DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO.ACAD/SU/Sci./B.Sc. & M.Sc. Syll./5/2015

It is hereby notified for information to all the concerned that, on the recommendation of the Faculty of Science the Academic Council at its meeting held on 30-05-2015 has accepted the **revised semester-wise syllabi as mentioned against their names in the Faculty of Science as under :-**

Sr. No.	Name of the Subject	Semester
[1]	B.Sc. Computer Science Degree Course	III & IV
[2]	B.Sc. Information Technology Degree Course	III & IV
[3]	B.C.A. Science Degree Course	III & IV
[4]	B.Sc. Animation Degree Course	III & IV
[5]	B.Sc. Bioinformatics Degree Course	III & IV
[6]	B.Sc. Computer Science [Optional]	III & IV
[7]	B.Sc. Information Technology [Optional]	III & IV
[8]	B.Sc. Computer Applications [Optional]	III & IV
[9]	B.Sc. Computer Maintenance [Optional]	III & IV
[10]	B.Sc. Environmental Science [Optional]	V & VI
[11]	B.Sc. Bio-Chemistry [Optional]	V & VI
[12]	B.Sc. Forensic Science Degree Course	V & VI
[13]	B.Sc. Industrial Chemistry [Optional]	V & VI
[14]	B.Sc. Electronics [Optional]	V & VI
[15]	B.Sc. Zoology [Optional]	V & VI
[16]	B.Sc. Microbiology [Optional]	V & VI
[17]	B.Sc. Instrumentation Practice [Optional]	V & VI
[18]	B.Sc. Statistics [Optional]	V & VI
[19]	B.A. Statistics [Optional]	V & VI
[20]	B.A. / B.Sc. Mathematics [Optional]	V & VI
[21]	B.Sc. Home Science Degree Course	V & VI
[22]	B.Sc. Textile Interior Decoration Degree Course	V & VI
[23]	B.Sc. Fishery Science [Optional]	V & VI
[24]	B.Sc. Dairy Science & Technology [Optional]	V & VI
[25]	B.Sc. Botany [Optional]	V & VI
[26]	B.Sc. Physics [Optional]	V & VI
[27]	M.Sc. Computer Science	III & IV
[28]	M.Sc. I.T.	III & IV

This is effective from the Academic Year 2015-16 & onwards as appended herewith.

All concerned are requested to note the contents of the circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO.ACAD/SU/SCI./
2015/3761-4160
Date:- 16-06-2015.

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Director,
Board of College and University Development.

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Copy forwarded with compliments to:-

1] The Principals, affiliated concerned colleges,
Dr. Babasaheb Ambedkar Marathwada University

Copy to :-

1] The Controller of Examinations,
2] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter,
Dr. Babasaheb Ambedkar Marathwada University,
3] The Superintendent, [B.Sc. Unit],
4] The Superintendent, [M.Sc. Unit],
5] The Programmer [Computer Unit-1] Examinations,
6] The Programmer [Computer Unit-2] Examinations,
7] The Record Keeper.

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M.Sc. (Computer Science)

Semester III & IV

(at college level)

(effective from 2015-16)

M.Sc. – III Semester

Paper No.	Title of the Paper	Teaching Load (Lect./ week)	Max. Marks	Examinations (Hours)
13.	Programming in Java	04	50	03
14.	Computer Graphics	04	50	03
15.	Research Methodology	04	50	03
16.	Elective-1 1.1 Digital Image Processing 1.2 Pattern recognition 1.3 Digital Signal Processing 1.4 Human Computer Interaction	04	50	03
17.	Practical-3 based on theory paper-13 and -14	08	50	04
18.	Practical-4 based on theory paper-15 and 16	08	50	04
	Total Marks		**300**	

M.Sc. – IV Semester

Paper No.	Title of the Paper	Teaching Load perweek (Lect.)	Max. Marks	Examinations (Hours)
19.	Artificial Intelligence	04	50	03
20.	Complier Design	04	50	03
21.	Internet Computing using ASP.NET	04	50	03
22.	Elective-2 2.1 Biometrics. 2.2 Bioinformatics 2.3 Neural networks 2.4 Operation Research	04	50	03
23.	Major Project	08	70	04
24.	Seminar	03	30	04
	Total Marks		**300**	

Paper No.:13 **M.Sc.(C.S.) Semester : III**

Topic: Paper title: Programming in Java

Unit –I

Introduction: History and features of Java, Difference between C, C++ & JAVA. JAVA and Internet, WWW, Web Browsers, java supports system, Java Environment. JDK, JVM, Byte code

Java Programming Basics: Structure of Java program, JAVA tokens and Statements, Constants & Variables, Data types, Operators, Command line arguments.

Java Statements & Arrays: Condition and Looping statement: if, if..else, switch, while, do-while and for. Introduction to arrays, types of arrays, new operator, Strings: String class & its methods, Vectors: Vector Class & its Methods.

Classes & Objects: Specifying classes, Methods and fields, creating objects, Passing objects to methods, returning objects, static fields & methods, Constructors, Garbage collection, Overloading methods & constructors, this keyword.

Unit –II

Inheritances: Specifying sub class, types of inheritance, visibility control: public, private, protected, package. super keyword, Overriding methods, Dynamic method dispatch, Abstract methods and classes, final methods & classes,

Packages & Interfaces : Introduction to packages, naming conventions, package statement, creating packages, import statement, accessing package, use of CLASSPATH, adding class to package, hiding classes. Interface, implementing interfaces, multiple interfaces.

Multithreading: Creation threads, Extending Thread class, implements Runnable interface, stopping and blocking thread, Thread life cycle, thread priorities & Thread synchronization, using Thread methods.

Unit –III

Exception Handling: Managing errors, types of errors, exceptions, syntax of exception handling code. try, catch, throw, throws and finally statements, multiple catch & nested try statements.

Java Input Output: Java I/O package, Byte/Character Stream, Buffered reader / writer, File reader / writer, File Sequential / Random. Reading numeric, character & strings data from keyboard.

Applet programming: Applet Vs. Application, Creating applets, life cycle, local & remote applets. <APPLET> tag & its attributes, adding applet to HTML file, Running applet.

Unit –IV

Abstract Windows Toolkit (AWT): Components and Graphics, Containers, Frames and Panels, Layout Managers, Border layout, Flow layout, Grid layout, Card layout, AWT components. Event delegation Model, Event source and handler, Event categories, Listeners, Interfaces, Controls such as text box, radio buttons, checkboxes, lists, choice, command buttons, text area etc.

JDBC: Java database connectivity, Types of JDBC drivers, Writing JDBC applications, Types of statement objects(Statement, PreparedStatement and CallableStatement), Types of resultset, Inserting and updating , records, JDBC and AWT.

Unit –V

Networking with Java : Networking basics, Sockets, port., Internet addressing,

java.net – networking classes and interfaces, Implementing TCP/IP based Server and Client

Servlets: Introduction Servlet API Overview, Writing and running Simple Servlet, Servlet Life cycle, Generic Servlet, HTTPServlet, ServletConfig, ServletContest, Writing Servlet to handle Get and Post methods.

Books:

1) The complete Reference J2SE: Herbert Schildt, Tata Mc-Graw Hill Publication.
2) Programming with Java: E.Balaguruswamy.
3) Core Java-2: Cray s.Horstmann, Gray Corneel, Pearson Education.
4) Java Handbook: Patrick Naughton, Tata Mc-Graw Hill Publication.
5) Core Java An integrated Approach: R.Nageswara Rao
6) Java 6 Programming. Black Book : Dreamtech Press.

Paper No.:14 **M.Sc.(C.S.) Semester : III**

Topic: Paper title: Computer Graphics

Unit –I

Introduction of computer Graphics and its applications, Overview of Graphics systems, Video display devices, Raster scan display, Raster scan systems, video controller, Raster scan display processor, Random scan display, random scan systems, color CRT monitor, Flat panel display, Interactive input devices, Logical classification of input devices, Keyboard, mouse, Trackball and spaceball, Joysticks, Image scanner, Light pens, Graphics software, Coordinates representations, Graphics functions.

Unit –II

Line drawing algorithms, DDA, Bresenham's, Circle generating, Mid-point circle algorithm, Ellipse generating, Polynomials, Scan-line polygon fill, Boundary fill.

Unit –III

Basic transformation's, Translation, Rotation, Scaling, Matrix representation's & homogeneous co-ordinates, Composite transformation's, Reflection, Two dimensional viewing, Two dimensional clipping, Line, Polygon, Curve, Text. 3D-transformation, Projection, Viewing, Clipping.

Unit –IV

Spline representation, Cubic spline, Bezier curve, Bezier surfaces, Beta spline, Bspline surfaces, B-spline curve, Hidden surfaces, Hidden lines, Z-buffer.

Unit –V

Fractal's geometry Fractal generation procedure, Classification of Fractal, Fractal dimension, Fractal construction methods. Color models, XYZ, RGB, YIQ, CMY & HSV, Shading algorithms, Shading model, Illumination model, Gouraud shading, Phong shading.

Books:

1. Computer Graphics by M. Pauline Baker, Donald Hearn, PHI.

2. Mathematical Element for Computer Graphics By. David F. Roger., J. Alan Adams, Tata
McGHill.
3. Principles of Interactive Computer Graphics By. William. M. Newmann. Mc. Graw Hill.

Paper No.:15 **M.Sc.(C.S.) Semester : III**

Topic: Paper title: Research Methodology

Unit –I

Description: Introduction - meaning of research - objectives of research - motivation in research - types of research - research approaches - significance of research -research methods versus methodology - research and scientific method - importance of knowing how research is done - research processes - criteria of good research - defining research problem - selecting the problem - necessity of defining the problem - techniques involved in defining a problem -

Unit –II

Research design - meaning of research design - need for research design - features of good design - different research designs - basic principles of experimental design. Originality in Research: Resources for research - research skills - time management - role of supervisor and scholar - interaction with subject experts. Thesis Writing: The preliminary pages and the introduction - the literature review - methodology - the data analysis - the conclusions - the references (IEEE format).

Unit –III

Review of Literature: Significance of review of literature - source for literature: books -journals – proceedings - thesis and dissertations - unpublished items. On-line Searching: Database – Sci Finder – Scopus - Science Direct - Searching research articles - Citation Index - Impact Factor - H-index

Unit –IV

Introduction of analytical tools – Introduction to data analysis - least squares fitting of linear data and non-linear data - exponential type data - logarithmic type data - power function data and polynomials of different orders - plotting and fitting of linear, Non-linear, Gaussian, Polynomial, and Sigmoidal type data - fitting of exponential growth, exponential decay type data - plotting polar graphs - plotting histograms - Y error bars - XY error bars - data masking.

Unit –V

Quantitative Techniques: General steps required for quantitative analysis - reliability of the data - classification of errors – accuracy – precision - statistical treatment of random errors - the standard deviation of complete results - error proportion in arithmetic calculations - uncertainty and its use in representing significant digits of results - confidence limits - estimation of detection limit.

Books:

[1] C. R. Kothari, Research Methodology Methods and Techniques, 2nd. ed. New Delhi: New Age International Publishers, 2009.
[2] R. Panneerselvam, Research Methodology, New Delhi: PHI, 2005.
[3] P. Oliver, Writing Your Thesis,New Delhi:Vistaar Publications, 2004.

[4] F. Mittelbach and M. Goossens,The LATEX Companion, 2nd. ed. Addison Wesley, 2004.

References

[1] J. W. Creswell, Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 3nd. ed. Sage Publications, 2008.

[2] Kumar, Research Methodology: A Step by Step Guide for Beginners, 2nd. ed. Indian: PE, 2005.

[3] B. C. Nakra and K. K. Chaudhry, Instrumentation, Measurement and Analysis,2nd. ed. New Delhi: TMH publishing Co. Ltd., 2005. [4] I. Gregory, Ethics in Research, Continuum, 2005.

Paper No.:16 (Elective-1.1) **M.Sc.(C.S.) Semester : III**

Topic: Paper title: Digital Image Processing

Unit –I

Introduction to image processing, Two Dimensional Systems and Mathematical Preliminaries.

Unit –II

Image Perception, Image Sampling and Quantization, Image Transforms, Image Representation by Stochastic Models.

Unit –III

Image Enhancement, Image Filtering and Restoration.

Unit –IV

Image Analysis and Computer Vision.

Unit –V

Image Reconstruction from Projections, Image Data Compression.

Books:

1. Fundamentals of Digital Image Processing, A. K. Jain, Prentice Hall, (ISBN: 9780133361650) Oct 01, 1988
2. Digital Image Processing, 3rd Ed. Rafael C. Gonzalez, Richard E. Woods, Prentice Hall, ISBN 0-13-168728-x, 978-0-13-168728-8

Paper No.:16 (Elective-1.2) **M.Sc.(C.S.) Semester : III**

Topic: Paper title: Pattern Recognition

Unit –I

3D Object Recognition: Inspirations and Lessons from Biological Vision, Range Sensing for Computer Vision, Feature Extraction for 3-D Model Building and Object Recognition.

Unit –II

Three-Dimensional Surface Reconstruction: Theory and Implementation, CAD-Based Object Recognition in Range Images Using Pre-compiled Strategy Trees, Active 3D Object Models.

Unit –III

Image Prediction for Computer Vision, Tools for 3D Object Location from Geometrical Features by Monocular Vision, Part-Based Modeling and Qualitative Recognition, Appearance-Based Vision and the Automatic Generation of Object Recognition Programs.

Unit –IV

Recognizing 3D Objects Using Constrained Search, Recognition of Superquadric Models in Dense Range Data, Recognition by Alignment, Representations and Algorithms for 3D Curved Object Recognition

Unit –V

Structural Indexing: Efficient Three Dimensional Object Recognition, Building a 3-D World Model for Outdoor Scenes from Multiple Sensory Data, Understanding Object Configurations, Modal Descriptions for Modeling, Recognition, and Tracking, Function-Based Generic Recognition for Multiple Object Categories

Books:

1. Three-Dimensional Object Recognition Systems, Anil K. Jain, Patrick J. Flynn, P. J. Flynn, Elsevier Science Ltd, (ISBN: 9780444897978) Apr 01, 1993.

Paper No.:16 (Elective-1.3) **M.Sc.(C.S.) Semester : III**

Topic: Paper title: Digital Signal Processing

Unit –I

Introduction, Discrete-Time Signals and Systems, The Z-Transform and Its Application to the Analysis of LTI Systems

Unit –II

Frequency Analysis of Signals and Systems, The Discrete Fourier Transform: Its Properties and Applications.

Unit –III

Efficient Computation of the DFT: Fast Fourier Transform Algorithms, Implementation of Discrete-Time Systems.

Unit –IV

Design of Digital Filters, Sampling and Reconstruction of Signals, Multirate Digital Signal Processing.

Unit –V

Linear Prediction and Optimum Linear Filters, Power Spectrum Estimation.

Books:

1. Digital Signal Processing: Principles, Algorithms and Applications, 3/E, **John G. Proakis, Dimitris K Manolakis**, Prentice Hall, ISBN-10:0133737624, ISBN-13: 9780133737622

Paper No.: 16 (Elective-1.4) **M.Sc.(C.S.) Semester : III**

Topic: Paper title: Human Computer Interaction

Unit –I

1. The Human: Introduction, Input-output channels, human memory, thinking, Emotion, Individual differences

2. The Computer: Introduction, Text entry devices, Positioning, pointing and drawing, Display devices, Devices for Virtual reality and 3D interaction, Physical controls, sensors and special devices, Paper :Printing and scanning, Memory, Processing and Networks.

Unit –II

1.The Interaction: Introduction, Model of interaction, Framework and HCI, Ergonomics, Interaction styles, element of the WIMP interface, Interactivity, the content of the interaction, Experience, engagement and fun

2. Paradigms: Introduction, Paradigms for interaction.

Unit –III

1. Interaction Design Basics: Introduction, The process of design, User focus, Scenarios, Navigation design, screen design and layout, Iteration and prototyping.

2. HCI in the Software Process: Introduction, the software life cycle, Usability Engineering, Iterative design and prototyping, Design Rationale.

3.Design Rules: Introduction, Principles to support usability, standards, guidelines, Golden rules and heuristics, HCI Patterns.

Unit –IV

1.Implementation Support: Introduction, element of windowing systems, Programming the application, User interface management system.

2.Evaluation Techniques: Introduction, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation Choosing and Evaluation Method.

3.Universal Design: Introduction, Universal Design Principales, Multi-modal interaction, Design for diversity.

Unit –V

1.User Support: Introduction, Requirement of user support, approaches to user support, Adaptive help system, designing user support systems.

2.Cognitive Models: Introduction, Goal and task hierarchies, Linguistics models, Challenges of display-based systems, physical and device models, coginative architectures.

Books:

1. Human - Computer Interaction: Alan Dix, Janet Finly,Gregory D.Abowd,Russell Beale,

Third Edition

Paper-17: Practical based on Paper-13 and Paper-14

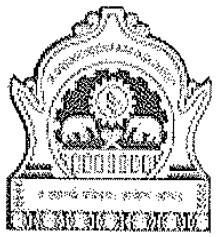
List of Practical: Programming in Java

1 Program that demonstrate use of Arrays.
2 Program to demonstrate constructors.
3 Program to demonstrate method overloading.
4 Program that demonstrate static fields and static methods of class.
5 Program that demonstrate inheritance and its types
6 Program to demonstrate use of method overriding.
7 Program to demonstrate the use of abstract method and abstract class.
8 Program that demonstrate String operations (String class methods)
9 Program that demonstrate package creation and use in program.
10 Program to demonstrate interface.
11 Program to handle exceptions in program (system generated & user defined exceptions)
12 Program that demonstrate multithreading. (Creating thread using Thread class and implementing Runnable interface)
13 Program for Thread synchronization.
14 Program using Byte Stream & Character Stream classes.
15 Program for reading input from keyboard.
16 Program that demonstrate Applet programming.
17 Program that demonstrate 2D shapes on frames.
18 Write a program that demonstrate use of various controls and Layouts
19 Program that demonstrate text and fonts.
20 Program that demonstrate event handling for various types of events.
21 Program to demonstrate JDBC (Inserting, displaying & updating records)
22 Program to demonstrate socket programming. (Client & Server)
23 Program to demonstrate Servlets.

OOAD: At least 10 practical should be conducted on OOAD.

Paper-18: Practical based on Paper-15 and Paper-16

At least 15 practical should be conducted on each paper



M.Sc. (Computer Science)

Semester IV

Paper No.:19 **M.Sc.(C.S.) Semester : IV**

Topic: Paper title: Artificial Intelligence

Unit –I

Introduction: Games, theorem proving, natural language, processing, vision & speech processing, robotics, and expert systems AI, Techniques – search, knowledge, abstraction problems solving State Space Search,

Control Strategies: Depth First Search, Breadth First Search, and Production Systems.

Problem Characteristics: Decomposition, Ignoble, Recoverable, Predictable.

Unit –II

Use of Heuristics: Hill climbing. Best First Search A* Algorithm : Admissibility, AND/OR Graph-AO* Constraint Satisfaction : Cryptoairthmetic, Waltz Line Labeling.

Game Playing: Miming Search, Alpha-Beta Pruning.

Knowledge Representation: Predicate Logic, Well Formed Formulas, Quantifiers; Prenex Normal Form, Solemnization; unification, modus ponies; resolution refashion-various strategies.

Unit –III

Rule Based Systems: Forward Reasoning: conflict resolution , backward reasoning: use of no backtrack structured knowledge representations : semantic net : slots , inheritance , frames-exceptions and defaults –attached predicates, conceptual dependency formalism.

Object Oriented Representations: Al Programming Languages: PROLOG , Syntax, Procedural and declarative meanings, prologue unification mechanism, anonymous variable, lists; use of fail, CUT, Not.

LISP: Basic Concepts, eval functions, functions and variables, scooping of LISP variables, iteration and recursion.

Unit –IV

Handling Uncertanity: Probablistic Reasoning , Bays Net , Dempster Shaver Theory, use of Certainty Factors, Fuzzy Logic Nonmonotonic Reasoning, Dependency Directed Backtracking, Truth, Maintenance Systems.

Learning: Concept of Learning, Learning Automation; The Genetic Algorithm, Learning by Induction, Neural Networks, Hopfield Networks, Perceptions-Learning Algorithm, Backpropagation Network Boatsman Machine, Recurrent Networks. Planning: Components of Planning System , Plan Generation Algorithms, Forward State Propagation, Backward State Propagation , Non-Linear Planning Using Constraint Posting .

Unit –V

Expert Systems: Need & Justification for Expert Systems-Cognitive Problems, Expert System Architecture , Rule Based Systems, Non Production System, Knowledge Acquisition, Case Studies: Mycin, R1.

Natural Language Processing: Syntactic Analysis, Top Down and Bottom Up Parsing; Augmented Transition Networks, Semantic Analysis, Case Grammars.

References:

1. Artificial Intelligence - E. Rich & K. Knight, Tata MC-Graw Hill
2. Introduction To Al And Expert Systems –D.W . Paterson ., Paretic Hall Of India

3. Introduction To Expert Systems - Peter Jackson, Addison Wesley Pub. Company.
4. A. I. and Engineering Approach - R.J. Schalkoff. MC-Graw Hill Ed.
5. Principles of AI - N.J. Nilsson, Narrows Publishing House.
6. Programming In Prolog - Clocks & Melissa, Narrows Publishing House.
7. Rule Based Expert S ystem - M. Sasikumar, S. Ramani, Narosa Pub. House
8. Artificial Intelligence – P.H. Winston 2nd Edition, Addison-Wesley ,1984.
9. Prolog From The Beginning - H.Konigslerg & F.De .Bruyn, MC-Graw Hill Ed.

Paper No.:20 **M.Sc.(C.S.) Semester : IV**

Topic: Paper title: Compiler Design

Unit –I

Introduction to Compilers : Overview, Structure, implementation. Programming Language Grammars: Inter Language grammars, derivation, reduction, syntax tree, ambiguity, regular grammars & expressions.

Unit –II

Scanning and Parsing Techniques : The Scanner, parser, translation, elementary symbol table organization, structures.

Unit –III

Memory Allocation: Static and dynamic memory allocation, array allocation and access, allocation for strings, structure allocation, common & equivalence allocation. Introduction to Compilation of expressions.

Unit –IV

Compilation of Control Structures : Control transfers, procedural calls, conditional execution, interation control constructs. Error detection, indication & recovery.

Compilation of I/O Statements: Compilation of I/O list, compilation of FORMAT list, IOSUB, file control.

Unit –V

Code Optimization: Major issues, optimizing transformations, local optimizations, program flow analysis, Global Optimization, writing compilers.

References:

1) Compiler Construction - D.M.Dhandhere (M)
2) Compiler Writing - Tremble-Sorenson (TMH)
3) Computers : Princ, Techniques cools by Aho - Person.
4) The Essence of Compilers by Hanter - Pearson.

Paper No.:21 **M.Sc.(C.S.) Semester : IV**

Topic: Paper title: ASP.Net

Unit –I

HTML Basics: Introduction to Internet, Applications, Web designing, web browser, web pages, home page, web site, web servers, www. Concepts of hypertext, hypermedia, versions of HTML, elements of HTML, syntax, sections of HTML,

building & executing html documents, Various tags of HTML: Headings & Title, Text-level elements, Changing Colors font, size using FONT> Tag, Text alignment & paragraph Creating links with <A Href> tag, Inserting image using <IMG> tag, Creating Table with <TABLE> tag, rowspan, colspan attributes. <FRAMESET> & <FRAME> tag, <FORM> tag, creating text boxes, buttons, checkboxes, radio buttons, hidden control, password, lists & dropdown list, textarea. Submitting a form, get & post method. ASP & HTML forms. Working with Cascading Style Sheet (CSS).

Unit –II

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

Unit –III

ADO.NET: Overview of ADO.NET, from ADO to ADO.NET, ADO.NET architecture, Accessing data using data adapters and datasets, using command and data reader, binding data to data bind controls, displaying data in data grid.

Unit –IV

XML in .NET: XML basics, attributes, fundamentals of XML classes: Document, text writer, text reader, XML validations, XML in ADO.NET, Data document

Unit –V

Web Services: Introduction, State management, view state, session state, application state, service description language, building & consuming a web service. Web application development, Caching, Threading concepts, Creating threads in .NET, Managing threads, Thread Synchronization, features of .NET, role based security & code access security, permissions

References:

1. The Completer Reference ASP.NET – Mathew Macdonald (TMH)
2. Professional ASP.NET – Wrox publication
3. VB.NET Programming Black Book – Steven Holzner (Dreamtech pub.)
4. Introduction to .NET framework – Wrox publication.
5. ASP.NET Unleashed - bpb publication.
6. Learn HTML in a weekend – Steven E. Callihan (TMH)
7. Using HTML – Lee Anne Philips (PHI)

Paper No.:22 (Elective-2.1) **M.Sc.(C.S.) Semester : IV**

Topic: Paper title: Biometrics

Unit –I

Introduction : Operation of a biometric system, Verification versus identification, Performance of a biometric system, Applications of biometrics, Biometric characteristics, Limitations of biometric systems, Introduction to Biometrics and its

various techniques.

Unit –II

Finger Print Verification Techniques: Introduction, History, Matching Verification and Identification, Feature Types, Image processing and verification.

Unit –III

Hand Geometry Based Verification Introduction, System Operation, Implementation Issues, Applications.

Unit –IV

Retina Recognition Introduction, Retina/Choroidas Human Descriptor, Computing Subsystem

Unit –V

DNA Based Identification: Introduction, A brief History of DNA based Identification, Applications of DNA Identification Technology.

References:

1. BIOMETRICS Personal Identification in Networked Society, edited by Anil K. Jain and Ruud Bolle and Sharath Pankanti
2. Handbook of Multibiometrics by Arun A, Ross and Karthik Nandakumar and Anil K. Jain Springer-Verlag New York Inc, Oct 19, 2007, (ISBN: 9780387710402) (Only Chapter 1)
3. Biometric Systems: Technology, Design and Performance Evaluation,(Hardcover) James Wayman, Anil Jain, Davide Maltoni, Dario Maio

Paper No.:16 (Elective-2.2) **M.Sc.(C.S.) Semester : IV**

Topic: Paper title: Bioinformatics

Unit –I

What Is Bioinformatics, Goal, Scope, Applications, Limitations, , How Is Computing Changing Biology, Isn't Bioinformatics Just About Building Databases, What Does Informatics Mean to Biologists, What Challenges Does Biology Offer Computer Scientists, What Skills Should a Bioinformatician Have, Why Should Biologists Use Computers, What Is a Database, Types of Databases, Biological Databases, Pitfalls of Biological Databases.

Unit –II

Molecular Biology's Central Dogma, What Biologists Model, Why Biologists Model, Chemical Composition of Biomolecules, Composition of DNA and RNA, Watson and Crick Solve the Structure of DNA, Development of DNA Sequencing Methods, Gene finders and Feature Detection in DNA, DNA Translation, Pair wise Sequence Comparison, Sequence Queries Against Biological Databases, Multifunctional Tools for Sequence Analysis

Unit –III

Multiple Sequence Alignments, Trees, and Profiles, The Morphological to the Molecular Multiple Sequence Alignment, Phylogenetic Analysis, Profiles and Motifs, Visualizing Protein Structures and Computing Structural Properties, A Word About Protein Structure Data, The Chemistry of Proteins, Web-Based Protein Structure Tools, Structure Visualization, Structure Classification, Structural Alignment, Structure Analysis, Solvent Accessibility and Interactions, Computing Physicochemical Properties.

Unit –IV

Predicting Protein Structure and Function from Sequence, Determining the Structures of Proteins, Predicting the Structures of Proteins, From 3D to 1D, Feature Detection in Protein Sequences, Secondary Structure Prediction, Predicting 3D Structure.

Unit –V

Tools for Genomics and Proteomics, From Sequencing Genes to Sequencing Genomes, Sequence Assembly, Accessing Genome Information on the Web, Annotating and Analyzing Whole Genome Sequences , Functional Genomics: New Data Analysis Challenges, Proteomics, Biochemical Pathway Databases, Modeling Kinetics and Physiology

Reference Books:

1. Developing Bioinformatics Computer Skills, By Cynthia Gibas & Per Jambeck Publisher: Shroff/O'Reilly, First Edition April 2001, ISBN: 9788173662423
2. Essential Bioinformatics By JIN XIONG, Cambridge University Press. (Only Chapter One)
3. Bioinformatics Technologies By Springer ISBN 3-540-20873-9 Springer Berlin Heidelberg New York
4. Bioinformatics: Sequence and Genome Analysis By David Mount

Paper No.:16 (Elective-2.3) **M.Sc.(C.S.) Semester : IV**

Topic: Paper title: Neural Network

Unit –I

Intrduction The role of neural networks in engineering, artificial intelligence, and cognitive modelling.

Unit –II

Supervised learning in neural networks: Feed-forward neural networks of increasing complexity, gradient descent learning and extensions, learning and generalization theory

Unit –III

Computation and dynamical systems : Hopfield model of content-addressable memory, Hopfield-Tank approach to optimisation, resistive networks for vision models, complex dynamical learning models.

Unit –IV

Reinforcement Learning: The problem of reinforcement learning, Arp learning, Q-learning, TD-learning. Generalization and function approximation. Unsupervised Learning :Competitive learning, Self-organizing feature maps, ART networks, GWR networks.

Unit –V

Selected Applications : The perceptron and linear separable functions multilayer perceptrons backpropagation, one basic learning algorithm for feedforward networks variations and improvements of backpropagation generalisation ability recurrent networks: Hopfield Networks and Boltzmann Machines unsupervised learning selforganising feature maps

Paper-23

Major Project

Team size : maximum 2 students
Project Work : 40

Project Report : 20

Viva Voce : 10

Total : 70

Paper-24

Seminar: 30 marks

Reference Book:

1. An Introduction to Neural Networks by K Gurney
2. Neural Neural by Sue

Paper No.: 16 (Elective-2.4) **M.Sc.(C.S.) Semester : IV**

Topic: Paper title: Operation Research

Unit –I

1. **Operation Research** : Introduction, Nature and meaning of OR, Management of applications of OR, Modeling in OR, Principles of modeling, general method for solving OR Models, Scope of OR
2. **Linear Programming Problem:** Introduction of LPP, some important definitions, Formulation of LPP, Graphical Method, General formulation of LPP, Slack and Surplus Variables, Standers form, matrix form of LPP. Problems on Graphical Method

Unit –II

1. **Simplex Method :** Computational procedure of Simplex Method, Computation by Simplex Method, artificial variable method. Problems on Simplex method.
2. **Revised Simplex Method:** Standard Forms of Revised Simplex method, formulation of LPP in Standard Form, obtain BFS, computational procedure and problems.

Unit –III

1. **Duality in Linear Programming:** Introduction, Definition of Primal-Dual Problem, converting Primal into its Dual, Duality and Simplex Method, Problems.
2. **Dual Simplex Method:** procedure of Dual Simplex Method Problems

Unit –IV

1. **Assignment Problem:** formulation of Assignment Problem, Hungarian Method for assignment Problem.
2. **Transportation Problem:** formulation of Transportation Problem, Matrix form of Transportation Problem, Feasible Solution, Basic Feasible solution, and Optimal Solution, problems.

Unit –V

1. **PERT and CPM:** Introduction, Applications of PERT/CPM, Basic steps in PERT/CPM, Network diagram Representation, Drawing Network Diagram, Labeling and Fulkerson's I-J Rule, Time Estimates and Critical Path in Network Analysis, Resource Allocation, use of PERT/CPM for management, problems. Introduction to nonlinear Programming Problem.
2. **Critical Path Analysis (CAP):** Network representation of simple projects, Critical path computation: Construction of time schedule, Crashing of project duration

References:

1. *Operation Research* by S.D. Sharma
2. *Introduction to Operations Research by* Frederick S.Hiller, Gerald J.Lieberman
3. *Operations Research An introduction by* Hamdy A. Taha,
4. *Operations Research by* Kanti swarup, Gupta P.K. and ManMohan.
5. *The Critical Path Method by* Saffer L.R., Fitter J.B. and Meyer W.L.