miceline Kamber,2006, "Data Mining Concepts and Techniques ", Morgan Kaulmann Publishers, Massachusetts, USA.
2. Margaret Dunham.H,2003, "Data mining Introductory & Advanced Topics", Pearson Education, India.

REFERENCE BOOK(S)

1. Arun Pujari.K, 2003, "Datamining Techniques", Universities Press (India)Pvt, Hyderabad
2. Max Bramer, 2020, "Principles of data mining", Springer 4th Edition, New York, USA
3. Pieter Adriaans, Dolf Zantinge, 1998, "Data Mining" Pearson Education, India.

E-RESOURCES

1. https://hanj.cs.illinois.edu/bk3/bk3_slidesindex.htm
2. https://www.slideshare.net/2cdude/data-warehousing-3292359

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2020 – 2021)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

Semester: III-CC-X: Compiler Design

Ins. Hrs. /Week: 5 **Course Credit: 3** **Course Code:21PCS312**

OBJECTIVES:

- The students should have understood the different phases of compiler
- To study about needs of the compiler
- The students know about working of each phase of compiler

UNIT- I: Introduction to compilers (14 Hours)

Analysis of source program – Phase of compiler – Cousins of compilers– Grouping of phases – **Simple one pass compiler:** overview – Syntax definition -**Lexical analysis:** removal of white space and comments – Constants – Recognizing identifiers and keywords – Lexicalanalysis – Input buffering – Sentinels-Specification of tokens – Recognition tokens- Transition Diagrams, Recognition of reserved Words and Identifiers.

UNIT- II: Symbol tables (16 Hours)

Symbol table entries – List data structures for symbol table – Representation of scope information – **Syntax Analysis:** Role of parser – Context free grammar – Writing a grammar – Topdown parsing – Simple bottom up parsing – Shift reducing parsing-Symbol Table Per Scope-The Use of Symbol Tables.

UNIT- III: Syntax directed definition (16 Hours)

Syntax Definition: Definition of Grammars-Derivations-Parse tree- Ambiguity-Associativity of operators-Precedence of Operators-**Syntax-Directed Translation:** Postfix Notation-Synthesized Attributes- Simple Syntax-Directed Definitions-Tree Traversals- Translation Schemes-**Parsing:** Top-Down parsing -Predictive Parsing-When to use ϵ-Productions- Designing a Predictive Parser-Left Recursion-A translator for Simple Expressions-Lexical Analysis.

UNIT- IV: Run-time environment (14 Hours)

Storage Organization-Static versus Dynamic Storage Allocation-Stack **Allocation of space:** Activation trees-Activation records-Calling Sequences-Variable-Length Data onthe Stack-**Access to Nonlocal data on the stack:** Data Access without Nested procedures-Issues withNested procedures-A Language with Nested Procedure Declarations-Nesting Depth-Access Links- Manipulating Access Links-Access Links for Procedure Parameters-Displays-Heap management- Introduction to Garbage Collection-Introduction to Trace -based Collection.

UNIT- V: Code generation (15 Hours)

Issue in design of code generator: Input to the Code Generator-The Target Program-Instruction Selection-Register Allocation-Evaluation order – **The target Language:** A Simple Target Machine model-Program and Instructions Cost– **Addresses in the target Code:** Static Allocation-Stack Allocation-Run-Time Addresses for Names - **Basic clocks and flow graphs:** Basic Blocks-Next-Use Information-Flow Graphs-Representation of Flow Graphs-Loops - Optimization of basic blocks- A simple Code Generator-Peephole Optimization-Register allocation and assignment.

Total Lecture Hours- 75

COURSE OUTCOME

The students will be able to,

1. Know about different phases of compiler
2. Understand symbol table entry and syntax directed definition
3. Learn storage and organization of storage allocation strategies
4. Study about intermediate code generation
5. Know about code optimization and basic blocks of code optimization

TEXT BOOK(S)

1. Aho, Ullman, 2001, "Compilers, Principles and Techniques and Tools", – 6th edition, Pearson Education, India.
2. Tremblay.J. P and Sorrenson.P. G, 1985, "The Theory and Practice of Compiler Writing", McGraw Hill.

REFERENCE BOOK(S)

1. Andrew Appel.N, "Modern Complier Implementation in C", Cambridge University Press, United Kingdom.
2. Kakde Charles. O.G, 2011 ,"Algorithms for Compiler Design" River Media ©.
3. Seidl, Hack Sebastian.H, and Reinhard Wilhelm, "Compiler Design: Syntactic and Semantic AnalysisBook".

E-RESOURCES

1. https://www.youtube.com/watch?v=Qkwj65l_96I
2. https://www.slideshare.net/naparnanayak/code-generation-15188739

Semester: III-CP-III: Datamining Lab

Ins. Hrs. /Week: 8 **Course Credit: 4** **Course Code:21PCS313P**

OBJECTIVE:

- To provide a practical introduction to the R programming language
- Understand to navigate and optimize the R integrated development environment (IDE)RStudio
- Learn to import external data, manipulate data for specific needs, and running summary statistics and visualizations

EXERCISE:

1. Write a R program using Simple Commands.
2. Write a R program using Control Structures.
3. Write a calculator program using R.
4. Data Preprocessing:
   a. Data type Conversion
   b. Data Transformation
5. Filters:
   a. Replace Missing Values
   b. Add Expression
6. Regression: Perform Simple Regression using R Package
7. Classification: Apply Naïve Bayes Rule by using R Package.
8. Clustering: Apply Partitioned Algorithm by using R Package.
9. Clustering: Apply Hierarchical Algorithm by using R Package.
10. Association Rule Mining: A-Priori Algorithm by using R Package.

Total Lecture Hours-45

COURSE OUTCOME

Upon completion of the course, students should be able to,

1 Understand to import external data into R for data processing and statistical analysis
2 Learn the main R data structures – vector and data frame
3 Understand to compute basic summary statistics
4 Develop data visualizations with the ggplot package
5 Evaluate fundamental error problems.

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

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(For the Candidates admitted in the academic year 2020 – 2021)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

Semester: III-EC-III(a): Network Security

Ins. Hrs. /Week: 6 **Course Credit: 3** **Course Code:21PCSE3A**

OBJECTIVES:

- To provide knowledge for establishing secured network based computing and information systems
- To learn about how to maintain the Confidentiality, Integrity and Availability of data
- To understand various protocols for network security to protect against the threats in the networks

UNIT- I: Classical Encryption Techniques (14 Hours)

Symmetric Cipher model: Cryptography – Cryptanalysis and Brute-Force Attack-**Substitution Techniques:** Caesar Cipher – Monoalphabetic Ciphers – Playfair Cipher – Hill Cipher – Polyalphabetic Ciphers – One Time Pad Transposition Techniques – Rotor Machines – Steganography.

UNIT- II: Block ciphers and the Data Encryption Standards (16 Hours)

Traditional Block Cipher Structure-Stream Ciphers and block Ciphers – Motivation for the Feistel Cipher Structure – The Fiestel Cipher-**The Data Encryption Standard:** DES Encryption – DES Decryption-**The Strength of DES:** The use of 56-Bit Keys – The Nature of the DES Algorithm – Timing Attacks-**Block Cipher Design Principles:**Number of Rounds – Design of function F – Key Schedule Algorithm-**Public Key Cryptography and RSA:** Public Key Cryptosystems-Applications for Public-Key Cryptosystems – Requirementsfor public-Key Cryptography – Public Key Cryptanalysis-The RSA Algorithm-**Cryptographic Hash Functions:** Applications of Cryptographic Hash Functions – Requirements and Security- HashFunctions based on Cipher Block chaining – Secure Hash Algorithm – SHA-3.

UNIT- III: Transport level Security (08 Hours)

Web Security Considerations: Web Security Threats- Web Traffic Security Approaches-**Secure Socket Layer :** SSL Architecture – SSL Record Protocol – Change Cipher Spec Protocol – Alert Protocol – Handshake Protocol- Cryptographic Computations- **Transport Layer Security:** Version Number- Message Authentication Code – Pseudorandom Function –Alert Codes – Cipher Suites – Client Certificate types – Certificate Verify and Finished Messages – Cryptographic Computations – Padding-HTTPS – Secure Shell(SSH) - **Electronic MailSecurity:** Pretty Good Privacy – S/MIME – Domain keys Identified Mail.

UNIT- IV: Wireless Network Security and IP Security (12 Hours)

Wireless Security- Wireless Network Threats – Wireless Security Measures-**Mobile Device Security:** Security Threats – Mobile Device Security Strategy-**IEEE 802.11 Wireless LAN Overview:** The Wi-Fi Alliance – IEEE 802 Protocol Architecture – IEEE 802.11 Network Components and Architectural Model – IEEE 802.11 Services- **IEEE 802.11i Wireless LAN Security :** IEEE 802.11i Services – IEEE 802.11i Phases of Operations Discovery Phase – Authentication Phase – Key Management Phase – Protected data Transfer Phase-The IEEE Pseudorandom Function-**IP Security:** Overview-IP Security policy – Encapsulating Security Payload – Combining Security Associations – Internet Key Exchange.

UNIT- V: Web and System Security **(10 Hours)**

Web Security-Secure socket layer and transport layer security - secure electronic transaction (SET) - **System Security:** The Security Problem - Program Threats- System and Network Threats - Cryptography as a Security Tool Cryptography as a Security Tool- User Authentication- Implementing Security Defenses-Firewalling to Protect Systems and Networks- Computer-Secrity Classifications -**An Example:** Windows XP.

Total Lecture Hours- 60

COURSE OUTCOME:

Upon completion of the course, students should be able to,

1. Understand the concepts, methods of Network Security using cryptography basics
2. Understand the Hash Functions in network security
3. To learn about IP security, Wireless Network security
4. To know about Web security
5. To know about system security

TEXT BOOK(S):

1. Behrouz A .Ferouzan, 2015, "Cryptography & Network Security", Tata Mc Graw Hill, India.
2. Neal Krawetz, 2007, Introduction to Network Security, Charles River media Publications.
3. William Stallings, 2020, "Cryptography and Network Security-Principles and Practices",Eighth edition, Pearson Publications, India.

REFERENCE BOOK(S):

1. Johannes Buchaman.A, 2004, "Introduction to cryptography" (2nd edition), ISBN 0 387 20756 2Springer, United States.
2. Robert Collins, 2017, "Network Security Monitoring: Basics for Beginners", A Practical Guide.
3. William Stalings, 2016, "Network Security Essentials-Applications and Standards", Sixth Edition,Pearson Publications, India.
4. William Stallings, 2003, "Cryptography and Network Security-Principles and Practices", Prentice-Hall, Third edition, **ISBN:**8178089025, India.

E_RESOURCES:

1. http://www.cs.vsb.cz/ochodkova/courses/kpb/cryptography-and-network-security_- principles-and-practice-7th-global-edition.pdf
2. http://uru.ac.in/uruonlinelibrary/Cyber_Security/Cryptography_and_Network_Security.pdf
3. https://youtu.be/2Z3toEiY5ll

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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

Semester: III-EC-III (b): Soft Computing

Ins. Hrs. /Week: 6 **Course Credit: 3** **Course Code:21PCSE3B**

OBJECTIVE:

- To provide an introduction to the basic principles, techniques, and applications of soft computing
- To develop some familiarity with current research problems and research methods in Soft Computing by working on a research or design project
- To impart knowledge in Fuzzy Set Theory, Optimization, Neural Networks, Neuro Fuzzy Modeling and Application of Computational Intelligence

UNIT- I: Fuzzy Set Theory (14 Hours)

Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set – Theoretic Operations – Member Function Formulation and Parameterization – **Fuzzy Rules and Fuzzy Reasoning**: Introduction – **Extension Principle and Fuzzy Relations:** Extension Principle-Fuzzy Relations – **Fuzzy If Then Rules:** Linguistic Variables- Fuzzy If Then Rules – **Fuzzy Reasoning**: Compositional Rule of Inference Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models.

UNIT-II: Optimization (14 Hours)

Derivative based Optimization –Introduction- Descent Methods-Gradient Based methods – The Method of Steepest Descent – **Newton's Methods:** Classical Newton's Method–ModifiedNewton's Method – Quasi Newton's Method– **Step Size Determination**: Initial Bracketing-Line Searches-Termination Rules **Conjugate Gradient Methods:** Conjugate Directions-From Orthogonality to Conjugacy-Conjugate Gradient Algorithms– **Derivative Free Optimization:** Genetic Algorithms – Simulated Annealing – Random Search – Downhill Simplex Search.

UNIT-III: Neural Networks (11 Hours)

Supervised Learning Neural Networks – **Perceptrons**: Architecture and Learning Rule-Exclusive -OR Problem – Adaline- Backpropagation Multilayer perceptrons –Backpropagation Learning Rule-Methods of Speeding Up MLP Training- MLP's Approximation Power- **Radial Basis Function Networks**: Architecture and Learning Methods-Functional Equivalence to FIS- Interpolation and Approximation RBFNs – Unsupervised Learning and Other Neural Networks – Competitive Learning Networks – Kohonen Self – Organizing Networks – Learning Vector Quantization Hebbian Learning.

UNIT-IV: Neuro Fuzzy Modeling (10 Hours)

Adaptive Neuro Fuzzy Inference Systems – Introduction– ANFIS Architecture – Hybrid Learning Algorithm – Learning Methods that Cross fertilize ANFIS and RBFN – ANFIS as a Universal Approximator-Coactive Neuro Fuzzy Modeling – Framework – Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum- **Data Clustering Algorithms:** Introduction-K-Means Clustering-Fuzzy C-Means Clustering- Mountain Clustering Method- Subtractive Clustering.

UNIT-V: **Application of Computational Intelligence** **(11 Hours)**

ANFIS Applications- Printed Character Recognition – Inverse Kinematics Problems – Automobile MPG Prediction-Nonlinear System Identification – Channel Equalization- Adaptive Noise Cancellation-Soft Computing for Color Recipe Prediction-**Fuzzy Sets and Generic Algorithms in Game Playing:** Introduction-Variants of Genetic Algorithms-Using Genetic Algorithms in Game Playing-Simulation Results of the Basic model- Using Fuzzily Characterized Features-Using Polyploid GA in Game playing.

Total Lecture Hours- 60

COURSE OUTCOME

The students will be able to,

1. Comprehend the fuzzy logic and the concept of fuzziness involved in various systems and fuzzy set theory
2. Understand the concepts of fuzzy sets, knowledge representation using fuzzy rules, approximate reasoning, fuzzy inference systems, and fuzzy logic
3. To understand the fundamental theory and concepts of neural networks, Identify different neural network architectures, algorithms, applications and their limitations
4. Understand appropriate learning rules for each of the architectures and learn several neural network paradigms and its applications
5. Reveal different applications of these models to solve engineering and other problems

TEXT BOOK(S)

1. Jang. J.S.R, Sun. C.T and Mizutani.E, 2004, "Neuro Fuzzy and Soft Computing", PHI, Pearson Education, India.
2. Stamatios Kartalopoulos.V, 2004, "Understanding Neural Networks and Fuzzy Logic Basic concepts& Applications", IEEE Press, PHI, New Delhi.

REFERENCE BOOK(S)

1. Ahmar, Abbas, 2003, "Grid Computing - A Practical Guide to technology and Applications", CharlesRiver media.
2. Timothy Ross.J, 1977, "Fuzzy Logic with Engineering Application, "McGraw Hill, India
3. Vojislav Kecman, 2006 ,"Learning & Soft Computing Support Vector Machines, Neural Networks, andFuzzy Logic Models", Pearson Education, New Delhi.

E-RESOURCES

1. https://www.slideshare.net/ganeshpaul6/soft-computing-14879490
2. https://www.worldscientific.com/worldscibooks/10.1142/p773

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., COMPUTER SCIENCE

Semester: III-EDC-II (a): Internet and Its Applications

Ins. Hrs. /Week: 4 **Course Credit: 2** **Course Code:21PCSED2A**

OBJECTIVE:

- Designed to aim at imparting a basic level of Internet Concepts
- Absorption of the basic working of Email and other features of using E-mail
- Familiarize students with basic idea about web concepts and social media

UNIT- I: Internet Concepts **(09 Hours)**

Introduction - Internet Connection Concepts -Working methods of internet-Web Browser- Types of Web Browser- Web Server and its types- Internet Service Provider (ISP)-Uniform Resource Locator (URL) -Web Client- Getting Connected - Connecting to Dial up internet Accounts - High Speed Connections ISDN - ADSL, and Cable Modes -Internet Technologies – DNS-WWW- Elements of Web-Web Browsing- Intranet connecting LAN to the Internet.

UNIT- II: E-mail Concepts **(09 Hours)**

Email Concepts – Working of Email- Components of E-mail System-E-mail Application - E-mail Client-E-mail Server -E-mail Account - E-mail Addressing -Identifying E-mail Address- E-mail Basic Commands - Sending and Receiving Files by E-mail -Types of E-mail- The Benefits of E-mail - E-mail Etiquette - Controlling E-mail volume - Send and Receiving Secure E-mail- E-mail -Viruses- Digital signatures.

UNIT- III: Internet Services **(09 Hours)**

Introduction-Internet- Intranet-Extranet-Internet Conferencing Concepts -Categories of Internet Services-Communication Services-Information Retrieval Services-Internet Connectivity- Internet protocols- E-mail Mailing Lists - Newsgroups -working of Usenet Newsgroup – Usenet Newsgroup Concepts - Reading Usenet Newsgroups - Usenet Netiquette - Mailing List Vs Newsgroup - Discussion forums -Video Conferencing- Modes of Video Conferencing-Video Sharing.

UNIT- IV: Social Media **(09 Hours)**

Online Chatting - Chat Etiquette - Web based chat services - Instant Messaging (IP)- Internet Relay Chat (IRC) - Internet Telephony - Advantages of Internet Telephony - Voice over InternetProtocol (VOIP) - Videoconferencing - Components of Complete Video Conferencing System- Whatsapp- Telegram - Instagram - Facebook - Twitter - Making money on the Internet.

UNIT- V: Security **(09 Hours)**

Introduction - Goals of information of Security - Security Protocols - Threats - EmailPhishing - Data Encryption - Types of Encryption - Hashing - Digital Signature - Firewall Security - Security Attacks - Security Properties -**Security Mechanism:** Attack Prevention - **Attack Avoidance:** Public key cryptography - secret key cryptography - Secure Network Protocol - Secure Applications.

Total Lecture Hours- 45

COURSE OUTCOME

The students will be able to,

1. Understand the concepts of computer and its memory storage
2. Understand the internet and its applications
3. To acquire about WWW concepts
4. To know about creation of email and uses of functions
5. Perform with presentation skills

TEXT BOOK(S)

1. Alexis Leon, Mathew Leon,2000, “Internet for everyone”, Leon Tech world, Chennai, India.
2. Rohit Khurana,2010, “Computer Fundamentals Internet Basics” , APH Publishing Corporation.

REFERENCE BOOK(S)

1. Alexis Leon and Mathews Leon “Internet for everyone” -Leon Tech World Publication.
2. Doja.M. N,2005, “Fundamentals of computer and information Technology”, Deep and Deep Publications.
3. Xavier.C,2006, “World Wide Web with HTML”,Tata Mc-Graw Hill, New Delhi.

E-RESOURCES

1. https://web.sonoma.edu/users/f/farahman/sonoma/courses/es465/lectures/es465_fall2010/lect_ch1.pdf
2. https://www.youtube.com/watch?v=obmsLCEUSoM
3. https://www.slideshare.net/osuchin/internet-basics-13440260
4. https://www.netliteracy.org/wp-content/uploads/2012/07/Basic-Internet-Skills.pdf

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PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

Semester: III EDC-II (b): Introduction to Web Design

Ins. Hrs. /Week: 4 **Course Credit: 2** **Course Code:21PCSED2B**

OBJECTIVES:

- To fabricate the important features of HTML
- To create HTML documents and enhance them with browser extension
- To evaluate CSS Features and Web Hosting

UNIT- I: Web Design Principles **(09 Hours)**

Principles of Web Designing: Simple is the best - Consistency - Typography and Readability - Mobile Compatibility - Colour palette and imaginary - Easy loading - Easy Navigation - Communication - Planning process - Five Golden rules of web designing - **Designing Navigation:** Structural Navigation - Associative Navigation - Utility Navigation - Page design - Home Page Layout- Design Concept - Why create a web site - Web Standards - Audience requirement.

UNIT- II: Introduction to HTML **(09 Hours)**

Designing a HTML Page -HTML History - HTML Documents - Basic structure of an HTML document - Head and Body Sections - HTML Editors - Creating an HTML document - Designing the Body Section - Formatting Text by using Tags - Heading - Applying Bold and Italic Formatting- Paragraphs - Line Breaks - HTML Tags - Tab Settings - Comments - Attributes - Quotations
- colors - Style and Symbols.

UNIT- III: Elements of HTML **(09 Hours)**

Introduction to elements of HTML - Working with Text - Working with List- Orderedand Unordered List - Table Handling - Cell spanning Multiple Rows and Columns - Frames - Nested Frame sets - Working with Hyperlinks - Images - Image Map - Background Images - The Picture Element -**Multimedia:** Video- Audio- Plugins - Working with Forms - Forms attributes and Elements - Controls.

UNIT- IV **(09 Hours)**

Introduction to Cascading Style Sheets: Concept of CSS - Creating Style Sheet - CSS Properties - CSS Styling (Background, Text Format, Controlling Fonts) -Working with block elements and objects -Working with Lists and Tables - **Box Model** : Border Properties - Padding Properties - Margin Properties . **CSSAdvanced:** Grouping - Dimension - Display - Positioning - Floating - Align - Pseudo class - Navigation bar -Image sprites - Attribute Sector - CSS Id and Class - CSS Color - Creating page Layout and Site Designs.

UNIT- V **(09 Hours)**

Introduction to Web Publishing or Hosting: Prerequisites for Website Publishing - Web Development Software - Internet Connection - Web Server - Web Hosting Overview - Types of Hosting - Web Hosting Companies - Creating the Web Site - Choosing the correct Domain - Saving the site - Working on the web site - Creating web site structure - Creating Titles for web pages - Themes-Publishing website.

Total Lecture Hours- 45

COURSE OUTCOME

The students will be able to,

1. Understand the features of Web design
2. Develop a web pages using the concept of HTML using CSS
3. Capable of design website using different techniques
4. Understand the concept of Page Layout and Site Designs
5. Publishing websites with different themes

TEXT BOOK(S)

1. Kogent Learning Solutions Inc,"HTML 5 in simple steps"-. published by Dreamtech Press, NewDelhi.
2. Murray,Tom/Lynchburg, "Creating a Web Page and Web Site".
3. Xavier.C,2006, "World Wide Web with HTML",Tata Mc-Graw Hill, New Delhi.

REFERENCE BOOK(S)

1. Ian Pouncey, Richard York, "Beginning CSS: Cascading Style Sheets for Web Design"-published by Wiley India.
2. John Duckett, "Beginning HTML, XHTML, CSS, and JavaScript" published by Wiley India.
3. Steven M. Schafer, "HTML, XHTML, and CSS Bible", 5ed- published by Wiley India.

E-RESOURCES

1. https://www.slideshare.net/sirchristopher/introduction-to-css-68864307
2. https://www.youtube.com/watch?v=BvJYXl2ywUE.

SEMESTER -IV

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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(For the Candidates admitted in the academic year 2020 – 2021)
PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE
M.Sc., COMPUTER SCIENCE

Semester: IV-CC-XI: Artificial Intelligence

Ins. Hrs. /Week: 6 **Course Credit: 4** **Course Code:21PCS414**

OBJECTIVES:

- To describe the concepts of Artificial Intelligence
- To know about the methods of solving problems using Artificial Intelligence
- To know about concepts of Expert Systems and machine learning

UNIT-I: Introduction to Artificial Intelligence (18 Hours)

Various Definitions of AI-Foundation of AI-Strong and Weak AI-History of AI-**Current Trends in AI:** Game Playing-Logistic Planning-Robotics- Language understanding and Problem Solving-Human Vs Machine-Feature of Artificial Intelligence-**Intelligent Agents:** Agents and it's Environment – Architecture of Agent- Role of an Agent Program-The weak and Strong Agent-The Environments-Types of Agents-Designing an Agent System.

UNIT-II: Problem solving Methods (18 Hours)

Problem solving Methods- Search Strategies- Uninformed – Informed– Heuristics – Local Search Algorithms and Optimization Problems – Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation – Backtracking Search –Game Playing – Optimal Decisions in Games – Alpha–Beta Pruning – Stochastic Games.

UNIT-III: Knowledge Representation (18 Hours)

First Order Predicate Logic – Prolog Programming – Unification – Forward Chaining-Backward Chaining – Resolution – Knowledge Representation – Ontological Engineering-Categories and Objects – Events – Mental Events and Mental Objects – Reasoning Systems for Categories–Reasoning with Default Information.

UNIT-IV: Introduction to Software Agent (11 Hours)

Agent Characteristics-Approaches to Agent Design- **Architecture for Intelligent Agents:** Agent Architectures – Types of Agents-**Communication among Agents:** Basic concepts of ACL (Agent Communication Language)-Agents and Objects- Agents and Expert System- Negotiation and Bargaining –Argumentation in Artificial Intelligence-Artificial Neural Networks.

UNIT-V: Applications (10 Hours)

AI applications - **Language Models:** N-gram character models- Smoothing n-gram models-**Information Retrieval**: The PageRank Algorithm- IR system evaluation-Natural LanguageProcessing-**Speech Recognition:** Acoustic Model-Language Model-Building Speech Recognizer- **Robot Hardware:** Sensors-Effectors-Perception-Planning- Moving.

Total Lecture Hours- 75

COURSE OUTCOMES

The students will be able to,

1. Understand the problems that are amenable to solution by AI methods
2. Understand the appropriate AI methods to solve a given problem
3. Learn about the Formalize given problem in the language/framework of different AI methods.
4. Implement basic AI algorithms
5. Describe about design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports

TEXT BOOK(S)

1. Anamitra Deshmukh-Nimbalkar, 2020, " Artificial Intelligence", First Edition, Technical Publications, Chennai, Tamil Nadu.
2. David Poole.L, Alan Mackworth.K, 2010, "Artificial Intelligence: Foundations of Computational Agents", Second Edition, Cambridge University Press, Cambridge, England.
3. Elaine Rich and Kevin Knight," 1991, Artificial Intelligence", Second Edition, Tata McGrawHill Publishers New Delhi, India.

REFERENCE BOOK(S)

1. Ethem Alpaydin, 2009, "Introduction to Machine Learning (Adaptive computation and Machine Learning Series)", Second Edition, The MIT Press, Cambridge, London.
2. Stuart Russel and Peter Norvig, 2007, "AI – A Modern Approach", 2nd Edition, Pearson Education, London, England.

E-RESOURCES

1 https://bit.ly/3ehDIG4
2 https://bit.ly/3suPDWf
3 https://bit.ly/2Q6dlLv

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(For the Candidates admitted in the academic year 2020 – 2021)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M.Sc., COMPUTER SCIENCE

Semester: IV-CC- XII: Advanced Computer Architecture

Ins. Hrs. /Week: 6 **Course Credit:3** **Course Code:21PCS415**

OBJECTIVES:

- To describe the advanced computer Architecture and theories of parallel computing
- To explain the network properties and applications of cost-effective computer systems to meet the requirements.
- To illustrate Processors and Memory hierarchy, Concepts of Pipelining Multiprocessors and Multicomputer and Parallel Programming

UNIT- I: Parallel Computer Models **(15 Hours)**

The state of computing: Computer Development Milestones - Elements of Computers - Evolution of Computer architecture - System Attributes to Performance - **Multiprocessors and Multicomputers:** Shared-Memory Multiprocessors - Distributed- Memory Multicomputers - A Taxonomy of MIMD Computers – **Multivector and SIMD computers:** Vector Supercomputers - SIMD Supercomputers – **PRAM and VLSI Models:** Parallel Random-Access Machines – VLSI Complexity Model.

UNIT- II: Program and Network Properties **(17 Hours)**

Conditions of Parallelism: Data and Resource Dependencies - Hardware and Software Parallelism - The Role of Compilers – **Program Partitioning and Scheduling:** Grain Sizes and Latency - Grain Packing and Scheduling - Static Multiprocessor Scheduling – **Program flow mechanisms:** Control Flow Versus Data Flow fit - Demand-Driven Mechanisms - Comparison of Flow Mechanisms – **System Interconnect Architectures:** Network Properties and Routing - Static Connection Networks - Dynamic Connection Networks.

UNIT- III: Processors and Memory Hierarchy **(16 Hours)**

Advanced processor Technology: Design space of processors - Instruction set architecture - CISC scalar processors - RISC scalar processors – **Super scalar and Vector processors:** Superscalar Processors - The VLIW Architecture - Vector and Symbolic Processors – **Pipelining and Superscalar Techniques- Linear Pipeline Processors-**Asynchronous and Synchronous Models - Clocking and Timing Control - Speedup, Efficiency and Throughput – **Nonlinear Pipeline Processors:** Reservation and Latency Analysis - Collision Free Scheduling - Pipeline Schedule Optimization - Types of Pipeline Design.

UNIT- IV: Multiprocessors and Multicomputers **(14 Hours)**

Multiprocessor System interconnects: Hierarchical bus systems - Crossbar switch and multiport memory - Multistage and combining networks – Three Generations of Multicomputers - **Message Passing Mechanisms:** Message passing schemes - Deadlock virtual channels - Flow control strategies - Multicast routing algorithms – **SIMD Computer Organizations:** Implementation models - CM-2 architecture - Mas-par MP-1 architecture – The **Connection Machine CM 5:** Synchronized MIMD machine - CM-5 network architecture - Control processors and processing nodes - Inter-processor communications.

UNIT- V: Software for Parallel Programming **(13 Hours)**

Parallel Programming Models: Shared-Variable Model - Message Passing Model - Data-Parallel Model - Object-Oriented Model - Functional and Logic Models– **Parallel Languages and Compilers:** Language Features for Parallelism - Parallel Language Constructs - Optimizing Compilers for Parallelism – **Dependence Analysis of Data Arrays:** Iteration Space and Dependence Analysis Subscript Separability and Partitioning - Categorized Dependence Tests

Total Lecture Hours- 75

Course Outcome

The students will be able to,

1. Understand the concepts of advanced computer Architecture and theories of parallel computing
2. Understand the network properties and applications of cost-effective computer systems to meet therequirements
3. Learn about Processors and Memory hierarchy and Concepts of Pipelining
4. Describe about Multiprocessors and Multicomputers
5. Illustrate the concept of and Parallel Programming

Text Book(S)

1. Kai Hwang and Naresh Jotwani, 2017, "Advanced Computer Architecture - Parallelism, Scalability,Programmability", Third Edition, McGraw-Hill International – USA
2. Kai Hwang and Faye Briggs. A, 2000, "Computer Architecture and Parallel Processing", McGraw-Hill International Edition, USA.

REFERENCE BOOK(S)

1. John Hennessy.L, David Patterson. A, 2019, "Computer Architecture A Quantitative Approach",6th Edition, Elsevier, USA.
2. Michael Quinn.J, 2017, "Parallel Computing, Theory and Practice", McGraw-Hill InternationalEdn., 2nd Edition,Singapore
3. Richard Kain.Y, 2015, "Advanced Computer Architecture – A Systems Design Approach" 1st Edition,Pearson Education, India.

E-RESOURCES:

1. https://onlinecourses.nptel.ac.in/noc19_cs62/preview
2. http://www.stet.edu.in › SSR_Report › PDF › 3.pdf
3. https://vincyjoseph.files.wordpress.com/2014/01/computer_architecture_hwang_brigg.pdf