

Bharathi Women's College
(Autonomous)
Chennai - 600 108
PG Department of Computer Science



M.Sc. Computer Science

SYLLABUS

2019-2020

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS)

M.Sc., DEGREE COURSE IN COMPUTER SCIENCE

CHOICE BASED CREDIT SYSTEM

(To Take Effect from the Academic Year 2019-2020 and Thereafter)

REGULATIONS

1. CONDITIONS FOR ADMISSION

Candidates with B.Sc. Degree in Computer Science or Computer Science & Technology or B.C.A. degree of this University or any other degree accepted as equivalent thereto by the syndicate shall be eligible for admission to M.Sc Computer Science Degree course in Bharathi Women's College (Autonomous), Chennai-108.

2. ELIGIBILITY FOR THE AWARD OF DEGREE

A candidate shall be eligible for the award of the degree only if he/she has undergone the prescribed course of study in a college affiliated to the University for a period of not less than two academic years, passed the examination of all the four semesters prescribed earning 91 credits and fulfilled such conditions as have been prescribed thereof.

3. DURATION OF THE COURSE

The duration of the course is for two academic years consisting of four semesters.

4. EXAMINATIONS

There shall be four semesters examination: first semester examination at the middle of the first academic year and the second semester examination at the end of the first academic year. Similarly, the third and fourth semester examinations shall be held at the middle and the end of the second academic year, respectively.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI -108
M.Sc. COMPUTER SCIENCE
(CBCS Syllabus for PG students admitted from the academic year 2019-2020)

SEMESTER I

Part	Course Component	Code	Title of the Paper	Credit	Hrs/ week	ESE	CIA	Total
I	Core T-1	19MHA	Advanced Java Programming	5	5	75	25	100
	Core T-2	19MHB	Advanced Computer Architecture	5	5	75	25	100
	Core T-3	19MHC	Software Project Management	5	5	75	25	100
	Core P-1	19MH1	Advanced Java & Latex Lab	5	6	60	40	100
II	Core Elective 1 (Any one)	19EH1	Cryptography and Network Security	4	4	75	25	100
		19EH2	Advanced Computer Networks	4	4	75	25	100
		19EH3	Wireless Networks	4	4	75	25	100
	Core Elective 2 (Any one)	19EH4	Optimization Techniques	4	5	75	25	100
		19EH5	Statistical Computing	4	5	75	25	100
		19EH6	Theory of Computation	4	5	75	25	100
	Soft Skill	19MS1	Language & Communication Skills	2	-	-	-	100

SEMESTER II

I	Core T-4	19MHD	Windows and Visual C++ Programming	4	4	75	25	100
	Core T-5	19MHE	Open Source Software Technologies	4	4	75	25	100
	Core T-6	19MHF	Machine Learning	4	4	75	25	100
	Core P-2	19MH2	Visual C++ Programming & Open Source Software Technologies Lab	5	6	60	40	100
II	Core Elective 3 (Any one)	19EH7	Advanced Data Base Management System	4	4	75	25	100
		19EH8	Embedded Systems	4	4	75	25	100
		19EH9	Distributed Operating System	4	4	75	25	100
	Core Elective 4 (Any one)	19EH10	Cloud Computing	4	4	75	25	100
		19EH11	Pervasive Computing	4	4	75	25	100
		19EH12	Game Programming	4	4	75	25	100
	Supp-Elective 1	19SH1	E-Commerce	3	4	75	25	100
	Soft Skill	19MS2	Life and Managerial Skills	2	-	-	-	100

SEMESTER III

II	Core T-7	19MHG	Dot Net Programming	5	5	75	25	100
	Core T-8	19MHH	Data Mining Techniques	5	5	75	25	100
	Core T-9	19MHJ	Design and Analysis of Algorithms	5	5	75	25	100
	Core P-3	19MH3	Dot Net Programming Lab & Data Mining Tool	5	6	60	40	100
II	Core Elective 5 (Any one)	19EH13	Soft Computing	4	5	75	25	100
		19EH14	Parallel Processing	4	5	75	25	100
		19EH15	Compiler Design	4	5	75	25	100
	Supp-Elective 2	19SH2	Web Services	3	4	75	25	100
	Soft Skill	19MS3	Essentials of Spoken & Presentation Skills	2	-	-	-	100
	Soft Skill	19MS5	Internship	2	-	100	-	100

SEMESTER IV

I	Core T-10	19MHK	Mobile Computing	4	5	75	25	100
	Core T-11	19MHL	Big data Analytics	5	5	75	25	100
	Project	19MH4	Project & Viva Voce	8	20	-	-	100
	Soft Skill	19MS6	Contemporary Awareness	2	-	75	25	100

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI - 108.

Choice Based Credit System for PG from the academic year 2019-20

Pattern for M.Sc., COMPUTER SCIENCE

I SEMESTER				II SEMESTER				III SEMESTER				IV SEMESTER			
Sub	Order. of Pap.	Cr.	Hrs.	Sub	Order. of Pap.	Cr.	Hrs.	Sub	Order. of Pap.	Cr.	Hrs.	Sub	Order. of Pap.	Cr.	Hrs.
Core	1	5	5	Core	4	4	4	Core	7	5	5	Core	10	4	5
Core	2	5	5	Core	5	4	4	Core	8	5	5	Core	11	5	5
Core	3	5	5	Core	6	4	4	Core	9	5	5	Project	1	8	20
Pract	1	5	6	Pract	2	5	6	Pract	3	5	6				
Elective	1	4	4	Elective	3	4	4	Elective	5	4	5				
Elective	2	4	5	Elective	4	4	4								
				Supportive Elective	1	3	4	Supportive Elective	2	3	4				
Soft skill	1	2	-	Soft skill	2	2	-	Soft skill	3	2	-	Soft skill	4	2	-
								Internship	1	2	-				
TOT		30	30			30	30			31	30			19	30

TOTAL CREDITS

110

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE PAPER I – ADVANCED JAVA PROGRAMMING

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 5

SEMESTER : I

CREDITS : 5

SUBJECT CODE: 19MHA

OBJECTIVES

Advanced Java is a comprehensive study of several advanced Java topics. After studying this subject, the student will be able to: Create network based applications- Create business applications- Implement Server side programming.- Develop dynamic software components.- Develop database application-Design and develop powerful GUI based components.- Create Animation using Applet, Thread and AWT controls.

UNIT I

Applet fundamentals- Applet Class-Applet lifecycle- Steps for Developing Applet Programs- Passing Values through Parameters- Event handling with AWT components Creating Windows and graphics – Layout Managers- Swing component classes- borders- Tree – Table – Tabbed panels – scroll panes

UNIT II

Java Beans: Advantages –Introspection-Bound and Constrained Properties- Persistence – Customizes – Java Beans API - Networking: Basics – Inet Address – TCP/IP Client Sockets – URL – Datagrams – URI class.

UNIT III

Database Programming : Design of JDBC- Structured Query Language - JDBC Configuration – Executing SQL Statements – Query Execution – Scrollable and Updatable Result Sets – Row Sets – Metadata – Transactions .

UNIT IV

Servlet: The Life Cycle of a Servlet – Servlet Development Options – Using Tomcat – Simple Servlet – Servlet API – javax.servlet package – Reading Servlet Parameters – javax.servlet.http package – Handling HTTP Requests and Responses- Using Cookies- Session Tracking.

UNIT V

JSP Syntax and Semantics – Expressions, Scriptlets and Declarations –Session and Thread Management - RMI : Roles of Client and Server - Remote Method Calls - The RMI Programming Model – Parameters and Return Values in Remote Methods – Remote Object Activation .

TEXT BOOKS

1. Herbert Schildt - The Complete Reference Java - Tata McGraw Hill Publishing Company Limited Edition 8. (Unit –I, Unit-II, IV)
2. Cays Horstmann and Gary Cornell - Core Java Volume II, Pearson Edition, 2001 (Unit-III, V)
3. Phil Hanna - The Complete Reference JSP 2.0 - Tata McGraw Hill Publishing Company Limited Edition 2003. (Unit-V)

REFERENCE BOOKS

1. P. Naughton and H. Schildt – “Java2: The Complete Reference” - Tata McGraw Hill Publishing Company Limited, Edition 3, 1999.
2. K. Arnold and J. Gosling – “The Java Programming Language” - Edition 2, Publication, 2000
3. Karl Moss – “Java Servlets Developers Guide”- Tata McGraw Hill Publishing Co.Ltd.

OUTCOMES:

- Able to develop a Graphical User Interface (GUI) with Applet and Swing.
- Develop a Client-Server Application with Database Maintenance.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE PAPER II – ADVANCED COMPUTER ARCHITECTURE

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 5

SEMESTER: I

CREDITS : 5

SUBJECT CODE: 19MHB

OBJECTIVES

Main objective of this paper is to provide an exposure to current and emerging trends in Computer Architectures, focusing on performance and the hardware/software interface. The emphasis is on studying and analyzing fundamental issues in architecture design and their impact on performance.

UNIT I

Parallel Computer Models - Program and Network Properties: Conditions of parallelism – Program partitioning and scheduling – Program flow mechanisms.

UNIT II

Processors and Memory Hierarchy: Advanced Processor Technology - Superscalar and Vector processors – Virtual memory technology- Bus, Cache and Shared Memory.

UNIT III

Pipelining and Superscalar Techniques: Linear pipeline processors- Non-linear pipeline processors- instruction pipeline design- arithmetic pipeline design- Superscalar pipeline design.

UNIT IV

Multiprocessors and Multicomputers: Microprocessor System Interconnects- Cache Coherence and Synchronization Mechanisms- Three generations of multicomputers – Message Passing Mechanisms.

UNIT V

Multi-vector and SIMD Computers: Vector Processing Principles- Multivector Multiprocessors- Compound Vector Processing – SIMD Computer Organizations- Connection Machine CM-5.

TEXT BOOKS

Kai Hwang, Naresh Jotwani “Advanced Computer Architecture: Parallelism, Scalability and Programmability”, McGraw-Hill Inc., 2016.

REFERENCE BOOKS

1. M.M Mano, “System Architecture”, Third Edition.
2. V.C. Hamachar, G.Vranesic, S.C zaky, “Computer organization”.

OUTCOMES:

- Exposure to advance concepts of parallel and vector processing.
- Gain Knowledge about system architecture and multiprocessors.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600108.

M.Sc. - COMPUTER SCIENCE

CORE PAPER III – SOFTWARE PROJECT MANAGEMENT

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 5

SEMESTER: I

CREDITS : 5

SUBJECT CODE : 19MHC

OBJECTIVES

This course introduces the various concepts related to Software Project Management

UNIT I

Introduction to Software Project Management: Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

UNIT II

Project Evaluation : Strategic Assessment – Technical Assessment – Cost Benefit Analysis
Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation

UNIT III

Activity Planning : Objectives – Project Schedule – Sequencing And Scheduling Activities – Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity On Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.

UNIT IV

Monitoring And Control : Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

UNIT V

Managing People And Organizing Teams : Introduction – Understanding Behavior – Organizational Behaviour: A Background – Selecting The Right Person For The Job –

Instruction In The Best Methods – Motivation – The Oldman–Hackman Job Characteristics Model – Working In Groups – Becoming A Team – Decision Making – Leadership – Organizational Structures – Stress – Health And Safety – Case Studies.

TEXT BOOKS

1.Bob Hughes and Mike Cotterell, 2004, Software Project Management, Fourth Edition, Tata McGraw Hill Edition.

REFERENCE BOOKS

- 1.Ramesh, Gopalaswamy, “Managing Global Projects”, Tata McGraw Hill, 2001.
- 2.Royce, “Software Project Theory”, Pearson Education, 1999
- 3.P.Jalote, “Software Project Management In Practice”, Pearson Education, 2000.

OUTCOMES:

- Analyze the scope, cost, timing, and quality of the project, at all times focused on project success as defined by project stakeholders.
- Align the project to the organization's strategic plans and business justification throughout its lifecycle.
- Identify project goals, constraints, deliverables, performance criteria, control needs, and resource requirements in consultation with stakeholders.
- Implement project management knowledge, processes, lifecycle and the embodied concepts, tools and techniques in order to achieve project success.
- Adapt projects in response to issues that arise internally and externally.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600108.

M.Sc. - COMPUTER SCIENCE

CORE PRACTICAL I – ADVANCED JAVA AND LATEX LAB

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 6

SEMESTER: I

CREDITS : 5

SUBJECT CODE: 19MH1

JAVA

1. Implement Event handling using AWT.
2. Implement Swing Components.
3. Performing Java Database Connectivity
4. HTML to Servlet Applications
5. Working with JavaBeans
6. Designing online applications with JSP
7. Implementing RMI
8. Applet to Servlet Communication

LATEX

1. Create a .tex file then add title, author and date information. Include text for some formatting, alignments, line breaks, bulleted lists, numbered lists and nesting lists. Generate a .pdf file.
2. Create a .tex file then enter text in landscape layout, double column, multiple column, boxes, frames, rotated text format illustrations.
3. Create a .tex file to include a document text with 3 sections, a few sub sections, a subsubsection, footnotes, margin notes and end notes then create references to a section. Add few citations and generate a .pdf file.
4. Create a .tex file to create a table between text. Add caption and reference then display the .pdf file.

5. Add an figure of any kind to a document, add caption and reference. Use command to convert one file format to another.
6. Create a .tex file then add math expressions in simple, differentiations, integrations, matrices, infinite series, cases, continued fractions, nested roots and boxed equations representations.
7. Create a .tex file to add algorithm and theorem environment.
8. Create a .tex file for typesetting in Indian languages.
9. Create a .tex file to include a bibliography list at the end of the document. Create a bibliography database for including citations inside the document.
10. Use Beamer package for making a slide show with some text, equations and illustrate the pause feature.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE ELECTIVE I – CRYPTOGRAPHY AND NETWORK SECURITY

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 4

SEMESTER : I

CREDITS : 4

SUBJECT CODE: 19EH1

OBJECTIVES

To introduces the concepts of cryptography and network security.

UNIT I

Introduction: Services, Mechanisms and Attacks - Classical Encryption Techniques - DES.

UNIT II

Public Key Cryptography and RSA- Other Public- Key Crypto systems.

UNIT III

Message Authentication & Hash Functions- Hash Algorithms.

UNIT IV

Network Security Practice: Authentication Applications-Electronic Mail Security.

UNIT V

System Security: Intruders-Malicious Software – Firewalls.

TEXT BOOKS

1. William Stallings, “Cryptography and Network Security: Principles & Practice”, Prentice Hall, 3rd Edition 2002.

REFERENCE BOOKS

1. Atul Kahate – “Cryptography and Network Security” – Tata McGraw Hill Publishing Co.Ltd.
2. Ankit Fadia and Manu Zacharia – “Intrusion Alert –an Ethical Hacking guide to Intrusion Detection”.

OUTCOMES:

At the end of the course, the student should be able to:

- Understand the fundamentals of networks security, security architecture, threats and vulnerabilities.
- Apply the different cryptographic operations of symmetric cryptographic algorithms
- Apply the different cryptographic operations of public key cryptography
- Apply the various Authentication schemes to simulate different applications.
- Understand various Security practices and System security standards

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE ELECTIVE I – ADVANCED COMPUTER NETWORKS

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 4

SEMESTER : I

CREDITS : 4

SUBJECT CODE: 19EH1

OBJECTIVES:

- To study communication network protocols, different communication layer structure.
- To learn security mechanism for data communication.

UNIT I:

Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP models – Example networks: Internet, 3G Mobile phone networks, Wireless LANs –RFID and sensor networks - Physical layer – Theoretical basis for data communication - guided transmission media

UNIT-II:

Wireless transmission - Communication Satellites – Digital modulation and multiplexing - Telephones network structure – local loop, trunks and multiplexing, switching. Data link layer: Design issues – error detection and correction.

UNIT III:

Elementary data link protocols - sliding window protocols – Example Data Link protocols – Packet over SONET, ADSL - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols.

UNIT IV:

Network layer - design issues - Routing algorithms - Congestion control algorithms – Quality of Service – Network layer of Internet- IP protocol – IP Address – Internet Control Protocol.

UNIT V:

Transport layer – transport service- Elements of transport protocol - Addressing, Establishing & Releasing a connection – Error control, flow control, multiplexing and crash recovery - Internet Transport Protocol – TCP - Network Security: Cryptography.

TEXT BOOK:

1.A. S. Tanenbaum, 2011, Computer Networks, Fifth Edition, Pearson Education, Inc.

REFERENCE BOOKS:

- 1.B. Forouzan, 1998, Introduction to Data Communications in Networking, Tata McGraw Hill, New Delhi.
- 2.F. Halsall, 1995, Data Communications, Computer Networks and Open Systems, Addison Wesley.
- 3.D. Bertsekas and R. Gallager, 1992, Data Networks, Prentice hall of India, New Delhi.
- 4.Lamarca, 2002, Communication Networks, Tata McGraw Hill, New Delhi.
- 5.Teresa C.Piliouras, “Network Design Management and Technical Perspectives, Second Edition”, Auerbach Publishers, 2015.

OUTCOMES:

After the completion of this course students will be able to

- To master the terminology and concepts of the OSI reference model and the TCP-IP reference model.
- To be familiar with network tools and network programming

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE ELECTIVE I – WIRELESS NETWORKS

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 4

SEMESTER : I

CREDITS : 4

SUBJECT CODE: 19EH1

OBJECTIVES

- To Study about Wireless Networks, Protocol Stack and Standards.
- To Study about Fundamentals of 3G Services, Its Protocols and Applications.
- To Study about Evolution of 4G Networks, its Architecture and Applications.

UNIT I:

WIRELESS LAN - Introduction-WLAN Technologies: Infrared, UHF Narrowband, Spread Spectrum -IEEE802.11: System Architecture, Protocol Architecture, Physical Layer, MAC Layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, Radio Layer, Baseband Layer, Link Manager Protocol, Security – IEEE802.16-WIMAX: Physical Layer, MAC, Spectrum Allocation For WIMAX

UNIT II:

MOBILE NETWORK LAYER - Introduction – Mobile IP: IP Packet Delivery, Agent Discovery, Tunneling And Encapsulation, IPV6-Network Layer In The Internet- Mobile IP Session Initiation Protocol – Mobile Ad-Hoc Network: Routing, Destination Sequence Distance Vector, Dynamic Source Routing.

UNIT III:

MOBILE TRANSPORT LAYER - TCP Enhancements For Wireless Protocols – Traditional TCP: Congestion Control, Fast Retransmit/Fast Recovery, Implications Of Mobility – Classical TCP Improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time Out Freezing, Selective Retransmission, Transaction Oriented TCP – TCP Over 3G Wireless Networks.

UNIT IV:

WIRELESS WIDE AREA NETWORK - Overview Of UTM Terrestrial Radio Access Network-UMTS Core Network Architecture: 3G-MSC, 3G-SGSN, 3G-GGSN, SMS-GMSC/SMS-IW MSC, Firewall, DNS/DHCP-High Speed Downlink Packet Access (HSDPA)- LTE Network Architecture And Protocol.

UNIT V :

4G NETWORKS - Introduction – 4G Vision – 4G Features And Challenges – Applications Of 4G – 4G Technologies: Multicarrier Modulation, Smart Antenna Techniques, OFDM-MIMO Systems, Adaptive Modulation And Coding With Time Slot Scheduler, Cognitive Radio.

TEXT BOOK

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education 2012.(Unit I,II,III)
2. Vijay Garg , "Wireless Communications And Networking", First Edition, Elsevier 2014.(Unit IV,V).

REFERENCES:

1. Erik Dahlman, Stefan Parkvall, Johan Skold And Per Beming, “3G Evolution HSPA And LTE For Mobile Broadband”, Second Edition, Academic Press, 2008.
2. Anurag Kumar, D.Manjunath, Joy Kuri, “Wireless Networking”, First Edition, Elsevier 2011.
3. Simon Haykin , Michael Moher, David Koilpillai, “Modern Wireless Communications”, First Edition, Pearson Education 2013.
4. David G. Messerschmitt, “Understanding Networked Applications”, Elsevier, 2010.

OUTCOMES :

Upon Completion of the course, the Students will be able to

- Conversant With The Latest 3G/4G And WiMAX Networks And Its Architecture.
- Design and Implement Wireless Network Environment For Any Application Using Latest Wireless Protocols And Standards.
- Implement Different Type Of Applications For Smart Phones And Mobile Devices With Latest Network Strategies.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE ELECTIVE II – OPTIMIZATION TECHNIQUES

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 5

SEMESTER : I

CREDITS : 4

SUBJECT CODE : 19EH2

OBJECTIVES

This course introduces the knowledge of formulating mathematical models for quantitative analysis of managerial problems in industry; ability to understand and analyze managerial problems in industry so that they are able to use resources (capitals, materials, staffing, and machines) more effectively; skills in the use of Operations Research approaches and optimization tools in solving real life cases in industry.

UNIT I

Introduction - Nature and scope of OR- Role of OR in Business and Management – Classification of models – Methods for solving OR models – Phases of OR- Limitation. Linear programming – formulation – graphical solution (2 variable) of LPP. Advantages and Limitations of LPP.

UNIT II

General LPP – Canonical and standard forms of LPP - Simplex method – Artificial variable - Big M method.

UNIT III

Transportation problem North West corner, Least cost, Vogel's approximation method– MODI method. Assignment problem.

UNIT IV

Sequencing problem - processing n jobs 2 machines, processing n jobs 3 machines, processing n jobs m machines. Game Theory: Introduction – Two person zero-sum games – The Maximin – Minimax principle – Games Without saddle points, Mixed strategies – Matrix oddment method for $n \times n$ games – Dominance property – Graphical method.

UNIT V

Applications of PERT/CPM techniques – network diagram representation- time estimates and critical path in network analysis – problems in PERT/CPM.

TEXT BOOKS

1. Sunderesan, Ganapathy Subramanian and Ganesan – “Resource Management Techniques” , AR publications, 2003
2. Kalavathy S – “Operations Research” Second Edition, Vikas Publication

REFERENCE BOOKS

1. S.D. Sharma, “Operations Research”, Kedar Nath Ram Nath Publications
2. V.K.Kapoor, “Operations Research”, Sultan Chand Publications.
3. Manmohan, Kanthi, Swarup Gupta, “Operations Research”, Sultan Chand Publications.
4. Taha, “Operations Research”, TMH Publications

OUTCOMES:

Upon completion of the course, students will

- Describe clearly a problem, identify its parts and analyze the individual functions. Feasibility study for solving an optimization problem
- Evaluate and measure the performance of an algorithm, Discover, study and solve optimization problems.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE ELECTIVE II – STATISTICAL COMPUTING

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 5

SEMESTER : I

CREDITS : 4

SUBJECT CODE : 19EH2

OBJECTIVES:

- To understand the applications of various correlation methods
- To study and model the sampling concepts
- To acquire knowledge on Hypotheses test

UNIT-I:

Correlation - Definition of Correlation- Scatter Diagram- Kari Pearson's Coefficient of Linear Correlation- Coefficient of Correlation and Probable Error of r- Coefficient of Determination - Merits and Limitations of Coefficient of Correlation- Spearman's Rank Correlation(7.1-7.9.4).

UNIT-II:

Regression Analysis - Regression and Correlation(Intro)- Difference between Correlation and Regression Analysis- Linear Regression Equations -Least Square Method- Regression Lines- Properties of Regression Coefficients- Standard Error of Estimate.(8.1-8.8)

UNIT-III:

Probability Distribution and mathematical Expectation- Random Variable- Defined - Probability Distribution a Random Variable- Expectation of Random Variable- Properties of Expected Value and Variance(12.2-12.4).

UNIT-IV:

Sampling and Sampling Distributions - Data Collection- Sampling and Non-Sampling Errors – Principles of Sampling-- Merits and Limitations of Sampling- Methods of Sampling- Parameter and Statistic- Sampling Distribution of a Statistic- Examples of Sampling Distributions- Standard Normal, Student's t , Chi-Square (χ^2) and Snedecor's F-Distributions(14.1-14.16).

UNIT-V:

Statistical Inference- Estimation and Testing of Hypothesis - Statistical Inference- Estimation- Point and interval- Confidence interval using normal, t and χ^2 Distributions- Testing of Hypothesis- Significance of a mean - Using t Distribution(15.1-15.10.2).

TEXTBOOK:

1. K.L. Sehgal, “Quantitative Techniques and Statistics”, First Edition, Himalaya Publishing House, 2011.

REFERENCES:

1. N. P. Bali, P. N. Gupta, C. P. Gandhi, “A Textbook of Quantitative Techniques”, First Edition, Laxmi Publications, 2008.
2. U. K. Srivastava, G. V. Shenoy, S. C. Sharma, “Quantitative Techniques for Managerial Decisions”, Second Edition, New Age International Publishers, 2005.
3. David Makinson, “Sets, Logic and Maths for Computing”, Springer, 2011.

OUTCOMES:

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

- Data analytics from a database formed from the real world problem
- Predict the exact reason for the real time issues

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE ELECTIVE II – THEORY OF COMPUTATION

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 5

SEMESTER : I

CREDITS : 4

SUBJECT CODE : 19EH2

OBJECTIVES:

The learning objectives of this course are to introduce students to the mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability. To enhance/develop students' ability to understand and conduct mathematical proofs for computation and algorithms.

UNIT I:

Introduction to formal proof – Additional forms of proof – Inductive proofs –Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions.

UNIT II:

Regular Expression – FA and Regular Expressions – Proving languages not to be regular – Closure properties of regular languages – Equivalence and minimization of Automata.

UNIT III:

Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages – Definition of the Pushdown automata – Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG– Deterministic Pushdown Automata.

UNIT IV:

Normal forms for CFG – Pumping Lemma for CFL – Closure Properties of CFL – Turing Machines – Programming Techniques for TM. A language that is not Recursively Enumerable (RE).

UNIT V:

An undecidable problem RE – Undecidable problems about Turing Machine – Post's Correspondence Problem – The classes P and NP.

TEXTBOOK:

1. Peter Linz, "An Introduction to Formal Languages and Automata", Third Edition, Narosa, 2005
2. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", second Edition, Pearson Education, 2007.

REFERENCE BOOKS:

1. H.R. Lewis and C.H. Papadimitriou, "Elements of the theory of Computation", Second Edition, Pearson Education, 2003.
2. Thomas A. Sudkamp, "An Introduction to the Theory of Computer Science, Languages and Machines", Third Edition, Pearson Education, 2007.

OUTCOMES:

After completing this course, students will be able to:

- Analyse and design finite automata, pushdown automata, Turing machines, formal languages, and grammars.
- Demonstrate the understanding of key notions, such as algorithm, computability, decidability, and complexity through problem solving.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE PAPER IV – WINDOWS AND VISUAL C++ PROGRAMMING

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 4

SEMESTER: II

CREDITS : 4

SUBJECT CODE: 19MHD

OBJECTIVES

To acquaint the student with basics of Windows Programming and to make the student knowledgeable and familiarize in the area of Visual C++ programming language.

UNIT I

Windows programming: The Windows Environment – Windows Programming Options – First Windows Program – Windows and Messages: An Architectural Overview – The HELLOWIN Program - Registering the Window Class - Creating and Displaying the window – Message Loop –The Windows Procedure – Processing the Messages - WM_PAINT message – WM_DESTROY message – Data types - An Introduction to GDI: The Device Context – The Paint Information Structure - TextOut – Scroll Bars – Menus.

UNIT II

Visual C++ Programming: Visual C++ Components – The Microsoft Foundation Class Library Application Framework – Getting started with AppWizard - ClassWizard – Event handling – Keyboard and Mouse events - Message Boxes and Menus - Graphics Device Interface - Pen, Brush, Colors, Fonts – Working with Icons, Cursors, and Bitmaps.

UNIT III

Dialog Boxes: Modal vs. Modeless Dialog Boxes – CDialog Class - List Box – Edit Box – Check Box - Using DDX and DDV functions – CColorDialog – CFileDialog – CfontDialog.

UNIT IV

Common controls: Toolbar – Slider Control – Progress Bar – Status Bar – Tab Control – Tree View Control – Creating Document/View Applications - SDI Applications – MDI Applications.

UNIT V

Visual C++ and Database Management: Database Management with Microsoft ODBC – Database Management with Microsoft Data Access Objects – Exploring ActiveX Controls.

TEXT BOOKS

1. Charles Petzold, “Programming Windows”, Microsoft press, Fifth Edition, 2007.
(Unit – I)
2. Herbert Schildt, “MFC Programming from the Ground Up”, Tata McGraw Hill Education Pvt. Ltd., 2011.
3. David J.Kruglinski, George Shepherd, Scot Wingo, “Programming Microsoft Visual C++”, Fifth Edition, Microsoft Press, 2012.
4. John Paul Mueller, “Visual C++ 6 from the Ground Up”, Tata McGraw-Hill Publishing Company Ltd.

REFERENCE BOOKS

1. Richard C. Leinecker, Tom Archer, “Visual C++ 6 Programming Bible”, Wiley India Pvt. Ltd., 2011.
2. Kate Gregory “Using Visual C++”, Prentice Hall of India Pvt., Ltd.

OUTCOMES:

After completing this course, students will be able to:

- Develop applications on applying the MFC and Visual C++ concepts.
- Projects can be developed using the Visual C++ and DBMS.
- Gain in depth knowledge on ActiveX Controls.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE PAPER V – OPEN SOURCE SOFTWARE TECHNOLOGIES

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 4

SEMESTER : II

CREDITS : 4

SUBJECT CODE : 19MHE

OBJECTIVES

The user will become proficient in software development processes, databases middleware components to be productive in a software development environment that uses OSS components.

UNIT I

Open Source: Introduction Open Source – open source vs. commercial software – What is Linux ? – Free Software – Where I can use Linux ? Linux kernel – Linux distributions.

UNIT II

LINUX: Introduction Linux Essential Commands – File System concept – Standard Files – The Linux Security Model - Introduction to Unix – Unix Components – Unix Files – File Attributes and Permission – Standard I/O – Redirection – Pipes and Filters – Grep and Stream Editor – Process and Signal Commands Shell Programming – Shell Variables – Export, Read, Exit Commands – Control Structures – Arithmetic in Shell Programming – Debugging Scripts.

UNIT III

APACHE: Introduction Apache Explained – Starting, Stopping and Restarting Apache – Modifying the Default configuration – Securing Apache – Set user and Group – Consider allowing access to local documentation – Don't allow public-html web sites – Apache control with htaccess.

UNIT IV

MySQL: Introduction to MySQL – The show databases and table – The USE command – CreateDatabase and Tables – Describe Table – Select, Insert, Update and Delete statement
Some administrative detail – Table joins – Loading and Dumping a database.

UNIT V

PHP: Introduction –PHP Form processing – Database Access with PHP – MySQL, MySQL Functions – Inserting Records – Selecting Records – Deleting Records – Update Records.
Perl: Introduction – perl documentation – Perl Syntax rules – Mod perl: Introduction – Turning CGI into mod perl programs – Pure mod perl programs

TEXT BOOKS

1. James Lee and Brent Ware “Open Source Web Development with LAMP using LINUX, Apache, MySQL, Perl and PHP”, Dorling Kindersley (India) Pvt. Ltd, 2008.

REFERENCE BOOKS

1. Eric Rosebrock, Eric Filson, “Setting up LAMP: Getting Linux, Apache, MySQL and PHP and working together”, John Wiley and Sons, 2004.
2. Anthony Butcher , “Teach Yourself MySQL in 21 days”, 2nd Edition, Sams Publication.
3. Rich Bower, Daniel Lopez Ridreejo, Alian Liska , “Apache Administratpor’s Handbook”, Sams Publication.
4. Tammy Fox, “RedHat Enterprise Linux 5 Administration Unleashed”, Sams Publication.
5. Naramore Eligabette, Gerner Jason, Wrox Press, Wiley Dreamtech Press, “Beginning PHP5, Apache, MySQL Web Development”, 2005.
6. Stever Holzner, “PHP: The Complete Reference”.
7. Vikram Vaswami, “The Complete Reference MySQL”, Tata McGraw Hill.
8. M.G. Venkateshmurthy, “Introduction to Unix & Shell Programming”, Pearson Education India, Delhi, 2005

OUTCOME:

On the successful completion of this course, Students will be able to:

- Become proficient in software development processes, databases middleware components.
- Gain knowledge about OSS operating system, scripting language, databases and web server and open source distributions.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE PAPER VI – MACHINE LEARNING

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 4

SEMESTER : II

CREDITS : 4

SUBJECT CODE : 19MHF

OBJECTIVES

- To Learn about Machine Intelligence and Machine Learning applications.
- To implement and apply machine learning algorithms to real-world applications.
- To identify and apply the appropriate machine learning technique to classification, pattern recognition, optimization and decision problems.
- To understand how to perform evaluation of learning algorithms and model selection.

UNIT I :

INTRODUCTION TO MACHINE LEARNING: Introduction - What is Human Learning - Types of Human Learning - What is Machine Learning - Types of Machine Learning - Applications of Machine Learning. PREPARING TO MODEL: Introduction - Machine Learning Activities - Basic Types of Data in Machine Learning - Exploring Structure of Data - Data Quality and Remediation - Data Preprocessing.

UNIT II:

MODELLING AND EVALUATION : Introduction - Selecting a Model - Training a Model (for Supervised Learning) - Model Representation and Interpretability - Evaluating Performance of a Model - Improving Performance of a Model.

BASIC OF FEATURE ENGINEERING: Introduction - Feature Transformation - Feature Subset Selection.

UNIT III:

BAYESIAN CONCEPT LEARNING: Introduction - Why Bayesian Methods are important- Baye's Theorem - Baye's Theorem and Concept Learning - Bayesian Belief Network .

UNIT IV :

SUPERVISED LEARNING CLASSIFICATION: Introduction - Example of Supervised Learning - Classification Model - Classification Learning Steps - Common Classification Algorithm. SUPERVISED LEARNING REGRESSION: Introduction – Example of Regression – Common Regression Algorithms – Simple linear regression – Multiple linear regression – Assumptions in Regression Analysis – Main Problems in Regression Analysis – Improving Accuracy of the Linear Regression Model – Polynomial Regression Model – Logistic Regression – Maximum Likelihood Estimation. UNSUPERVISED LEARNING : Introduction - Unsupervised vs Supervised Learning - Application of Unsupervised Learning - Clustering - Finding Pattern using Association Rule.

UNIT V:

BASICS OF NEURAL NETWORK : Introduction - Understanding Biological Neuron - Exploring Artificial Neuron - Types of Activation Function - Early Implementation of ANN -Architectures of Neural Network - Learning Process in ANN - Back Propagation - Deep Learning.

OTHER TYPES OF LEARNING: Introduction - Representation Learning -Active Learning - Instance Based Learning - Association Rule Learning - Ensemble Learning Algorithm.

TEXT BOOK:

Saikat Dutt, Subramanian Chandramouli , Amit Kumar Das —Machine Learning, Pearson India Education Services Private Limited, 2019.

REFERENCES:

1. Tom M. Mitchell —Machine Learning, McGraw-Hill Education (India) Private Limited, 2013
2. Ethem Alpaydin, —Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press 2004.
3. Stephen Marsland, —Machine Learning: An Algorithmic Perspective, CRC Press, 2009.
4. Michael Affenzeller, Stephan Winkler, Stefan Wagner, Andreas Beham, “Genetic Algorithms and Genetic Programming”, CRC Press Taylor and Francis Group.

OUTCOMES:

On completion of the course students will be expected to:

- Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.
- Have an understanding of the strengths and weaknesses of many popular machine learning approaches.
- Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.
- Be able to design and implement various machine learning algorithms in a range of real-world applications.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

**CORE PRACTICAL II – VISUAL C++PROGRAMMING AND
OPEN SOURCE SOFTWARE TECHNOLOGIES LAB**

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 6

SEMESTER: II

CREDITS : 5

SUBJECT CODE: 19MH2

VISUAL C++

1. Program to create a List Box and add the capital cities of various states in our country.
2. Program using MFC that displays line, rectangle, rounded rectangle, ellipse and polygon filled with colors.
3. Program using MFC that fills the background of the client area with a bitmap.
4. Program using MFC that displays a menu. Choose the menu items using keyboard accelerator keys and display appropriate messages for the selected menu item using message boxes.
5. Program using ToolBar and StatusBar.
6. Program to create a Dialog Box which demonstrates the use of controls.
7. Program to invoke the common font dialog box and retrieve selections made in it.
8. Program to create an application for Document View Architecture in Single Document Interface to manipulate student name and grade.
9. Program to create a Multiple Document Interface application.
10. Program to create an ODBC and implement it in an application.

OPEN SOURCE SOFTWARE TECHNOLOGIES

1. Design a menu driven program for rename, remove and copy commands.
2. Write a shell program to find the details of an user session.
3. Write a shell program to change the extension of a given file.
4. Write a program to get two user inputs – the file name and the column no(n). using cat command, list the nth column from mentioned file.
5. Use an if/then/else construct that prints information about the current month. The script should print the number of days in this month, and give information about leap year if the current month is February.
6. Check whether the given number is Armstrong / prime / perfect or not.
7. Write a shell program to find the substring of the given string.
8. Write a shell program to compare two given strings.
9. Create a Perl program which displays “Hello world” and the exit perl.
10. Create a text file containing any three lines using perl.
11. Create a MySQL table and execute queries to read, add, remove and modify a record from that table
12. Write a server side PHP program that displays marks, total, grade of student in tabular format by accepting user inputs for name, number and marks from a HTML form.
13. Write a PHP program that adds products that are selected from a web page to a shopping cart.
14. Write a PHP program to access the data stored in a MySQL table.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE ELECTIVE III – ADVANCED DATABASE MANAGEMENT SYSTEM

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 4

SEMESTER: II

CREDITS : 4

SUBJECT CODE: 19EH3

OBJECTIVES

This paper provides an introduction on various ways of designing and implementing database systems, features, and distributed databases. The study is divided into various sections and explains the basic design and execution of relational databases. The paper provides knowledge and understanding of the underlying principles of Relational Database Management Solution. It also provides information on implementing and maintaining an effective and efficient database system with the help of the rising trends.

UNIT I

Database System Architecture – Physical Data Organization –Enhanced Entity Relationship (EER) Model - Introduction to Database Design.

UNIT II

Advanced SQL - Query Processing and Optimization – Transaction Processing and Concurrency Control.

UNIT III

Database Recovery System – Database Security – Database Connectivity and Web Technologies – Database Administration and Security.

UNIT IV

Object Oriented Databases – Object Relational Database – Parallel Database Systems –
Distribution Database Systems

UNIT V

Decision Support Systems (DSS) – Emerging Database Technologies – Case Study:
Database design of an Internet Bookshop – Commercial Database: Microsoft SQL Server.

TEXT BOOKS

1. Shio Kumar Singh, “Database Systems – Concepts, Designs and Application”, Always Learning, 2nd Edition, 2011 (Unit –I, Unit-II: Ch-11, 12, Unit-III: Ch-13, 14, Unit -IV, Unit-V.
2. Carlos Coronel, Steven Morris and Peter Rob, “Database Principles – Fundamentals of Design”, Implementation and Management, Cengage Learning, 9th Edition, 2011. (Unit-II: Ch-8, Unit-III: Ch14, Ch-15

REFERENCE BOOKS

1. Thomas M.connolly, Carolyn E.Begg, “database system-practical approach to design,implementation,and management”, third edition, pearson education, 2003.
2. Gary W.hansen and james V.hansen, “Database Management and design”, Prentise Hall of india Pvt Ltd, 1999.
3. C.S.R.Prabhu, “Object Oriented Database Systems”, PHI,2003.
4. M.TamerOzsu, Partrick Ualduriel, “Principles of Distributed Database Systems”, Second Edition,Pearson Education,2003.

OUTCOME:

On completion of the course, students will able to

- Know about the Various Datamodels and Works on Database Architecture
- Knowledge patterns, Object Oriented Databases are well equipped.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE ELECTIVE III – EMBEDDED SYSTEMS

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 4

SEMESTER: II

CREDITS : 4

SUBJECT CODE: 19EH3

OBJECTIVES:

This course will enable students to understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system. The course describes the hardware software co-design and firmware design approaches. It makes the students to know the RTOS internals, multitasking, task scheduling, task communication and synchronisation. They can learn the development life cycle of embedded system.

UNIT I:

Introduction to Embedded system - Embedded system vs General computing systems - History - Classification - Major Application Areas - Purpose of Embedded systems - Smart running shoes: The innovative bonding of lifestyle with embedded technology. Characteristics and Quality Attributes of Embedded systems

UNIT II:

Elements of an Embedded system - core of the embedded system: General purpose and domain specific processors, ASICs, PLDs, COTS - Memory - Sensors and Actuators - Communication Interface: Onboard and External Communication Interfaces - Embedded Firmware - Reset circuit, Brown-out protection circuit, Oscillator unit, Real-time clock, and Watchdog timer - PCB and Passive Components.

UNIT III:

Embedded Systems - Washing machine: Application-specific - Automotive: Domain specific Hardware Software Co-Design - Computational Models - Embedded Firmware Design Approaches - Embedded Firmware Development Languages - Integration and testing of Embedded Hardware and firmware.

UNIT IV:

RTOS based Embedded System Design: Operating System Basics - Types of operating Systems - Tasks, process and Threads - Multiprocessing and Multitasking - Task Scheduling- Task Communication - Task Synchronisation - Device Drivers - choosing an RTOS.

UNIT V:

Components in embedded system development environment, Files generated during compilation, simulators, emulators and debugging - Objectives of Embedded product Development Life Cycle - Different Phases of EDLC - EDLC Approaches - Trends in Embedded Industry - Case Study: Digital Clock.

TEXT BOOK:

1. K. V. Shibu, "Introduction to embedded systems", TMH education Pvt. Ltd. 2009.

REFERENCE BOOKS:

1. Raj Kamal, "Embedded Systems: Architecture, Programming and Design", TMH. Second Edition 2009.
2. Frank Vahid, Tony Givargis, "Embedded System Design", John Wiley. Third Edition 2006.
3. Cliff Young, Faraboschi Paolo, and Joseph A. Fisher, "Embedded Computing: A VLIW Approach to Architecture, Compilers and Tools", Morgan Kaufmann Publishers, An imprint of Elsevier, 2005.
4. David E. Simon, "An Embedded Software Primer" Pearson Education, 1999.

OUTCOMES:

Students are able to

- Describe the differences between the general computing system and the embedded system, also recognize the classification of embedded systems.
- Become aware of interrupts, hyper threading and software optimization.
- Design real time embedded systems using the concepts of RTOS.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE ELECTIVE III –DISTRIBUTED OPERATING SYSTEM

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 4

SEMESTER: II

CREDITS : 4

SUBJECT CODE: 19EH3

OBJECTIVES:

1. To study distributed operating system concepts.
2. To understand hardware, software and communication in distributed OS.
3. To learn the distributed resource management components.
4. Practices to learn concepts of OS and Program the principles of Operating Systems.

UNIT I:

Introduction – Operating System Definition – Functions of Operating System – Types of Advanced Operating System – Design Approaches – Synchronization Mechanisms – concepts of a Process – Critical Section Problem – Process Deadlock – Models of Deadlock – Conditions for Deadlock – System with single-unit requests, Consumable Resources , Reusable Resources.

UNIT II:

Distributed Operating Systems: Introduction- Issues – Communication Primitives – Inherent Limitations –Lamport's Logical Clock , Vector Clock, Global State , Cuts – Termination Detection – Distributed Mutual Exclusion – Non Token Based Algorithms – Lamport's Algorithm - Token Based Algorithms –Distributed Deadlock Detection – Distributed Deadlock Detection Algorithms – Agreement Protocols.

UNIT III:

Distributed Resource Management – Distributed File Systems – Architecture – Mechanisms – Design Issues – Distributed shared Memory – Architecture – Algorithm – Protocols – Design Issues – Distributed Scheduling – Issues – Components – Algorithms.

UNIT IV:

Failure Recovery and Fault Tolerance – Concepts – Failure Classifications – Approaches to Recovery – Recovery in Concurrent Systems – Synchronous and Asynchronous Check pointing and Recovery – Check pointing in Distributed Database Systems – Fault Tolerance Issues – Two-Phase and Nonblocking Commit Protocols – Voting Protocols – Dynamic Voting Protocols.

UNIT V:

Multiprocessor and Database Operating Systems – Structures – Design Issues – Threads – Process Synchronization – Processor Scheduling – Memory management – Reliability/Fault Tolerance – Database Operating Systems – concepts – Features of Android OS, Ubuntu, Google Chrome OS and Linux operating systems.

TEXT BOOKS:

1. MukeshSinghal, N.G.Shivaratri, “Advanced Concepts in Operating Systems”, McGraw Hill 2000.
2. Distributed Operating System – Andrew S. Tanenbaum, PHI.

REFERENCE BOOKS:

1. Abraham Silberschatz, Peter B.Galvin, G.Gagne, “Operating Concepts”, 6th Edition Addison Wesley publications 2003.
2. Andrew S.Tanenbaum, “Modern Operating Systems”, 2nd Edition Addison Wesley 2001.

OUTCOMES:

- Clear understanding on several resource management techniques like distributed shared memory and other resources
- Knowledge on mutual exclusion and Deadlock detection of Distributed operating system.
- Able to design and implement algorithms of distributed shared memory and commit protocols
- Able to design and implement fault tolerant distributed systems.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE ELECTIVE IV – CLOUD COMPUTING

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 4

SEMESTER: II

CREDITS : 4

SUBJECT CODE: 19EH4

OBJECTIVES

The Paper aims to equip students with the comprehensive and in-depth knowledge of Cloud Computing concepts, technologies, architecture and applications by introducing and researching state-of-the-art in Cloud Computing fundamental issues, technologies, applications and implementations. Another objective is to expose the students to frontier areas of Cloud Computing and information systems, while providing sufficient foundations to enable further study and research.

UNIT I

INTRODUCTION - Foundations - Cloud computing at a glance – Historical developments – Building cloud computing environments – Virtualization - Characteristics of virtualized environments - Taxonomy of virtualization techniques – Virtualization and cloud computing - Pros and cons of virtualization- Technology examples.

UNIT II

ARCHITECTURE - Cloud Computing Architecture - The cloud reference model - Types of clouds – Economics of the cloud - Open challenges – Cloud Platforms in Industry – Migrating into a cloud – Why migrate? – The seven step model.

UNIT III

CLOUD APPLICATIONS - Scientific applications - Business and consumer applications – Advanced Topics in Cloud Computing – Energy efficiency in clouds - Market-based management of clouds – Federated clouds / InterCloud- Third-party cloud services.

UNIT IV

IMPLEMENTATION AND MANAGEMENT - The MapReduce Programming model – MapReduce implementation for the cloud – SLA management in the Cloud – Types of SLA - Lifecycle of SLA – HPC on clouds

UNIT V

DATA SECURITY IN THE CLOUD - Legal Issues in Cloud Computing – Achieving production readiness for Cloud Services.

TEXT BOOKS

1. Rajkumar Buyya, Christian Vecchiola, S.Thamarai Selvi, “Mastering Cloud Computing: Foundations and Applications Programming”, MK Publications, 2013. (Units: 1, 2 & 3)
2. Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, “Cloud Computing: Principles and Paradigms”, Wiley publications. (Units: 4 & 5)

REFERENCE BOOKS

1. Haley Beard, “Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs”, Emereo Pty Limited, July 2008.

OUTCOME:

Completing this course should provide you

- With a good understanding of cloud computing.
- A systematic knowledge of the fundamental technologies, architecture, and security.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE ELECTIVE IV – PERVASIVE COMPUTING

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 4

SEMESTER: II

CREDITS : 4

SUBJECT CODE: 19EH4

OBJECTIVE :

To understand about pervasive computing through pervasive devices and PDA.

UNIT I:

Pervasive Computing: Past, Present and Future - Pervasive Computing Market – m-Business – Application examples: Retail, Airline check-in and booking – Health care – Car information system – E-mail access via WAP and voice.

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 – Development of Pervasive Computing web applications - Pervasive application architecture.

TEXT BOOK:

Pervasive Computing, Technology and Architecture of Mobile Internet Applications, JochenBurkhardt, Horst Henn, Stefan Hepper, Thomas Schaech & Klaus Rindtorff, Pearson Education, 2006.

REFERENCE BOOKS:

1. Pervasive Computing and Networking, Mohammad S. Obaidat, Mieso Denko, Isaac Woungang, Wiley 2011.
2. Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, McGraw Hill edition, 2006.

OUTCOME:

Completing this course should provide you

- With a good understanding of pervasive computing.
- Gain knowledge on human machine interfaces, Biometrics.
- Exposure to WAP Architecture and its Technology.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE ELECTIVE IV – GAME PROGRAMMING

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 4

SEMESTER: II

CREDITS : 4

SUBJECT CODE: 19EH4

OBJECTIVES:

- To get subsequent understanding of game design and development which includes the processes, mechanics and issues in game design, game engine development, modeling, techniques, handling situations, and logic.
- To create interactive games.

UNIT I:

Coordinate Systems, Ray Tracing, Modeling in Game Production, Vertex Processing, Rasterization, Fragment Processing and Output Merging, Illumination and Shaders, Parametric Curves and Surfaces, Shader Models, Image Texturing, Bump Mapping, Advanced Texturing, Character Animation, Physics-based Simulation.

UNIT II:

Game Logic, Game AI, Path Finding, Game Theory, Character development, Story Telling, Narration, Game Balancing, Core mechanics, Principles of level design, Genres of Games, Collision Detection.

UNIT III:

Renderers, Software Rendering, Hardware Rendering, and Controller based animation, Spatial Sorting, Level of detail, collision detection, standard objects, and physics.

UNIT IV:

Flash, DirectX, OpenGL, Java, Python, XNA with Visual Studio, Mobile Gaming for the Android, iOS, Game engines - Adventure Game Studio, DX Studio, Unity.

UNIT V :

Developing 2D and 3D interactive games using OpenGL, DirectX – Isometric and Tile Based Games, Puzzle games, Single Player games, Multi Player games.

TEXTBOOK:

JungHyun Han, “3D Graphics for Game Programming”, Chapman and Hall/CRC, 1st Edition, 2011

REFERENCES:

1. Andy Harris, “Beginning Flash Game 2005.
2. David H. Eberly, “3D Game Engine Design, Second Edition: A Practical Approach Real-Time Computer Graphics” Morgan Kaufmann, 2nd Edition, 2006.
3. Dino Dini, “Essential 3D Game Programming”, Morgan Kaufmann, 1st Edition, 2012.
4. Ernest Adams and Andrew Rollings, “Fundamentals of Game Design” Prentice Hall 1st Edition, 2006.

OUTCOMES:

- Illustrate an understanding of the concepts behind game programming Techniques.
- Implement game programming techniques to solve game development tasks.
- Construct a basic game engine using open-source programming libraries.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE
SUPPORTIVE ELECTIVE PAPER I
E-COMMERCE

(For the students admitted from the year 2019 -2020)

HOURS PER WEEK : 4

SEMESTER: II

CREDITS : 3

SUBJECT CODE: 19SH2

OBJECTIVES

The objective of this paper is to understand the nature of e-Commerce; recognize the business impact, trends and potential of e-Commerce and the use of the Internet. To analyze the concept of electronic data interchange and its legal, social and technical aspects; to analyze the security issues over the web, the available solutions and future aspects of e-commerce security; Define and analyze the concept of E-banking and electronic payment system.

UNIT – I

Introduction to Electronic Commerce: Definition – Benefits – Impact - Classification- Applications; Electronic Commerce: Business Models; Electronic Data Interchange: Conventional trading process- Definition of EDI- Building Blocks-Value added networks- Benefits- Applications of EDI.

UNIT – II

Architectural Framework: Frame work of E-commerce; Information Publishing Technology: Information Publishing- Web Browsers- Hypertext Markup Language- Common Gateway Interface- Multimedia Content- Other Multimedia Objects- Virtual Reality Modeling Language(VRML).

UNIT III

Securing the Business on Internet: Need-Security policy, Procedures and Practices- site Security- Protecting the network-Firewalls-Securing the Web (HTTP) Service; Securing Network Transaction: Transaction security- cryptology- Cryptographic Algorithms- public

key algorithms-Authentication Protocols- Digital Signatures- Electronic mail Security- Security Protocols for web commerce.

UNIT –IV

Influence on supply chain management: Importance of supply chain management- impact on Supply chain management; Electronic Payment Systems: Introduction- Online payment systems- Pre-Paid Electronic Payment Systems- Post-Paid Electronic Systems- Requirements Metrics of a payment system; Search engines and Directory Services: Introduction- Information Directories- Search Engines- Search Engine Marketing- Formulating a good search strategy

UNIT – V

Mobile Commerce: Introduction, Framework and Models: Introduction- Benefits- Impediments- Mobile commerce framework; Agents in Electronic Commerce: Needs- Types- Technologies- Standards and protocols- Applications.

TEXT BOOKS

1. Bharat Bhasker, Electronic Commerce: Framework, Technologies and Applications, McGraw Hill, Fourth Edition, 2013
2. Laudon, k. c. & Traver, C. G.; E-Commerce Business, Technology, Society: Addison Wesley, 2014.

REFERENCE BOOKS:

1. P.T. Joseph, E-Commerce: An Indian Perspective, PHI learning, Fifth Edition, 2015.
2. Stallings, Willaim, Cryptography and Network security: principals and practice, Prentice Hall.
3. Murthy, C. S. V(2002). E-Commerce Concepts, Models, Strategies(2012 ed.). Himalaya Publishing House.

OUTCOMES:

On the successful completion of this course, Students will be able to:

- Recognize the business impact, trends and potential of e-Commerce and the use of the Internet.
- To gain the knowlegede of search engines and future trends of e-commerce.
- To have and exposure to electronic payment systems and e-commerce security.
- To analyze the concept of E-banking and Mobile-commerce.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE PAPER VII – DOT NET PROGRAMMING

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 5

SEMESTER: III

CREDITS : 5

SUBJECT CODE: 19MHG

OBJECTIVES:

- To acquaint the student with fundamentals of .NET Programming.
- To make the student knowledgeable in the area of ASP.NET and VB.NET programming language.
- To acquire knowledge on the usage of XML in .NET.

UNIT I:

Introduction to .NET - The .NET Framework - The Common Language Runtime – The .NET Class Library – Visual Studio.NET - Learning the .NET languages – Types, Objects and Namespaces – Setting up ASP.NET and IIS.

UNIT II:

Developing VB.NET Application: Introduction to VB.NET – Building VB.NET Application – VB IDE – Data type – Declaring variable – Operators and Statements – Handling Exceptions – Windows Forms: All about Windows Forms – Creating Windows Applications – Adding Controls to Forms – Handling events – MsgBox – Input Box – Multiple Forms – Handling Mouse and Keyboard events – Object Oriented Programming: Creating Classes and Objects.

UNIT III:

Developing ASP.NET Applications: ASP.NET Applications – Code-Behind – The Global.asax Application File – Understanding ASP.NET Classes – ASP.NET Configuration – Web Form Fundamentals – Web Control Classes – Validation and Rich Controls – State Management.

UNIT IV:

ADO.NET: Overview of ADO.NET: Introducing ADO.NET and Data Management – Characteristics of ADO.NET – The ADO.NET Object Model – ADO.NET data access – Data Binding: Introducing Data Binding – Single-Value Data Binding – Repeated-Value Data Binding - The Data List, Data Grid, Repeater.

UNIT V:

XML in .NET: XML's Hidden Role in .NET – XML Basics – Attributes – The XML Classes: The XML TextWriter – The XML TextReader – Working with XML Documents – Reading an XML Document – Searching an XML Document – XML Validation – XML Display and Transforms – XML in ADO.NET.

TEXT BOOKS:

1. Mathew Mac Donald, “ASP.NET Complete Reference”, TMH 2005
2. Visual Basic. NET Black Book, by Steven Holzner

REFERENCE BOOKS:

1. Mario Szpuszta, Matthew MacDonald , “Pro ASP.NET 4 in C# 2010: Includes Silverlight 2, “Apress, Third Edition .
2. J.Liberty, D.Hurwitz, “Programming ASP.NET”, Third Edition, O'REILLY, 2006.
3. Visual Basic. Net programming in easy steps by Tim Anderson, Dreamtech Press.

OUTCOMES:

- Learn major programming paradigms and techniques involved in design and implementation of modern programming languages.
- Learn about Microsoft .NET framework
- By the end students can develop, implement and creating Applications with C#. VB.NET and ASP.NET
- Creating ASP.Net applications using standard .net controls.
- An ability to use current techniques, skills, and tools necessary for computing practice.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE PAPER VIII – DATA MINING TECHNIQUES

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 5

SEMESTER: III

CREDITS : 5

SUBJECT CODE : 19MHH

OBJECTIVES

To inculcate the knowledge on data mining. Learn in depth the various data mining techniques and its applications.

UNIT I

INTRODUCTION: Introduction - What is Data Mining – Why Data Mining Now- The Data Mining Process :Software Development Approach – The Data Mining Process : The CRISP-DM Approach – Data Mining Applications – Data Mining Techniques - Future of Data Mining – Limitations of Data Mining-Data Mining Software.

UNIT II

DATA UNDERSTANDING AND DATA PREPARATION: Introduction – Data Collection and Preprocessing – Outliers – Mining Outliers – Missing data – Types of Data – Computing Distance – Data Summarizing using Basic Statistical Measurements – Displaying Data Graphically – Multidimensional Data Visualization.

UNIT III

MINING FREQUENT PATTERNS, ASSOCIATIONS, AND CORRELATIONS: Basic Concepts and a Road Map – Efficient and Scalable Frequent Itemset Mining Methods – Mining various kinds of Association Rules –From Association Mining to Correlation Analysis – Constraint-Based Association Mining.

UNIT IV

CLASSIFICATION AND PREDICTION: What is Classification? What is Prediction? – Issues Regarding Classification and Prediction – Classification by Decision Tree Induction – Bayesian Classification – Rule Based Classification – Classification by Backpropagation – Support Vector Machines – Other Classification Methods.

UNIT V

CLUSTER ANALYSIS: What is Cluster Analysis – Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical Methods – Density Based Methods – Outlier Analysis.

TEXT BOOKS

1. G.K Gupta ,”Introduction to Data Mining with Case Studies”, PHI Learning Private Limited , Third Edition, 2015.
2. Jiawei Han and Micheline Kamber. “Data Mining Concepts and Techniques”, Morgan Kaufmann Publishers , Second Edition, 2006.

REFERENCE BOOKS

1. K.P. Soman, Shyam Diwakar and V.Ajay , “Insight into Data Mining Theory and Practice”, Prentice Hall of India, Eastern Economy Edition, 2006.
2. Margaret H.Dunham, “Data Mining Introductory and advanced topics”, Pearson Education, 2003.
3. Arun K.Pujari, “Data Mining Techniques”, Universities Press(India) Pvt.Ltd.,2003.
4. Hillol Kargupta,Anupam Joshi, Krishnamoorthy Sivakumar, Yelena Yesha, “Data Mining:Next Generation Challenges and Future Directions”, AAAI Press, 2004.

OUTCOMES:

- After completing this course, students will be familiar with basic data mining concepts for solving real world problems.
- Exposure to know the various applications where data mining is applied in real world.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE PAPER IX – DESIGN AND ANALYSIS OF ALGORITHMS

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 5

SEMESTER : III

CREDITS : 5

SUBJECT CODE : 19MHJ

OBJECTIVES

This course gives insight into the design and analysis for selected problems.

UNIT I

Introduction - Definition of Algorithm – pseudocode conventions – recursive algorithms – time and space complexity –big-“oh” notation – practical complexities – randomized algorithms – repeated element – primality testing - Divide and Conquer: General Method - Finding maximum and minimum – merge sort.

UNIT II

Divide and conquer contd. – Quicksort, Selection, Strassen's matrix multiplication – Greedy Method: General Method –knapsack problem - Tree vertex splitting - Job sequencing with dead lines – optimal storage on tapes.

UNIT III

Dynamic Programming: General Method - multistage graphs – all pairs shortest paths – single source shortest paths - String Editing – 0/1 knapsack. Search techniques for graphs – DFS-BFS-connected components – biconnected components.

UNIT IV

Back Tracking: General Method – 8-queens - Sum of subsets - Graph Coloring – Hamiltonian cycles. Branch and Bound: General Method - Traveling Salesperson problem.

UNIT V

Lower Bound Theory: Comparison trees - Oracles and advisory arguments - Lower bounds through reduction - Basic Concepts of NP -Hard and NP-Complete problems.

TEXT BOOKS

E. Horowitz, S. Sahni and S. Rajasekaran, “Computer Algorithms”, Galgotia, New Delhi. 1999

REFERENCE BOOKS

1. G. Brassard and P. Bratley, “Fundamentals of Algorithms”, PHI, New Delhi, 1997.
2. A.V. Aho, J.E. Hopcroft, J.D. Ullmann,, “The design and analysis of Computer Algorithms”, Addison Wesley, Boston, 1974.
3. S.E.Goodman and S.T.Hedetniemi, “Introduction to the Design and Analysis of algorithms”, Tata McGraw Hill Int Edn, New Delhi, 1977.

OUTCOMES:

- It gives stepwise procedure to solve problems.
- The Problems can be broken down into small pieces for program development.
- Efficient approach of solving problems by a model of computations.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

**CORE PRACTICAL III – DOT NET PROGRAMMING AND
DATA MINING TOOL**

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 6

SEMESTER: III

CREDITS : 5

SUBJECT CODE: 19MH3

.NET 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.

DATA MINING

Using the Tools (or functions) perform the following experiments:

1. Perform Data Preprocessing (Data Filters) and Data Discretization on file attributes.
2. Perform the correlation ship analysis for the given dataset.
3. Perform Linear Regression Analysis for the given dataset.
4. Association rule mining using Apriori Algorithm.
5. Perform Clustering using Simple K-means.
6. Perform the information gain for a particular attribute in the given data.
7. Perform Classification using C4.5 algorithm.
8. Perform experiment to predict the class using the Bayesian classification.
9. Write a program to find out a weight or bias updating using the back propagation in Neural Networks.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE ELECTIVE V – SOFT COMPUTING

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 5

SEMESTER: III

CREDITS : 4

SUBJECT CODE: 19EH5

OBJECTIVES

- Develop the skills to gain a basic understanding of neural network theory and fuzzy logic theory.
- Introduce students to artificial neural networks and fuzzy theory from an engineering perspective.

UNIT I:

Introduction: Soft Computing Constituents – Soft Computing Vs Hard Computing – Characteristics - Applications - Artificial Neural Network (ANN): Fundamental Concept – Application Scope - Basic Terminologies – Neural Network Architecture – Learning Process – Basic Models of ANN: McCulloch-Pitts Model – Hebb Network – Linear Separability.

UNIT II:

Supervised Learning Networks: Perceptron Networks – Adaline and Madaline Networks – Back Propagation Network – Radial Basis Function Network. Associative Memory Networks – BAM - Hopfield Network - Boltzmann Machine. Unsupervised Learning Networks: Kohonen Self Organizing Network – Counter Propagation Network – ART Network.

UNIT III:

Fuzzy Sets: Basic Concept – Crisp Set Vs Fuzzy Set - Operations on Fuzzy Set – Properties of Fuzzy Sets – Fuzzy Relations: Concept – Fuzzy Composition – Fuzzy Equivalence and

Tolerance Relation - Membership Functions: Features – Fuzzification – Methods of Membership value assignments – Defuzzification – Methods.

UNIT IV:

Fuzzy Arithmetic – Extension Principle – Fuzzy Measures – Fuzzy Rules and Fuzzy Reasoning: Fuzzy Propositions – Formation of Rules – Decomposition of Rules – Aggregation of Rules – Approximate Reasoning – Fuzzy Inference and Expert Systems – Fuzzy Decision Making – Fuzzy Logic Control Systems.

UNIT V:

Genetic Algorithm: Fundamental Concept – Basic Terminologies – Traditional Vs Genetic Algorithm - Elements of GA - Encoding - Fitness Function – Genetic Operators: Selection – Cross Over - Inversion and Deletion - Mutation – Simple and General GA – The Schema Theorem - Classification of Genetic Algorithm – Genetic Programming – Applications of GA.

TEXT BOOK:

1. S.N. Sivanandam, S.N. Deepa, “Principles of Soft Computing”, Wiley India, 2012.
2. B.Yegnanarayana, “Artificial Neural Networks”, Prentice Hall of India Pvt. Ltd., 2005.
3. S. Rajasekaran, G.A.V. Pai, “Neural Networks, Fuzzy Logic, Genetic Algorithms”, Prentice Hall India, 2004.

REFERENCE BOOK

1. Laurance Fausett, Englewood cliffs, N.J., “Fundamentals of Neural Networks”, Pearson Education, 1992.
2. Simon Haykin, “Neural Networks”, Pearson Education, 2003.

OUTCOMES:

Upon completion of the course, the students are expected to

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

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE ELECTIVE V – PARALLEL PROCESSING

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 5

SEMESTER: III

CREDITS : 4

SUBJECT CODE: 19EH5

OBJECTIVE:

To study the Parallel computer Architecture, theories of parallel computing, interconnection networks and applications of cost effective computer systems.

UNIT I:

Parallel computer models: the state of computing – Multiprocessors and multicomputers – Multivector and SIMD computers.

UNIT II:

Program and Network properties: Conditions of parallelism – Program partitioning and scheduling – program flow mechanisms – system interconnect architectures.

UNIT III:

Processors and memory hierarchy : Advanced processor Technology – Superscalar and vector processors – Linear Pipeline Processors – Nonlinear Pipeline Processors.

UNIT IV:

Multiprocessors and Multicomputers: Multiprocessor System Interconnects- Message-Passing Mechanisms – SIMD Computer Organization. The Connection Machine CM5 – Fine – Grain Multicomputers.

UNIT V:

Software for Parallel Programming : Parallel Programming Models – Parallel Languages and Compilers – Dependence Analysis of Data Arrays.

TEXTBOOK:

1. Introduction To Parallel Processing, By M. Sasikumar, Dinesh Shikhare, Ravi P.Prakash, Eastern Economy Edition, 2014.

REFERENCE BOOKS:

1. Computer Architecture and Parallel Processing, Kai Hwang and Baye.
2. Parallel Computing, Theory and Practice, Michel J.Quinn, McGraw-Hill. International Edn., Singapore 1994.

OUTCOMES:

On the successful completion of this course, Students will be able to:

- Gain knowledge on advance concepts of parallel and pipeline processor technology.
- Study and understand in detail about the Parallel programming models.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE ELECTIVE V – COMPILER DESIGN

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 5

SEMESTER: III

CREDITS : 4

SUBJECT CODE: 19EH5

OBJECTIVE:

To understand the various phases of a compiler and to develop skills in designing a compiler.

UNIT I:

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:

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 :

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

UNIT IV :

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 :

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, 2003.

REFERENCES:

1. Torben Agidius Mogensen, “Introduction to Compiler Design”, Springer, 2011.
2. Henk Alblas and Albert Nymeyer, “Practice and Principles of Compiler Building with C”, PHI, 2001
3. Kenneth C. Loudon, “Compiler Construction : Principles and Practices”, Thompson Learning, 2003.

OUTCOME:

On the successful completion of this course, Students will be able to:

- Use the knowledge of patterns, tokens & regular expressions for solving a problem in the field of data mining.
- Study and understand in detail the working principle of a compiler.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE
SUPPORTIVE ELECTIVE PAPER II
WEB SERVICES

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 4

SEMESTER : III

CREDITS : 3

SUBJECT CODE : 19SH1

OBJECTIVES:

- To enable the student to be familiar with distributed services, XML and web services
- To study the use of web services in B2C and B2B applications

UNIT – I

Overview of Distributed Computing. Introduction to web services – Industry standards, Technologies and concepts underlying web services – their support to web services. Applications that consume web services.

UNIT – II

SOAP and WSDL: The SOAP model – SOAP messages – SOAP encoding 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.

UNIT – IV

Workflow: Business process management- workflows and workflow management. Quality of Service: What is QOS – Why is QOS important for web services – QOS metrics for Web services – QOS enabled web services. Mobile and Wireless mobile services – Challenges with mobile.

UNIT - V

Building real world enterprise applications using web services – sample source codes to develop web services – steps necessary to build and deploy web services and client applications to meet customers requirement – Easier development, customization, maintenance, transactional requirements, seamless porting to multiple devices and platforms.

TEXTBOOKS:

1. Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services : An Architects Guide , Prentice Hall, Nov 2003.

REFERENCES:

1. Martin Kalin, “Java Web Services: Up and Running”, O’Reilly Publishers.
2. Heather Williamson, “XML: The Complete Reference “,Tata McGraw-Hill Education India.

OUTCOMES:

On completion of this course you should be able to:

- Understand the design principles and application of SOAP and REST based web services.
- Design collaborating web services according to a specification.
- Implement an application that uses multiple web services in a realistic business scenario.
- Use industry standard open source tools such as Apache Axis2, Tomcat, Derby and Eclipse to build, test, deploy and execute web services and web applications that consume them.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE PAPER X – MOBILE COMPUTING

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 5

SEMESTER: IV

CREDITS : 4

SUBJECT CODE: 19MHK

OBJECTIVES:

To introduce the basic concepts of mobile computing technology used and its applications.

UNIT I

Introduction: Applications – history of Wireless Communication –Wireless Transmission – Frequencies for Radio Transmission- Signals– Antennas– Signal Propagation – Multiplexing – Modulation – Spread Spectrum.

UNIT II

Medium Access Control : SDMA – FDMA – TDMA – CDMA- Telecommunications Systems: Telecommunication Systems- GSM.

UNIT III

Satellite Systems : Applications- Basics – Routing – Localization – Handover – Broadcast Systems – cyclical repetition of data – digital audio broadcasting – digital video broadcasting – Convergence of broadcasting and mobile communications.

UNIT IV

Wireless LAN : Infra red vs radio transmission – infrastructure and adhoc network – IEEE 802.11– HiperLAN2- Bluetooth.

UNIT V

Mobile Network Layer: Mobile IP – Dynamic host configuration protocol – Mobile Adhoc Networks. Transport and Application Layers: Traditional TCP - Classical TCP improvements – WAP Architecture.

TEXT BOOKS

1. John Schiller, “Mobile Communications Pearson Education”, 2nd Edition, 2011.

REFERENCE BOOKS

1. William Stallings, “Wireless Communications and Networks”, Pearson Education, 2005.
2. Kauch Pahlavan, Prasanth Krishnamoorthy, “Principles of Wireless Networks”, Pearson Education, 2009.

OUTCOMES:

The Students should be able to

- Explain the basics of mobile system.
- Develop mobile application.
- Understand the Mobile Ad hoc networks and its routing.
- Understand the different types of security features.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

CORE PAPER XI – BIGDATA ANALYTICS

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 5

SEMESTER: IV

CREDITS : 5

SUBJECT CODE: 19MHL

OBJECTIVES:

To impart knowledge in Fundamentals on Big Data Analytics, Technologies and databases, Hadoop and Map Reduce Fundamentals. The course provides basic and advanced methods to big data technology and tools, including MapReduce, Hadoop and its ecosystem. This also enables the student to learn big data technologies such as Cassandra, Hive and MongoDB. On successful completion of the course the student should be able to apply Hadoop ecosystem components to participate in data science and big data analytics projects.

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 NewSQL, Introduction to MongoDB and its needs, Characteristics of MongoDB.

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. How Map Reduce Works – Anatomy of a Map Reduce – Map Reduce types and formats – Map Reduce features.

UNIT V

Cassandra and Hive: Introduction to Cassandra – Drawbacks of Relational Database - Cassandra data model – Cassandra examples. Hive – data types and file formats – HiveQL data definition – HiveQL data manipulation – HiveQL queries.

TEXT BOOKS

1. Seema Acharya and Subhashini Chellappan, “Big Data and Analytics”, Wiley India Pvt. Ltd., 2016
2. Tom White “Hadoop: The Definitive Guide” Third Edition, O’reily Media, 2012.

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. “Mining of Massive Datasets”, Anand Rajaraman, Jure Leskovec, Jeffery D. Ullman, Springer, July 2013.
4. Dirk deRoos, Paul Zikopoulos, Bruce Brown, Roman B. Melnyk, Rafael Coss, “Hadoop or Dummies”, John Wiley and sons publishers, 2014.
5. Gaurav Vaish, “Getting Started with NoSQL” , First Edition, Packt Publishers, 2013.

OUTCOMES:

On successful completion of the course the student should

- Apply Hadoop ecosystem components.
- Participate in data science and big data analytics projects.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 600 108.

M.Sc. - COMPUTER SCIENCE

PROJECT AND VIVA-VOCE

(For the students admitted from the year 2019 - 2020)

HOURS PER WEEK : 20

SEMESTER: IV

CREDITS : 8

SUBJECT CODE: 19MHM

**** The Project work will be carried out during the fourth semester of the final year. Students shall develop and implement individually a project work which is an application based on any emerging latest technologies. The project work is to be carried out in IT Companies.**

The idea is to introduce to the student, the methodology for solving a problem and preparing reports. Every month a review will be conducted. The Continuous Internal Assessment marks are based on the three reviews conducted during the six months period.

The student will prepare three copies of the report and submit it to the Head of the Department through the internal guide. This report will be submitted to the External Examiner during examination and the viva-voce is conducted for the same.

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 108.

QUESTION PAPER PATTERN FOR PG

(For PG students admitted from the academic year 2019-20)

Time : 3 Hrs

Marks : 75

SECTION – A

Answer **ALL** the questions.

(10x2=20)

(Without omitting any unit)

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

SECTION – B

Answer any **FIVE** questions out of seven.

(5x5=25)

(Atleast one question from each unit)

- 11.
- 12.
- 13.
- 14.
- 15.
- 16.
- 17.

SECTION – C

Answer any **THREE** questions out of five.

(3x10=30)

(Without omitting any unit)

- 18.
- 19.
- 20.
- 21.
- 22.

.....

BHARATHI WOMEN'S COLLEGE (AUTONOMOUS), CHENNAI – 108.

QUESTION PAPER PATTERN FOR PG - SUPPORTIVE ELECTIVE

(For PG students admitted from the academic year 2019-20)

Time: 3 Hrs

Marks: 75

SECTION – A

Answer any **FIVE** questions out of seven.

(5x5=25)

(Atleast one question from each unit)

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

SECTION – B

Answer any **FIVE** questions out of seven.

(5x10=50)

(Atleast one question from each unit)

- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.

.....
