AWADHESH PRATAP SINGH UNIVERSITY

REWA (M.P.) 486003

CBCS

CURRICULAM & SYLLABUS

MASTER OF COMPUTER SCIENCE (M.Sc.)

(UGC Approved)

Course Code: 08

www.apsurewa.ac.in

Approved by Board of studies dated 21-09-2020

DEPARTMENT OF COMPUTER SCIENCE A.P.S. UNIVERSITY, REWA (M.P.)
SYLLABUS FOR M.SC. COMPUTER SCIENCE
(w.e.f. SESSION 2020-2021)

Semester I

Paper Code	Subject Code	Subject Name	Course Type	Credits	Theory Marks	Internal Marks	Practical Marks	Total Marks
1081	**MSCS-101**	Discrete Mathematics	CC	4	60	40	0	100
1082	**MSCS-102**	Computer System Architecture	CC	4	60	40	0	100
10831 **10832**	**MSCS-103**	**Elective I:: (Any one of the following considering departmental constraints)** a) Data Structure Using C b) Web Technology	DCE	4	60	40	0	100
10841 **10842**	**MSCS-104**	**Elective II:: (Any one of the following considering departmental constraints)** a) Numerical Methods b) E-Commerce and E-Governance	DCE	4	60	40	0	100
1085	**MSCS-105**	DBMS *	GE	4	60	40	0	100
1086	**MSCS-106**	S/W Lab-I MSCS 102 & 103	LAB	2	0	40	60	100
1087	**MSCS-107**	S/W Lab-II MSCS104 & 105	LAB	2		40	60	100
1088	**MSCS-108**	Comprehensive Viva	VIVA	4				100
		Semester Total Marks and Credits		**28**				**800**

Semester II

Paper Code	Subject Code	Subject Name	Course Type	Credits	Theory Marks	Internal Marks	Practical Marks	Total Marks
2081	**MSCS-201**	System Software	CC	4	60	40	0	100
2082	**MSCS-202**	Software Engineering	CC	4	60	40	0	100
20831 **20832**	**MSCS-203**	**Elective III:: (Any one of the following considering departmental constraints)** a) Object Oriented Programming b) Programming in Python	DCE	4	60	40	0	100
20841 **20842**	**MSCS-204**	**Elective VI:: (Any one of the following considering departmental constraints)** a) Computer Network b) Big Data Analysis	DCE	4	60	40	0	100
2085	**MSCS-205**	Advanced Programming Language *	GE	4	60	40	0	100
2086	**MSCS-206**	S/W Lab-I MSCS 203	LAB	2		60	40	100
2087	**MSCS-207**	S/W Lab-I MSCS 205	LAB	2		60	40	100
2088	**MSCS-208**	Comprehensive Viva	VIVA	4				100
		Semester Total Credits and Marks		**28**				**800**

CC: Core Course GE: Generic Elective DCE: Discipline Centric Elective

* Student may choose this course as a Generic Elective or may choose a Generic Elective Course Offered in other UTDs at the same level or may choose a course offered by MOOCs through SWAYAM

Instructions:
1. For passing the subject examination minimum 40% marks must be separately scored in Theory Paper, Practical Exams and Internal Evaluation for the subject.
2. Please refer concerned regulation for details

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Semester III

Paper Code	Subject Code	Subject Name	Course Type	Credits	Theory Marks	Internal Marks	Practical Marks	Total Marks
3081	**MSCS-301**	Operating System	CC	4	60	40	0	100
3082	**MSCS-302**	Computer Graphics & Multimedia	CC	4	60	40	0	100
30831 **30832**	**MSCS-303**	**Elective V:: (Any one of the following considering departmental constraints)** a) Theory of Computation b) AI & Machine Learning	DCE	4	60	40	0	100
30841 **30842**	**MSCS-304**	**Elective VI:: (Any one of the following considering departmental constraints)** a) Advanced Computer Architecture b) Information & Network Security	DCE	4	60	40	0	100
3085	**MSCS-305**	Java Programming*	GE	4	60	40	0	100
3086	**MSCS-306**	S/W Lab-I MSCS 302	LAB	2		60	40	100
3087	**MSCS-307**	S/W Lab-I MSCS 305	LAB	2		60	40	100
3088	**MSCS-308**	Comprehensive Viva	VIVA	4				100
		Semester Total Credits and Marks		**28**				**800**

Semester IV

Paper Code	Subject Code	Subject Name	Course Type	Credits	Theory Marks	Internal Marks	Practical Marks	Total Marks
4081	**MSCS401**	Major Project/ Dissertation External Evaluation	CC	12				300
4082	**MSCS402**	Major Project/ Dissertation Internal Evaluation	CC	8				200
4083	**MSCS403**	Comprehensive Viva	Viva	4				100
		Total		**24**				**600**

CC: Core Course GE: Generic Elective DCE: Discipline Centric Elective

* Student may choose this course as a Generic Elective or may choose a Generic Elective Course Offered in other UTDs at the same level or may choose a course offered by MOOCs through SWAYAM

Instructions:

1. For passing the subject examination minimum 40% marks must be separately scored in Theory Paper, Practical Exams and Internal Evaluation for the subject.
2. For passing the semester, minimum aggregate marks must be 45% in the semester.

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Programme Outcomes

POs.1 To understand both the theoretical and practical concepts of Computer Science.
POs.2 To gain programming skill to provide solutions for real world problems.
POs.3 To gather a better understanding to analyze, design and development of software systems.
POs.4 To build a foundation for academics and research in Computer Science.

Programme Specific Outcomes

PSOs.1 Demonstrate understanding of the principles and concepts of the computer systems to develop efficient computing system.
PSOs.2 Analyze, design, develop, implement and test computer systems for providing solutions for computing problems.
PSOs.3 Enhancing skills and learning new computing technologies for attaining professional excellence and research.
PSOs.4 Design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design and data analytics of varying complexity.
PSOs.5 Acquaint with the contemporary trends in industrial/research and thereby bring forth novel solutions to existing problems.
PSOs.6 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

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PAPER (MCS-101) - DISCRETE MATHEMATICS

Course Objectives:

- Understand Different Types of Discrete Structures
- Express a Logic Sentence in Terms of Predicates, Quantifiers, and Logical Connectives
- Solve Problems Using the Principle of Inclusion-Exclusion.
- Understand Recursive Definitions;
- Understanding the computer problems by graph and trees concept

Course Outcomes:

- Analyze Properties of Algebraic Structures Such as Groups, Rings and Fields.
- Apply the Operations of Sets and use Venn Diagrams to Solve Applied Problems;
- Use and Analyze Recursive Definitions
- Understand, Explain and Apply the Basic Principles of Sets and Operations in Sets to Solve the Problems
- Analyze Modern Problems in Computer Science and solve them Using Graphs and Trees.

Unit-wise Syllabus:

UNIT I

Mathematical Logic and Set theory: Introduction. The theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the predicate Calculus. Set Theory. Introduction, Basic Concepts of Set Theory, Elementary representation of Discrete Structures: Relations and Ordering: Properties of Binary Relations in a set, Relation Matrix and the Graph of a Relation, Composition of Binary Relation, Partial Ordering, Functions: Composition, Characteristics, Natural Number.

UNIT II

Algebraic Structures: Introduction: Algebraic Systems: Examples and General Properties: Definition and Examples, Some Simple Algebraic Systems and General Properties, Semi groups and Monoids: Definition and Examples, Homomorphism of Semi group and Monoids, Sub semi groups and Sub Monoids, Grammars and languages: Discussion of Grammars, Formal Definition of a Language, Nations of Syntax Analysis Polish Expressions and Their Compilation, Groups: Definitions and Examples. Subgroups and Homomorphism. Co-sets and Lagrange's Theorem, Normal subgroups, Algebraic Systems with Two Binary Operations,

UNIT-III

Lattices and Boolean algebra: Introduction: Lattices as Partially Ordered Sets: Definition and Example. Some Properties of Lattices, Lattices as Algebraic Systems. Sub lattices, Direct Product and Homomorphism, Some Special Lattices, Boolean algebra, Definition and Examples, Sub algebra, Direct Product and Homomorphism Boolean Functions Boolean Forms and Free Boolean Algebra, Values of Boolean Expressions and Boolean Functions, Representation of Boolean Functions, Minimization of Boolean Function, Design Examples Using Boolean Algebra.

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UNIT -IV

Graph Theory: Introduction Basic Concepts of Graph Theory: Basic Definitions, paths, Reachability and Connectedness, Tree and fundamental Circuits: Some Properties of Trees, Pendent Vertices in a tree, Distance and Centers in a tree, Rooted and Binary Trees, Spanning tree, Fundamental Circuits. Matrix Representation of Graphs: Incidence Matrix, Circuit Matrix, An application to a Switching network, path Matrix and Adjacency Matrix

Text-Books;

1. Trembley J.P. & Manohar R: Discrete Mathematical Structure with Application to Computer Science, TMH
2. S Lipchutz: "Finite Mathematics", Schaum Series, MGH.

Reference Books:

1. C.L Liu- Elements of Discrete Mathematics- McGraw Hill.
2. K.H. Rosen, Discrete Mathematics and Applications, Fifth Edition 2003, Tatamcgraw Hill.
3. W.K. Grassmann and J.P. Trembnlay, Logic and Discrete Mathematics, a Computer Science
4. Ronald Graham, Donald Knuth and Oren Patashik- Concrete Mathematics: a Foundation for Computer Science Ronald Graham,
5. Donald Knuth and Oren Patashik- Concrete Mathematics: a Foundation for Computer Science-Addison-Wesley
6. Judith L. Gersting -Mathematical Structures for Computer Science,-Computer Science Press.
7. K. a. Ross, Ch. R. B. Wright, Discrete Mathematics, Prentice Hall Inc., 1992 (Or Pwn Warszawa 1996).

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Paper (MSCS-102) Computer System Architecture

Course Objectives:

- Understand Data Representation for Digital Logic
- Understand the Basic Blocks of Digital Logic
- Understand the Fundamental Organization of a Digital Computer
- Design Simple Combination & Sequential Circuits
- Examine the Basics of General Programming
- Learn the Micro programmed Controls
- Learn the Memory and I/O Organization.

Course Outcomes:

- Understand and Represent Data in Different Binary Formats
- Design Simplify and evaluate Boolean Equations and Circuits
- Explain and Analyse Basic Building Blocks of Digital Electronics and Computer
- Design and Analyse Simple Combination & Sequential Circuits
- Analyse the Basic Computer Organisation and Programming
- Understand the Organisation of I/O Devices and Computer Memory Mapping.

Unit-wise Syllabus:

UNIT I

Basic Computer Organization: Block diagram, Evolution of computers Systems. Classification of computers Data representation in computers, Binary. Octal and Hexadecimal numbering systems and their inter conversion, Binary codes -BCD. EBCDIC Gray. Parity, Error correction code. Concepts of Boolean algebra: Basic Postulates. Canonical from Minimization Techniques, Karnaugh Map. Logic gets. Flip-Flops (RS, D, JK, T)'

UNIT-ll

Basic Building Blocks of Computers: Registers (Shift Register), Counters (Binary, Up, Down, Ripple, Register transfer, Bus and Memory transfer, Arithmetic, shift and logic Micro-operations, CPU: introduction, general register organization, addressing modes, Memory organization - Memory hierarchy, Main memory, Auxiliary memory. Associative memory. Cache memory, Virtual memory, Data transfer: Modes of transfer. Asynchronous and Synchronous Data transfer. DMA

UNIT-III

Internal architecture of 8086/8088 Microprocessor: Software model of 8086/88. Memory Address Space and Data Organization, Data type, Segment registers and Memory Segmentation. Instruction pointer, Data registers , Pointer and Index registers, Status register, The Stack, I/O Address Space, Addressing modes of the 8086/88. Converting Assembly Language instructions to Machine Code, The IBM PC and its DEBUG program.

UNIT -IV

Introduction to 8086/88 Programming: The instruction set of the 8086/88. Data transfer. Arithmetic, Logic, Shift and Rotate Instructions, Flag Control instructions. Compare instruction, Jump Instructions.

Subroutines and subroutine handling instruction. The loop and loop-handling instructions. Strings and String handling instructions. Interrupts in 8086. Introduction to DOS/BIOS interrupt programming

Text Books:

1. M. Moris Manno: Computer System Architecture, PHI
2. Walter A. Trieble and Abtar Singh: 8088 and 8086 microprocessors: Programming, interfacing software, hardware and applications.PHI

Reference Books:

1. John P. Hayes: Computer Architecture and Organization' MGH
2. Andrew S. Tannenbaum: StructuredcomputerOrganization' PHI
3. Albert Paul Malvion: Digitalprinciples T'MH
4. B Ram. Microprocessor & Microcomputer dhanpat Rai& Sons

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PAPER (MSCS-103 A) DATA STRUCTURE USING C

Course Objectives:

- To Make the Student Learn a C Programming Language.
- To Learn Problem Solving Techniques using C.
- To Teach the Student to Write Programs in C and to Solve the Problems.
- To Teach the Concepts of C Programming Like Control Structures Functions Learn About arrays Structures and Union etc.
- Learn Basic Data Structures Such as Linked Lists Stacks and Queues Tree and Graph.
- Learn Algorithm for Solving Problems Like Sorting Searching Insertion and Deletion of Data
- Understand the Complexity of Various Algorithms.
- Introduce Various Techniques for Representation of the Data in in Memory.

Course Outcomes:

- Explain the Basic Terminology Used in Computer Programming.
- Explain the Process of Problem Solving Using C Programming Language.
- Write Compile and Debug Programs in C Language.
- Analyze and Solve Complex and Real Life Problems by Developing Application Programs using C Programming Language.
- Understand and explain Basic Data Structures Such as Linked Lists Stacks and Queues Tree and Graph.
- Select and apply Appropriate Data Structures to define the particular Problem statement.
- Implement Operations Like Searching/Sorting Insertion and Deletion Traversing on Various Data Structures.
- Determine and Analyze the Complexity of Given Algorithms

Unit-wise Syllabus:

UNIT-I

Programming Part I: Basics of C programming, Structure of a simple C program. Simple I/O functions, Data tvpes in C, operators &their precedence, Control Structures if-else statements. Switch statement. Loops while. do-while and for loop functions: User-defined functions, returning a value from a function. Local and global variables, automatic, Static Register and External Storage class Parameters: Type, Declarations of a function, functions with more than one parameters, recursion, Arrays: arrays (upto 2 Dimensions), Declaration and initialization, the break structured, string and character arrays. operations on arrays, The C preprocessors.

UNIT- II

Programming Part II: String and string functions Pointers, the concept of pointers, the address and correction operators, passing pointers as parameters. Dynamic memory allocation, Arrays and pointers, Passing by value and reference, Address arithmetic Pointer to pointers, Structures: initializing a structure, Types of structures. arrays within structures, structures within structures. Structures and functions. Files

in C, modes for files. functions used infiles (putchar, getchar, getc, putc. fopen, fclose, fscan, fprint, fseek. ftell. fread and (write), error handling in files.

UNIT- III

Data Structure part l: Introduction: Algorithm analysis for time and space requirements, stacks; operations on stacks applications of stacks, recursion. polish expressions and their manipulations, Queue; operations on queues, priority queues, linked storage representation, linked linear lists. Operations on linked list, circular linked list, doubly linked lists. Application of linked lists, Polynomial manipulation, error precision. fixed block storage allocation, dynamic storage management, first fit and best fit, storage allocation, garbage collection, compaction.

UNIT- IV

Data Structure part II : Definitions and concepts of general trees and binary trees, representation of binary tree. representation of general tree, binary tree traversal. binary trees. operation on binary trees. application of trees, manipulation of arithmetic's, expressions, binary search trees. evaluation of binary search trees. Graphs and their representation, matrix representation, list structure Breadth first search, Depth first search, spanning trees. application of graphs, topological sorting. sorting techniques selection sort. bubble sort, merge sort, tree sort, partition exchange sort. radix sort. heap sort ,searching techniques: Linear search. binary search. hash table method, hashing function .

Text Books:

1. Gotrified Progranuning with C
2. E Balagurusamy: Progranuning with C
3. Horowitz &Sahni: Fundamentals of Data Structures, Comp. Sc. Press
4. Tanenbaum A.S.: Data Structures using C, PHl

Reference books

1. Rajaraman Introduction to C. PHI
2. Y Kanetkar Let us C, BPB
3. S. Lipschutz Schaum s outline series. Data Structures. MGH
4. J.P Trembley &P.G. Slorenson: An Introduction to Data Structures, MGH
5. OE Knuth. The Art of Computer Programming, Addision Wesley R Ci Dromey- How to solve it by computer

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PAPER (MSCS-103 B) WEB TECHNOLOGY

Course Objectives:

- Learn How to Design and Develop a Web Page Using HTML and CSS
- Learn How to Link Pages So that they Create a Web Site.
- Design and Develop a Web Site Using Text Images Links Lists and Tables for Navigation and Layout.
- Style Your Page Using CSS Internal Style Sheets and External Style Sheets.
- Learn to use Java Script & XML in Web Design.
- Learn How to use Database in Web Design.

Course Outcome:

- Describe the concepts of WWW including Browser and HTTP Protocol.
- ListtheVariousHTMLTagsandusethemtodeveloptheUserFriendlyWebPages.
- Define the CSS with its Types and use them to provide the Styles to the Web Pages at Various Levels.
- DeveloptheModernWebPagesusingtheHTMLandCSSFeatureswithdifferentlayoutsas per Need of Applications.
- Use the Java script to develop the dynamic WebPages.
- Use Server Side Scripting with PHP to Generate the Web Pages dynamically using the Database Connectivity.
- Develop the Modern Web Applications using the Client and Server Side Technologies and the Web Design Fundamentals.

Unit-wise Syllabus :

UNIT-I

Introduction to Web Web Designing and Website Planning :concept of WWW Internet and WWW HTTP Protocol : Request and Response Web Browser and Web Servers Website Hosting-Free Vs. Paid Linux Vs. Windows Hosting Concepts & use of Database & Mail Servers Associated with Web Sites Features of Web 2.0 Concepts of Effective Web Design Web Design Issues Including Browser Bandwidth and Cache Display Resolution Look and Feel of the Website Page Layout and Linking User Centric Design Sitemap Planning and Publishing Website Designing Effective Navigation. Website Hosting Issues C panel and FTP.

UNIT-II

Web Development with HTML : Basics of HTML Formatting and Fonts Commenting Code Color Hyperlink Lists Tables Images Forms Meta Tags Character Entities Frames and Frame Sets Browser Architecture and Web Site Structure. Overview and Features of HTML5 use of HTML Code Editor& WYSIWYG Editor. Cascading Style Sheets (CSS): Style Sheets : Need for CSS Introduction to CSS Basic Syntax and Structure Using CSS Background Images Colors and Properties Manipulating Texts Using Fonts Borders and Boxes Margins Padding Lists Positioning Using CSS CSS2 Overview and Features of CSS3

UNIT-III

Technologies for Web Applications Javascript & XML: Javascript : Client Side Scripting with Javascript Variables Functions Conditions Loops and Repetition Pop Up Boxes Advance Javascript: Javascript and Objects Javascript Own Objects the Dom and Web Browser Environments Manipulation Using Dom Forms and Validations DHTML : Combining HTML, CSS and Javascript Events and Buttons. XML : Introduction of XML Validation of XML Documents DTD Ways to use XML, XML for Data Files Html Vs XML Embedding XML into HTML Documents Converting XML to HTML for Display Displaying XML Using CSS and XSL Rewriting HTML as XML Relationship Between HTML SGML and XML Web Personalization Semantic Web Semantic Web Services. Transforming XML Using XSL and XSLT

UNIT-IV

Web Design with PHP: Introduction and Basic Syntax of PHP Decision and Looping with Examples PHP and HTML Arrays Functions Browser Control and Detection String Form Processing Files Advance Features: Cookies and Sessions Object Oriented Programming with PHP. Introduction to Database Driven Websites with PHP: PHP and MYSQL: Basic Commands with PHP Examples Connection to Server Creating Database Selecting a Database Listing Database Listing Table Names Creating a Table Inserting Data Altering Tables Queries Deleting Database Deleting Data and Tables PHP My admin and Database Bugs.

Reference Books:

1. Roger S. Pressman David Lowe “Web Engineering” Tata McGraw Hill Publication 2007
2. Achyut S Godbole and Atul Kahate “Web Technologies” Tata McGraw Hill
3. Gopalan N P Akilandeswari “Web Technology: a Developer S Perspective” PHI
4. Chris Bates Web Programming: Building Internet Applications Wiley
5. C. Xavier “Web Technology & Design” Tata McGraw Hill.
6. Ivan Bay Ross “HTML DHTML Java Script Perl CGI” BPB.
7. Ralph Moseley and M.T. Savaliya- Developing Web Applications Wiley-India
8. Web Technologies Black Book Dreamtech Press
9. HTML5 Black Book Dreamtech Press
10. Joel Sklar- Web Design Cengage Learning
11. Harwani- Developing Web Applications in PHP and Ajax Mcgrawhill
12. P.J. Deitel & H.M. Deitel- Internet and WorldWideWeb How to Program Pearson

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PAPER (MCS-104 A) – NUMERICAL METHODS

Course Objectives:

- To Make the Student's Aware of Need of Numerical Methods.
- Cover the Classical Fundamental Topics in Numerical Methods: Approximation Numerical.
- Integration Numerical Linear Algebra Solution of Nonlinear Algebraic Systems and Solution of Ordinary Differential Equations.
- To Make Students Aware of Numerical Analysis Software and Computer Facilities.

Course Outcomes:

- Understand and analyze the real problems and formulate them into linear and non-linear Equations.
- Gain the knowledge of various Optimization Techniques for finding the solutions of Non-Linear and Linear Equations.
- Optimize the solutions by iteratively carrying out Error Analysis for Arithmetic Operations.
- Understand and explain the Propagation of Errors with the help of Complex Numerical
- Algorithms.
- Understand the usage of Interpolation techniques for Numerical Differentiation and
- Integration.

Unit-wise Syllabus:

UNIT-I

Statistical Methods: Introduction, Sampling, Frequency Distribution, Measures of central tendency, Measures of dispersion, discrete probability distribution: Significance of probability, Discrete, Binomial, Poisson and Normal Distribution, Curve fitting, Regression & Correlation: Linear least square fit, Nonlinear fit, Polynomial fit, coefficient of correlation, multiple, partial & rank Correlation. Tests of significance: chi square, T-test & f-Test

UNIT -II

Numerical methods 1: Solution of polynomial and Linear Equations: Introduction properties & Evaluation of polynomial Equation, Iterative methods for roots of Equations Bisection method. False position method , Newton- Raphson method for complex root, rate of Convergence , Muller method, fixed point method, Solution of simultaneous equation solution by notation method. Gauss elimination method pivotal Condensation, Gauss Seidel Method, Gauss Jordan method Matrix Method Gauss Jordan Matrix Inversion, Eigen Value & Eigen Vectors

UNIT -III

Numerical methods 2: Interpolation & Numerical Differentiation: Introduction, Linear interpolation, polynomial interpolation, difference Table, Gregory- Newton interpolation, Newton divided difference interpolation, Lagrange's interpolation (Backward and Forward) Errors in differences Hermite interpolation, Piecewise and spline interpolation Numerical differentiation by polynomial fit, higher order derivatives, Errors in Numerical differentiation

UNIT -IV

Numerical Methods3: Numerical Integration & Solution of Differential Equation: Numerical integration Introduction , Trapezoidal rule, Simpson's 1/3 rule, Newton's three eighth rule, Guassion Quadrature , Solution by Euler's method, Taylor series, Predictor- corrector method, Runge-Kutta method, Numerical solution of partial differential equation, parabolic partial differential equation, Elliptical differential equation, Laplace equation, Poisson equation , iterative methods.

Text Books

1. E. Balaguruswamy Computer Oriented Statistical & Numerical methods, Macmillan
2. E.V.Krishnamurthy: Numerical algorithms, computations in Sc, and Engg., Addison Wesley Publishing Company

Reference Books

1. Jain M.K. Lyengar S.R.K. &Jain R.K. Numerical Methods for Scientific & Engineering Computation EWP
1. 2.Desai. Fortran Programming & Numerical Methods. EWP

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PAPER (MCS-104 B) – E-COMMERCE AND E-GOVERNANCE

Course Objectives:

- To Develop Skills in Understanding Strategic Issues Related to E- Commerce and E- Governance
- To Develop a Broad Knowledge of E-Governance and E-Commerce Activities in India
- To Understand the Electronic Payment Systems
- To Develop Knowledge of How the Government May Contribute in Moving the Country Towards E-Commerce and E- Governance

Course Outcome:

- Explain and demonstrate E-Governance Initiatives at the National Level in India
- Make Classification of E-Commerce and E- Governance
- Students Able to Think Critically and Analytically to New Successful Business Ideas.

Unit-wise Syllabus :

UNIT-I

Introduction to E-Commerce: Definition, History of E-Commerce, E-Business Models B2B, B2C, C2C, C2B, Environment of E-Commerce, Dimensions of E-Commerce, Ethical Issues, Electronic Data Interchange, Value Chain and Supply Chain, E-Commerce Marketing, E-Commerce Strategy, E-Commerce Infrastructure, Advantages and Disadvantages of E-Commerce.

UNIT- II

Electronic Payment Systems: Payment Gateways, Payment Cards, Credit Cards, Debit Cards, Smart Cards, E-Credit Accounts, E-Money, Marketing on the Web, Categories of E-Commerce, Edi, Marketing Strategies, Advertising on the Web, Customer Service and Support, Internet Banking, Introduction to M-Commerce, Case Study: E-Commerce in Passenger Air Transport, Element of E-Commerce, Issues of E-Commerce

UNIT- III

E-Government, Theoretical Background of E-Governance, Issues in E -Governance Applications, Evolution of E-Governance, its Scope and Content, Benefits and Reasons for the Introduction of E-Governance, E-Governance Models - Broadcasting, Critical Flow, Comparative Analysis, Mobilization and Lobbying, Interactive Services / G2C,C2G

UNIT- IV

E-Readiness, E-Government Readiness, E- Framework, Step & Issues, Application of Data Warehousing and Data Mining in E-Government, Case Studies: NICNET-Role of Nationwide Networking in E-Governance, E-Seva. Origins in India E-Governance Projects in India Measures to Be Considered Before Going for E-Governance, Work plan and Infrastructure E-Government Systems Security: Challenges and Approach to Security of E-Government, Security Concern in E-

Commerce, Security for Server Computers, Communication Channel Security, Security for Client Computers. E-Security Network and Web Site Risk for E-Business, Information Technology ACT 2000 and its Highlights Related to E-Commerce, E-Security, Firewalls, Electronic Market / E- Shop, Introduction to Security, Types of Securities, Security Tools, Network Security.

Text Books

1. Gary P. Schneider, "E-Commerce", Cengage Learning India.
2. C.S.R. Prabhu, "E-Governence: Concept and Case Study", PHI Learning Private Limited.
3. P. Tjoseph, S.J.,"E-Commerce an Indian Perspective", Prentice-Hall of India.
4. V. Rajaraamn, "Essentials of E-Commerce Technology", PHI Learning Private Limited.
5. Amir Manzoor " E-Commerce: an Introduction", Lambert.

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PAPER (MCS-105) – DBMS (DATA BASE MANAGEMENT SYSTEMS)

Course Objectives:

- Understand the Fundamentals of Data Models and Conceptualize a Database System Using ER Diagram.
- Make a Study of Relational Database Design.
- Know About Data Storage Techniques and Query Processing.
- Impart Knowledge in Transaction Processing Concurrency Control Techniques and Recovery Procedures.
- To Understand MySQL Database Management System.

Course Outcome:

- Understand and describe the basic concepts and terminology of Database Management
- System.
- Analyze and Design the database of applications using ER modeling and Normalization.
- Demonstrate the database schema data modeling and normalization process with the help of example.
- Implement the database design using appropriate database tools.
- Describe the transaction processing system locking techniques and data recovery.

Unit-wise Syllabus:

UNIT -I

Basic Concept: An Introduction to database System, Basic Data System Terminology, Purpose of DBMS, Data Independence, An Architecture of DBMS: Schema. Subschema, Mapping , Physical & Logical Data, Basic File System, File Organization: Sequential, Index Sequential, Hosting, B- Tree based index. File Organization based on Dynamic Hashing with immediate splitting, Model of Real Word, Details of E-R Model.

UNIT -II

Three Data Models: An Overview of three Main Data Models:Hierarchical Model. Network Model, Relational Model and their inter comparison Concept of Relational Algebra: Basic Operation like Union, Intersection, and Difference. Product join, The relational Calculus: Domain & Tuple Calculus, relational Database Design: Integrity Constraints, Functional Dependency Single Value and Multi Value Functional dependency. Normal Forms: 1, 2, 3 Boycee Codd, & 4 Normal forms: Join Dependency.

UNIT -III

Query Processing & Database Software: Query Interpretation, Equivalence of Expression, Estimation of Query Processing Cost. Query Optimization by Algebraic Manipulation, Join Algorithms, Types of Data Base Languages. Procedural and Non- procedural Language, Relational Commercial Query Languages, QBE, SQL: Introduction , Basic Structure, the Power of SQL (Creation, Insertion, Deletion, Indexing & Modification of Database in SQL), query optimization strategies

UNIT -IV

Management Considerations & Future Trends: Security & Integrity: Introduction, Access Control, Crypto Systems, Statistical Database Security, S Concurrency Control: Transaction, Database System Architecture, Serializability, Locking, Database Recovery: Kinds of Failure, Recovery Techniques, Object, An Overview of Oriented Model, Distributed database: Structure, Tradeoffs, Design, Client Server Database, Knowledge Databases.

Text Books:

1. Henry F Korth & A Silbershatz, Data Base System Concepts, MGH
2. Arun K. Majumdar & P.B hattacharya: Data Base Management, System TMH

Reference Books:

1. Jeffrey O, Ullman: Principles of Database Systems, Galgotia Pub. Co. Ltd
2. Bipin C, Desai: An Introduction to database System Galgotia Pub, Co, LTD
3. James Martin: Principle of Database Management, PHI
4. James Martin: Computer Database organization, PHI

DEPARTMENT OF COMPUTER SCIENCE A.P.S. UNIVERSITY, REWA (M.P.)
SYLLABUS FOR M.SC. COMPUTER SCIENCE
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PAPER (MCS-201) -SYSTEM SOFTWARE

Course Objectives:

- To introduce student the fundamental model of the processing of high level language programs for execution on computer system.
- To explain the basic operations that are performed from the time a computer is turned on until a user is able to execute programs.
- To understand and implement Assembler, Loader, Linkers, Macros & Compilers.
- To introduce students the process management and information management via different software tools.

Course Outcome:

- Understand different components of system software.
- Understand intermediate code generation in context of language designing.
- Recognize operating system functions such as memory management as pertaining to run time storage management.

Unit-wise Syllabus:

UNIT I

Introduction to System Software: The Simplified instructional Computer (SlC): Machine structure (Memory. Register, Data formats.Instruction format, Addressing modes, instruction set. Input/output) Assemblers: Basic Assembler Function (A Simple S IC assembler tables and logic) Machine-dependent Assembler feature (instructionFormats and addressing modes, Program relocation) Machine-independents assembler, features (laterals. Symbol –defining statements, Expression, program blocks, control sections and program linking) . Assembler Design options(Two-pass assembler with overlays Structure one-pass assembler s Multi –pass Assemblers) Implementation Examples.

UNIT II

Loaders and Linkers: Basic Loader Functions. Machine dependent loader features (Relocation, Program Linking, Table and Logic a Linking Loader) , Machine-independent Loader features (Automatic library search, loader upturns, Overlay program), Loader Design option (Linkage editors, Dynamic Linking, Bootstrap Loaders), Text editors Overview of the editing process, User interface editor Structure.

UNIT III

Macro Processors: Basic Macro Processor Functions (Macro definition and expansion, Macro Processor table and logic), Machine Independent Macro Processor Features (Concatenation of macro parameters. Generation of Union sets conditional macro expansion, Keyboard macro parameters), Macro processor Design options recursive macro expansion/ General-purpose macro processors, Macro processing within language Interactive debugging systems, ‘debugging function and capabilities, Relationship with other the system. User-interface criteria)

UNIT IV

Compilers: Basic Compiler Functions (Grammars, Lexical analysis, Syntactic analysis, Code generation), Machine- Dependent compiler Features (Intermediate form of the program. Machine-dependent code optimization, Machine-Independent compiler Features (Storage allocation, Structured Variables, Machine-Independent code optimization, Block-structure Languages), Compiler Design options (division into passes, Interpreters, P-code compilers), Implementation examples.

Text Books:

1. Leland L, Beck: System Software (An Introduction to systems programming), Addison Wesley Publishing Company
2. Alfred Jeffrey Ullman: Principles of Compiler Design, Narosa Publishing Home, new Delhi

Reference Books:

1. D, M Dhamdhare Systems Programming & Operating Systems, THM

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PAPER (MCS-202) SOFTWARE ENGINEERING

Course Objectives:

- Understand Learn and Apply the Theoretical and Practical Knowledge of Software
- Development Such as Software Development Paradigms Process Models Tools and Techniques.
- Understand and Learn the Process of Software Requirements Identification Analysis Review and Learn Recording Requirements in the IEEE Format of the SRS Document.
- Understand the Various Types and Levels of Software Testing and Basic Approaches of Test Case Designing.
- Gain the Knowledge of the Various Models of Software Quality Estimation Quality Assurance and Control.

Course Outcomes:

- Identify Analyze Review and Validate the Requirement of Software Components and
- System and Also Prepare Software Requirement Specification (SRS) Document Using Relevant Standards Tools and Methodologies.
- Manage a Software Project by Applying Project Management Concepts Such as Planning
- Scheduling and Risk Management for Developing Qualitative and Economic Software.
- Work Effectively in Various Profiles of Software Developing Team Such as Software Analyst
- Architecture Programmer Tester Quality Assurance and Control officer Project Manager and Leaders.
- Communicate and Coordinate Competently by Listening Speaking Reading and Writing
- Software Documents
- Apply Coding Standards & Guidelines and Quality Norms in Coding of Software Systems to
- Satisfy the Requirements and Quality.
- Design Test Cases and Optimize the Test Suite for Unit Integration and System-Level Testing Using Various Techniques and Tools for Adequately Testing the Software Components and Systems.

Unit-wise Syllabus :

UNIT I

Introduction: The product and the process, program vs software products, Emergence of software engineering, software development life cycle models, classical waterfall, iterative waterfall, prototyping evolution, spiral & RAP model, comparison of various lfe cycle models, project management process, process management process.

UNIT II

Software Requirement Analysis & Specification (SRAS): Need for software requirement specification, requirement process, requirement analysis, requirement specification, planning a software project, cost

estimation. Project scheduling, staffing & personnel planning, software configuration management, plans: Quality assurance plan, risk management.

UNIT III

Software Design: Criteria for Software design, software design & design principle, module level coupling and Cohesion, design notation & specifications, design methodology verification design, Basic concepts, design methodology & metrics, object oriented VS function oriented design, detailed design.

UNIT IV

Coding and Testing: Standard guideline for coding, programming practice, testing fundamentals, unit testing, verification vs validation, black box & white box testing, functional testing, structural testing, object oriented program testing, software reliability & quality assurance, CASE, software maintenance

Text Books:

1. Pankaj Jalote: An Integral Approach to Software Engineering, Narosa
2. Rogers Pressman. Software Engineering, a practitioner's approach, MGH

Reference Books:

1. 1 Rajib Mall: Fundamental of Software Engineering, PHI
2. 2 Richard Farley: Software Engineering Concept, THM

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PAPER (MCS- 203 A)- OBJECT ORIENTED PROGRAMMING

Course Objectives:

- To Understand how C++ Improves C with Object-Oriented Features.
- To Learn how to Write Inline Functions for Efficiency and Performance.
- To Learn the Syntax and Semantics of the C++ Programming Language.
- To Learn how to Design C++ Classes for Code Reuse.
- To Learn how to Implement Copy Constructors and Class Member Functions.
- To Learn how to Overload Functions and Operators in C++.
- To Learn how Containment and Inheritance Promote Code Reuse in C++.
- To Learn how to Use Exception Handling in C++ Programs.

Course Outcomes:

- Explain Concepts and Advantages of Object Oriented Programming.
- Apply and implement the concepts of the Object-Oriented paradigms to analyze design and develop the solutions of real world problems using the Principles of information Hiding Localization and Modularity.
- Design Develop and maintain the small applications system utility for societal and academic problems using reusability concepts in team spirit.
- Demonstrate the Advanced Features of C++ Specifically Stream I/O Templates and Operator Over loading and Overriding.

Unit-wise Syllabus:

UNIT I

Introduction to OOP: Procedural, Structured and Object Oriented PROGRAMMING (OOP), Basic concepts of OOP: Object, Classes, Inheritance, Polymorphism, Reusability, Benefits & application of OOP, C++ program, basic data type , user defined data types, reference variable, operators, structures, union and enum, Functions : prototypes, default arguments, const arguments in functions, Inline functions, call by reference, function overloading, Friend and virtual Functions.

UNIT II

Classes and objects: Declaring a class, defining an object, data hiding and encapsulation, public and private data member & functions, constructors & destructors, parameterized constructors, multiple constructor in a class, copy constructors, array of object, object as function, arguments, returning object, the this pointer, memory allocation for objects, operator overloading- unary and binary operators, type conversions, pointers to functions.

UNIT III

Inheritance: Inheritance and derivation, single, multilevel, multiple, hierarchical & hybrid inheritance, constructors in multiple inheritance, private and protected inheritances, overriding functions, virtual

methods, ambiguity resolution, pure virtual functions, virtual functions and & destructors, object slicing, member classes: nesting of classes.

UNIT IV

Streams: C++ streams, stream classes, unformatted & formatted I/O operations, member functions of c-In, manipulators, managing output with manipulators, user defined manipulators with arguments, Files: Classes for file stream operations file I/O with streams, file modes, binary versus text files, binary I/O random access, error handling during file operations, command line arguments, elementary database management, Templates & Exception handling

Text Books:

1. E, Balagurusamy, Object Oriented Programming with C++, TMH
2. Jesse Liberty, Teach Your self ANSI C++ Tec media
3. Robert Lafore, Object Oriented Programming in Turbo C++, Galgotia Publications

Reference Books:

1. Stroustrup, The C++ Programming Language, Addison Wesley
2. Herbert Schild, C++ Complete Reference, THM
3. Yashwant Kanatkar, Let us C++ ,BPD

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PAPER (MCS- 203 B)- PROGRAMMING IN PYTHON

Course Objectives:

- To Introduce Python Programming Language as Multipurpose Programming Language with Features and Applications.
- To Learn Installing Python and Introducing Cross Multiplatform Usage of Python.
- To Practice Basic Language Features of Python.
- To Implement Oops Concepts Using Python.
- To Work with Files in Python

Course Expected Outcome:

- Install and use Python on Various Platform.
- Understand and Explain the features of Python language
- Design and Develop Python applications for data analysis using object-oriented concept .
- Build package and modules in Python with reusability and exception Aspect
- Write programs for Reading and Writing files in Python.

Unit-wise Syllabus :

UNIT I

Environment Setup of Python Application Area, Interactive Mode and Script Mode Data Types, Mutable and Immutable Variables, Expressions and Statements, Variables and Keywords, Operators and Operands in Python, Expressions and Statements; Taking Input (Using Raw_Input( ) and Input( ) and Displaying Output. Functions: Importing Modules, Invoking Built in Functions, Functions from Math Module, Functions from Random Module. Function from Date Time Module, Functions from Re-module Composition Defining Functions, Invoking Functions, Scope, Passing Parameters, Scope of Variables, Void Functions and Functions Returning Values, Recursion Conditional and Looping Construct, use of Compound Expression in Conditional and Looping Construct

UNIT II

Strings: String Operators, Comparing Strings Using Relational Operators; String Functions & Methods, Regular Expressions and Pattern Matching Lists: Concept of Mutable Lists, Creating, Initializing and Accessing the Elements, Traversing, Appending, Updating and Deleting Elements, Composition, Lists as Arguments, List Operations, List Functions and Methods
Dictionaries: Concept of Key-Value Pair, Creating, Initializing and Accessing the Elements in a Dictionary, Traversing, Appending, Updating and Deleting Elements. Dictionary Functions and Methods
Tuples: Immutable Concept, Creating, Initializing and Accessing Elements in a Tuple, Tuple Assignment, Tuple Slices, Tuple Indexing, Tuple Functions.

UNIT III

Concept of Object Oriented Programming: Data Hiding, Data Encapsulation, Class and Object, Polymorphism, Inheritance, Advantages of Object Oriented Programming Over Earlier Programming

Methodologies Classes: Defining Classes (Attributes, Methods), Creating Instance Objects, Accessing Attributes and Methods, Using Built in Class Attributes (Diet, Doc, Name, Module, Bases), Constructor (Init(), Del() and Str()) Methods in a Class, Private Attributes (Limited Support), Importance of "Self" (Acts as a Pointer to Current Calling Object) Operator Overloading with Methods

UNIT IV

Inheritance: Concept of Base Class and Derived Class: Single, Multilevel and multiple Inheritance Overriding Methods, Using Super() in Derived Class to Invoke Init() Or Overridden Methods of Parent Class Data File: Need for Non-Bold for Data File, Types of Data File-Text and Binary, Opening and Closing Files- Open(), Close(), Access Modes (Output, Input, Default), File Object, Access_Modes, Reading and Writing a File Read(), Readline(), Readlines(), Write(), Writeliness File Positions (Seek(), Tell()), Renaming and Deleting a File, Flush(),Implementation of Basic File Operations on Text and Binary File in Python.

Reference Books :

1. Mark Lutz Learning Python, 5th Edition o'reilly Publication
2. Fabrizio Romano Learning Python - Download Link – Https://Www.Packtpub.Com/ Packt/FreeEbook/Learning-Python
3. Mark Lutz Learning Python (Fourth Edition) –Download Link Http://Freebook. Qiniudn.Com/Learning%20python,%204th%20edition.Pdf
4. Https://Docs.Python.Org/3/Tutorial/Index.Html

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PAPER (MCS- 204 A) - COMPUTER NETWORK

Course Objectives:

- Build an Understanding of the Fundamental Concepts of Computer Networking.
- Familiarize the Student with the Basic Taxonomy and Terminology of the Computer
- Networking Area.
- Introduce the Student to Advanced Networking Concepts Preparing the Student for Entry Advanced Courses in Computer Networking.

Course Outcome:

- Demonstrate the Basic Concepts of Networking Principles Routing Algorithms, IP Addressing and Working of Networking Devices.
- Demonstrate the Significance Purpose and application of Networking Protocols and Standards.
- Describe compare and contrast LAN WAN MAN Intranet Internet AM FM PM and Various Switching Techniques.
- Explain the working of Layers and apply the various protocols of OSI & TCP/IP model.
- Analyze the Requirements for a Given Organizational Structure and Select the Most Appropriate Networking Architecture and Technologies.
- Design the Network Diagram and Solve the Networking Problems of the Organizations with Consideration of Human and Environment.
- Install and Configure the Networking Devices.

Unit-wise Syllabus:

UNIT I

Introduction to Networks:

Basics of Data Communications LAN, MAN. WAN. Various LAN Topologies, OSI Reference Model, TCP/IP Reference Model, Comparison of OSI and TCP/IP Reference Models, Physical Layer: Inter-Comparison of various communication media, Hardware and Software requirements for networking, Wireless communication: Radio& microwave Communication, Satellites: Geostationary Satellites, Lo w Orbit .Satellites, overview of VSAT, Broadband ISDN.

UNIT II

Data Link Layer: Data Link Layer Design Issues: Services Provided to Network Layer, Framing Error Control, Flow Control, Error Correction Codes. Error Detection Codes, Elementary Data Link Protocols – An unrestricted simplex Protocol, simplex s top-and-wail -protocol ,Simplex protocol for a noisy channel ,Sliding Windows Protocols - One bit sliding window protocol ,protocol using Go Back n Protocol using selective repeat.

UNIT III

Medium Access Sub- layer and the Network Layer: Multiple Access Methods - ALOHA, CSMA Protocols, Limited-Content ion Protocols, IEEE STNDARD FOR LANs AND MANS. Standard for Ethernet, Token Bus, Token Ring, Comparison of three, Bridges From 802.xt o 802.y. – The Network

Layer: Routing Algorithms: Shortest Path, Routing, Flooding, Flow Based, Routing, Hierarchical Routing, Broad Cast – Routing General Principles of Congestion control, Flow Specification, Internetworking, Tunneling Fragmentation IP, Protocols. IP Addresses

UNIT IV

The Transport and Application Layers: Elements of Transport Protocols: Addressing, establishing connection, Releasing connection flow control and buffering, multiplexing, crash recovery, internet Transport Protocols: TCP service model TCP protocol, TCP connection management, TCP congestion control, UDP, Network Security: Traditional cryptography, two fundamental Cryptographic principles. Secret key algorithms, public key, DNS- Domain name systems, SNMP. Electronic mail, World Wide Web

Text Books:

1. A. S. Tanenbaum : Computer Networks, PHI

Reference Books:

1. James Martin: Computer Networks& Distributed processing, PHI
2. Uyless Black: Computer Networks, PHI

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PAPER (MCS- 204 B) – BIG DATA ANALYSIS

Course Objectives:

- Familiarize the Students with Most Important Information Technologies used in Manipulating, Storing, and Analyzing Big Data.
- This Course Gives Students all Around Learning of the Big Data Framework using Hadoop and Spark, Including Yarn, HDFS and Map reduce
- It Provide an Overview of Approaches Facilitating Data Analytics on Huge Datasets.

Course Outcome:

- Ability to identify the characteristics of datasets and compare the trivial data and big data for various applications.
- Demonstrate an ability to use Hadoop framework to efficiently store retrieve and process Big Data for Analytics.
- Implement several Data Intensive tasks using the Map Reduce Paradigm

Unit-wise Syllabus :

UNIT I
Big Data- Introduction, Traditional vs. Big Data Business Approach, Big Data Analytics, Advantages, Applications, Distributed & Parallel Computing for Big Data, Components in Big Data Architecture, Virtualization Approaches.

UNIT II
Hadoop- Introduction, Features, Advantages, Versions, Key Considerations of Hadoop, RdbmsVsHadoop, Hadoop Ecosystem, HDFS - Architecture, Features, Commands, Processing Data withHadoop, Hadoop Yarn.

UNIT III
Mapreduce Framework, Features, Uses, Working onMapreduce, Mapreduce Input and Output Operations, Exploring Map and Reduce Functions, Mapreduce Optimization Technique, HBASE Introduction, Architecture, HBASE in Hadoop Applications.

UNIT IV
Processing Data withMapreduce, Task Execution & Environment – Installation of Eclipse, Hadoop, Java Development Kit and Linux Ubuntu OS, Mapreduce Program Steps to Obtain Word Count, Functionality of Input Format- Inputsplit, Recordreader, Fileinputformat, Output Process of Fileoutputformat – Outputformat, Recordwriter, Role of Combiner, Partitioner, Debugging Mapreduce.

Reference Books:

1. Rob Kitchin The Data Revolution: Big Data Open Data Data Infrastructures And Their Consequences SAGE Publications Ltd
2. Croll and B. Yoskovitz Lean Analytics: Use Data to Build a Better Startup Faster o'reilly
3. Mayer-Schönberger and K. Cukier Big Data: A Revolution That Will Transform How We Live Work and Think

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PAPER (MCS- 205) – ADVANCED PROGRAMMING LANGUAGE

Course Objectives:

- Identify the Basics of .Net Framework, Architecture and User Programs
- Do GUI Programming Using Vb.Net and C#
- Examine the Challenges Involved in .Net Framework Programming
- Do Event Driven Programming Projects
- Learn the ADO.Net Database Usages in Website Creation
- Empower the Websites with use of Xml.

Course Outcome:

- Understand and explore various Features of .Net Framework
- Analyze, Design and Developthe GUIbased Applications softwareusing Vb.Net and C#
- Design, Develop and Implement Complete software Projects using Vb.Net and C# with consideration of Environment in team spirit.
- Analyze the requirement, design and develop Dynamic and Static Websites and Web applications using .Net technology.
- Integrate and Apply Different Components Including Database, XMLwith Proper Choice of Languages Mapping

Unit-wise Syllabus :

UNIT I

Introduction to .Net, .Net Framework Features & Architecture, CL, Common Type System, MSIL, Assemblies: Types of Assemblies, Class Libraries. Event Drive Programming, Methods and Events Related with Mouse and Keyboard. Programming into Visual Studio, Types of Project in .Net, IDE of VB.Net- Menu Bar, Toolbar, Project Explorer, Toolbox, Properties Window, Form Designer, Form Layout, Immediate Window, ASP& HTML Forms

UNIT II

The VB.Net Language- Variables, Declaring Variables, Data Types, Scope & Lifetime of a Variable, Arrays, Types of Array, Control Array, Subroutine, Functions, Passing Argument to Functions, Optional Argument, Returning Value from Function. Control Flow Statements: Conditional Statement, Loop Statement. Forms: Loading, Showing and Hiding Forms, Working with Multiple Forms, Controlling one Form within Another, Overview of C#, Structure of C# Program, C# in .Net.

UNIT III

GUI Programing with Windows Form with Properties, Methods and Events: Text Box Control, Label Control, Button Control, Listbox, Combo Box, Checked Box, Picture Box, Radio Button, Pannel, Scroll Bar, Timer Control, Adding Controls At Runtime, Common Dialog Control: File, Save, Print, Help. Designing Menus, MDI Forms, Overview of Dynamic Web Page, Asp.Net Controls, Applications, Web Servers, Web Form Controls, Server Controls, Client Controls Adding Controls to a Web Form, Form Validation Controls: Client Side Validation, Server Side Validation

UNIT IV

ADO, .Net Architecture, Create Connection, Accessing Data Using Data Adapters and Datasets, Using Command & Data Reader, Data Bind Controls, Displaying Data in Data Grid. Data Form Wizard,

Processing SQL& Access Database Using Ado.Net Object Model, Connection Object, Command Object, Add, Delete, Move & Update Records to Dataset, Executing Queries, Basics of XML, XML in ADO, Web Service Description Language, Building & Consuming a Web Service. Web Application Deployment, Caching.

Reference Books

1. Steven HolznerVB.Net Programming-Black Book-Dreamtech Publications
2. Evangelos Petroutsos Mastering VB.Net - BPB Publications
3. Mathew Macdonald-The Complete Reference Asp.Net-TMH
4. Professional ASP.Net- Wrox Publication
5. Stephen Walther Active Server Pages 2.0 (Unleashed) -Techmedia
6. Eric a. Smith Asp 3 Programming Bible: IDG Books
7. C# Programming-Wrox Publication
8. Matt Telles-C# Programming Black Book-Dreamtech Publication

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PAPER (MCS- 301) - OPERATING SYSTEM

Course Objectives:

- Understand the Services provided by Operating System.
- Understand the Working and Organization of Process and its Scheduling and Synchronization.
- Understand Different Approaches of Memory Management Techniques.
- Understand the Structure and Organization of the File System.

Course Outcomes:

- Identify and describe the Services Provided by Operating Systems.
- Understand and Solve the Problems Involving Process Control Mutual Exclusion
- Synchronization and Deadlock.
- Apply Various Approaches of Memory Management
- Analyze Various Operating System Approaches in Linux and Windows

Unit-wise Syllabus:

UNIT I

Fundamental Concepts of Operating Systems: Overview of Process Management, Memory Management File Management, Device Management, operating system services, Evolution of operating systems - Serial processing, Batch Processing, Multi- Programming, Types of Operating systems- Batch operating system, Time- sharing operating systems, Real- time operating systems, Distributed operating system, Process Management: Process concept, Scheduling concepts, CPU scheduling, Scheduling algorithm, Multiple processor scheduling.

UNIT II

Inter Process Synchronization: Concurrent processer, the critical section problem, the Critical Region and Conditional Critical Region problem, Inter process synchronization, Inter process communication, Deadlock occurrence, Deadlock characterization, Deadlock prevention, Deadlock avoidance, Deadlock detection and recovery.

UNIT III

Memory Management Single Process Monitor, Static Partitioned memory allocation, Swapping, Relocation, Dynamic Partitioned Memory allocation, Compaction, Multiple fence register, Segmentation – Address translation, Descriptors scheduling paging, Page allocation, Virtual memory, Instruction interrupt ability, Management of virtual memory, Page replacement, Replacement algorithms, Comparison of various memory management techniques with reference to Protection and Sharability.

UNIT IV

File and Device Management: File System organization, File operations, Access methods, Directory structure organization, File protection- Goals of protection, Access matrix model of protection, Dynamic

protection Structure, Security encryption, Device management: Dedicated, Shared and Virtual devices, Sequential Access and Direct Access Devices, Channel and Control Units, I/O buffering, I/O schedulers, Spooling system.

Text Book

1. Peterson & Siberschatz: Operating system concepts, Sybex

Reference Book

1. Senart E. Madnik and J.J. Donovan: Operating Systems, McGraw Kill,
2. Milan Melankvic: Operating Systems, Concept and Design, McGraw Hill
3. Lister Andrew: Fundamentals of Operating Systems, Macmilan pub. Co.
4. Delteri An Introduction to Operating Systems. Addition Wesley.

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PAPER (MCS- 302) - COMPUTER GRAPHICS AND MULTIMEDIA

Course Objectives:

- The objective is to introduce the use of the components of graphics and will be familiar with building approach of algorithms related to them and comprehend the basic principles of 2-dimensional and 3-dimensional computer graphics, an understanding of how to scan, convert the basic geometrical primitives, how to transform the shapes to fit them as per the picture definition
- Provide an understanding of mapping the world coordinates to device coordinates.
- To Provide Students with the Basic Understanding of Multimedia Systems and its Components and Provide the Information about the Standard Tools and Techniques used in Development of Multimedia Components for Productions
- To Create Simple Multimedia Applications and Products for using Standalone Networked or Web Based Computers.

Course Outcomes:

- Student will be able to implement the basic concepts and learn the various algorithms to scan, convert the basic geometrical primitives, transformations, area filling, clipping, viewing,
- Develop Understanding of Technical Aspect of Multimedia Systems. Also To Understand and explain the storage mechanism and applicability of Various File Formats for Audio Video and Text Media.
- Develop the Various Multimedia Systems Applicable in Real Time.
- Create a Multimedia Component Using Various Tools and Techniques.
- Apply the Guidelines and Standards of Multimedia Systems and to analyze the performance of Multimedia System.

Unit-Wise Syllabus :

UNIT I

Overview of Graphics Systems and 2D Transformation: Display Devices, Hardcopy devices, Interactive Input Devices, Display processors, Graphics Software, Output primitives: Points and line drawing algorithms Circle generating algorithms Basic Transformations, Matrix Representations and Homogeneous Coordinates, Composite Transformations, Reflections, Shear, Raster methods for transformations, Windowing and Clipping: Windowing concepts, Clipping algorithms, Window – to – Viewport transformation,

UNIT II

3D Transformation, Viewing and Modeling: Three Dimensional Transformations: Basic transformations, Rotation about an arbitrary axis, Reflections, shears, Transformations of coordinate system, Projections, Viewing Transformations, Software representations, hardware implementation, Hidden surface & Hidden line removal: Classifications, Back Free removal. Depth Buffer method, Scan line method, Hidden line elimination, Curved surfaces, Shading and color model: Modeling light intensities, Displaying light intensities, Surface shading methods, Color models: Modeling methods: Basic concept, Master coordinates and modeling transformation structured, Display files, symbol operations.

UNIT III

Overview of Multimedia: Introduction, Application of multimedia, terminology, multimedia enabling technologies in digital representation, Hardware & structure requirement, multimedia standard, And hypertext: History, nature, Links navigation & structure. The nature of sound, digitizing sound, processing sound, compression format MIDI, Combining, source & picture, Video & image processing: Digitizing video, video standards video compression, digital video editing and post production, streamed video and video conferencing.

UNIT IV

Animation: Captured animation and image sequences, digital cel and sprite animation, key frame animation, 3D animation, Combining media: synchronization based presentation: SMIL(synchronize multimedia integration language), synchronize presentation (HTML + TIME) accessibility, knowledge base multimedia, future direction, ECMA Script syntax outline, Multimedia and network: networks and transport protocols, multicasting, application protocols for multimedia: HTTP caching; Quality of service, server side computation.

Text Books:

1. D. Hearn and Baker: Computer Graphics, Prentics Hall of india Pvt, Ted.
2. Harrington: Computer Graphics, MGH

Reference Books:

1. Newman and R.F. Sprouli: Principles on Interactive Computer Graphics. MGH
2. K. Glloi: Interactive Computer Graphics. PHI
3. A. Piastock and G. Kalley: Theory and Problems of Computer Graphics.MGH Multimedia System: Joh F. Kloegel Buford

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PAPER (MCS- 303 A) - THEORY OF COMPUTATION

Course Objectives:

- To give understanding of several formal mathematical models of computation
- Learn and Understand FSA, DFA, NDFA, Turing Machine, Regular Expression, Push Down Automaton.
- Learn and Understand Properties of Languages, Grammars and Automata and they are able to describe how they relate it to formal languages.
- Gain knowledge of Computing and Mathematics to Solve Problems. And they will understand what is possible and what is not possible with computers.

Course Outcomes

- The student will be able to analyze and compare different computational models.
- Demonstrates Models, Turing Machine, Regular Expression, Push down Automaton.
- Apply and Prove properties of Languages, Grammars and Automata.
- Apply Knowledge of Computing and Mathematics to Solve Problem
- Apply Mathematical Foundations, Algorithmic Principles and Computer Science Theory to the Modeling.
- To identify the limitations of some computational models and possible methods of proving them.

Unit-wise Syllabus:
UNIT -I

Automata Theory: Alphabets, strings languages, recursive definitions, regular expressions, problems on regular expressions, finite automata, transition table, transition diagram, transition graphs, different example of transition graphs, kleen's theorem , proof of kleen's theorem with variety of problem's Nondeterministic, Problem's conversion from Nondeterministic Finite Automata(NFA) to Deterministic Finite Automata (DFA), Finite automata with output, Moore machine, Mealy Machine, decidability.

UNIT -II

Pushdown Automata Theory 1: Context- Fee Grammars: Various examples' including syntax and semantics, productions (grammatical rules), Backus normal form, Parse tree, Regular grammar's Definition, Theorems & examples, Chomsky normal form, pushdown automata, various examples

UNIT-III

Pushdown Automata Theory 2: Context- Free Language: Definition, Theorem, Examples, Non-Context – Free Languages, Intersection & Complement: Theorem and Definitions, Parsing: Top-Down Parsing, Backtracking, Pushdown Transducers, Decidability.

UNIT-IV

Turing Theory: Turning machine: Definition, theorem & examples, Post Machine: Definition Theorem and examples, Minsk's theorem: Definition, theorem & examples.

Text Book:

1. I.A. Cohen: Introduction to Computer theory, John Wiely.
2. Hopcroft H,E. and Ullman J.D.: Introduction to automata theory Languages and Computation, Narosa publishing house, New-Delhi.

Reference Book:

1. Derick Wood: Theory of Computation, Harpers row publisher New York, 1987
2. Lewis H.R. & Papadimitriou C.H.: Elements of the theory of Computation, PHI, 1981
3. M.L. Minisky: Computations, finite infinite machines, Prentice Hall, 1967

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PAPER (MCS- 303 B) – AI & MACHINE LEARNING

Course Objectives:

- To Understand the Concepts of Artificial Intelligence and Machine Learning.
- To Gain Knowledge of Supervised and Unsupervised Learning
- Understand the Design of Learning Systems.
- Understand the Design of Expert Systems.

Course Outcomes:

- Demonstrate and Apply Artificial Intelligence Techniques, Various Types of Production Systems, and Characteristics of Production Systems.
- Design Neural Networks Architecture and Implement Functions and Various Algorithms Involved.
- Fuzzy Logic, Various Fuzzy Systems and their Functions.
- Genetic Algorithms, its Applications and Advances
- Able to Analyse and Design Expert Systems through Learning the Machine

Unit-wise Syllabus :

UNIT-I

AI Introduction, The AI problems, AI technique, Characteristics of AI Applications, Current Trends in AI. Machine Learning: Machine Learning Overview, Design of a Learning system, Types of machine learning, Applications of machine learning, Variables and probabilities - Probability Theory, Probability distributions

UNIT-II

Problem Solving, General Problem Solving, Production Systems, Control Strategies Forward and Backward Chaining, Searching :Searching for Solutions, Uniformed Search Strategies – Breadth First Search, Depth First Search. Heuristic Search, Greedy Best First Search, Knowledge Representations Mapping & Issues

UNIT-III

Soft Computing: Introduction to Soft Computing, Soft Computing vs. Hard Computing, Various Types of Soft Computing Techniques, Applications of Soft Computing. Basic Concepts of Neural Network, Human Brain- Biological Neural Network, Evolution of Artificial Neural Network, Structure and Function of a Single Neuron, Difference Between ANN and Human Brain, Characteristics and Applications of ANN, Learning Methods, Activation Function, Neural Network Architecture.

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UNIT-IV

Supervised Learning and Unsupervised Learning, Competitive LearningNetworks – Kohonen Self-Organizing Networks, Introduction to expert system and application of expert systems, case studies, MYCIN Fuzzy Logic: Fuzzy Set Theory, Crisp Set, Fuzzy Set, Operations on Fuzzy Sets: Compliment, Intersections, Unions, Product, Difference, Properties of Fuzzy set, Genetic Algorithm: Fundamentals, Basic Concepts, Working Principle, Encoding, Fitness Function, Reproduction.

Reference Books:

1. Elaine Rich and Kevin Knight "Artificial Intelligence" - Tata McGraw Hill.
2. Dan W. Patterson "Introduction to Artificial Intelligence and Expert Systems", Prentice India.
3. Nils J. Nilson "Principles of Artificial Intelligence", Narosa Publishing House
4. Christopher Bishop, "Pattern Recognition and Machine Learning", Springer
5. Kevin P. Murphy, "Machine Learning: A Probabilistic Perspective", MIT Press
6. EthemAlpaydin, "Introduction to Machine Learning", MIT Press
7. Tom Mitchell, "Machine Learning", McGraw-Hill
8. Stephen Marsland, "Machine Learning - An Algorithmic Perspective", Chapman and Hall/CRC Press
9. S, Rajasekaran& G.A. VijayalakshmiPai, Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis & Applications, PHI publication.
10. S.N. Sivanandam&S.N.Deepa, Principles of Soft Computing, Wiley Publications.

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PAPER (MCS- 304 A) - ADVANCED COMPUTER ARCHITECTURE

Course Objectives:

- To provide a comprehensive knowledge of scalable and parallel computer architectures.
- To understand how to achieve better performance with increased system resources.
- To learn how system resources are scaled by the number of processors used, the memory
- capacity enlarged, the access latency tolerated, the I/O bandwidth required, the performance level desired.

Course Outcomes:

- Understand different processor architectures and system-level design processes.
- Understand the principles of I/O in computer systems, including viable mechanisms for I/O and secondary storage organization.
- Understand different processor architectures and system-level design processes

Unit-wise Syllabus:

UNIT I

Parallel Processing: Reduced instruction set Computers- CISC characteristics RISC characteristics, overlapping register windows, The Berkley RISC system. Introduction to Parallel Processing- Evolution of Computer system, parallelism in Uniprocessor systems, parallel computer structure, architectural classification schemes, parallel processing Application (Business & scientific).

UNIT II

Principles of Pipelining and Vector Processing: Principal of linear pipelining , classification of pipeline processor, General pipeline & Reservation Tables, Interleaved memory organization, Instruction & Arithmetic pipelines: - Design of pipelined Instruction Units, Arithmetic pipelines Design Examples, Multifunction and array pipeline, Principles of designing pipelined processor, Vector processing- Vector Operations, Matrix Multiplication , Memory Interleaving, Super Computers.

UNIT III

Array Processors: Structures and Algorithms for array processor (SIMD Array processor, Marking and Data Routing mechanisms, Inter –PE communication) SIMD Interconnection Networks (Static Versus Dynamic. Network, Mesh-Connected Lilac network, cube inter connection network) parallel algorithms for Array processors (SIMD matrix Multiplication, parallel sorting on Array processors)

UNIT IV

Multiprocessor Architecture and programming: Functional Structures (Lossely coupled Multiprocessors, Tightly coupled Multiprocessors, Processor characteristic for Multiprocessing), Inter connection, Networks Time shared common bus, Multiport Memory, Crossbar Switch, Multistage Switching Network, Hyper Cube System, Inter Processor Arbitration (system bus, serial arbitration procedure, parallel arbitration logic, dynamic arbitration algorithms), Inter processor communication and synchronization,. Cache coherence, Conditions for incoherence solution to cache coherence problem,

Parallel memory organizations (Interleaved memory configurations), Multiprocessor Operating Systems (classification of Multiprocessor operating systems).

Text Books:

1. Kai Hwang & Faye A, Prigs: Computers Architecture and parallel processing, MGH
2. M, Morris Mano: Computer System Architecture, PHI

Reference Book:

1. Andrew S. Tannenbaum: Structured Computer Organization, PHI
2. Hohn P. Hayes: Computer System Architecture and Organization, MGH

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PAPER (MCS- 304 B) – INFORMATION & NETWORK SECURITY

Course Objectives:

- Aware and Understand the Challenges and Scope of Information Security. Gain the Knowledge of Basic Security Concepts.
- Learn and Understand the Importance of Cryptographic Algorithms and Their Uses.
- Learn and Understand Access Control Mechanism Used for User Authentication and Authorization. Understand and Practice the Sockets Layer (SSL).

Course Outcome:

- Explain the Principlesof Cryptography and Cryptanalysis Including Symmetric and Asymmetric Encryption, Hashing, and Digital Signatures.
- Explain the Fundamental Notions of Threat, Vulnerability, Attack and Countermeasure.
- Be able to Identify the Security Goals of an Information System, Point Out Contradictory Goals and Suggest Compromises.
- Identify and Classify Particular Examples of Attacks.
- Implement the Various Security Algorithms.

Unit-wise Syllabus :

UNIT-I

Introduction: Security Concepts:-Confidentiality, Integrity, and Availability,Threats, Risks, Sources of Threats, Attacks Classification, Cryptography, Confusion Vs. Diffusion, Stream Ciphers Vs. Block Ciphers, Classical Cryptography, Objectives of Cryptography, Secret-Key and Public-Key Cryptography, Cryptanalysis, RC5, Blowfish.

UNIT- II

Block Ciphers Block Cipher Principles, Feistel Networks, S-Boxes and P Boxes, Block Cipher, Des, Elementary Number Theory, Prime Numbers, Factoring, Modular Arithmetic , GCD, Modular Square Roots, Key Exchange: Diffie-Hellman, Public-Key Encryption: RSA, Entity Authentication: Passwords, Challenge-Response Algorithms, Digital Signature, Digital Certificates, X509 Certificates, SSL, HTTPS, and IPSEC.

UNIT- III

Introduction to Hash Function : Message Digest: MD5 and SHA-1, Attacks on Hash Functions., MD Family, SHA Family, Trapdoor Functions, Digital Signatures, Overview of GPG, Seahorse, Frontends– Kleopatra, Enigmail.

UNIT- IV

Network Issues, Public- Key Infrastructure (PKI), Kerberos, Encryption Using Non-Cryptographic Tools (VI,Zip), Authentication Principles and Methods, Passwords, Two-Factor Authentication, Steganography, Penetration Testing and Ethical Hacking.

Reference Books

1. William Stallings, Cryptography and Network Security, PHI.
2. Bruce Schneier- the Mathematics of Encryption- American Mathematical Society
3. Atulkahate, "Cryptography and Network Security", TMH.
4. Calabrese, Info Security Intelligence-Cryptography Principles Appl- Cengage Learn.
5. Krawetz- Intro to Network Security, Cengage Learning.
6. Bruce Schneier, Applied Cryptography, John Wiley and Sons Mark Stamp,

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Paper (MCS- 305) –Java Programming

Course Objectives:

- Introduce and Learn the Usage of the Java SDK Environment to Create Debug and Run Java Programs.
- Understand Fundamentals of Java Programming Such as Character Set Variables Data Types and Control Structures Array Class and Methods etc.
- Understand the Concepts of OOPs and Learn Implementation of them in Java by Defining Classes Invoking Methods using Class Libraries.
- Introduce Strings Vectors Interfaces Packages and Threads Handling in Java.
- Gain the Knowledge of Java Applets AWT Swings Servelet.
- Learn and Understand the GUI Application Web Applications N-Tier Architecture.
- Develop the Understandings of the Basic Knowledge of File Handling Database Connectivity Java Servelet and Web Application.

Course Outcomes:

- Explain and apply the Object Oriented Concepts for Solving Real Problem.
- Use the Java SDK Environment to Create Debug and Run Simple Java Programs.
- Apply Java Technology to Develop the Small Applications Utilities and Web Applications.
- Apply Event Management and Layout Managers Using AWT Swing JDBC and Servlet for Developing the Software for Various Problems.

Unit-wise Syllabus:

UNIT- I

Introduction: C,C++ Java a comparison, Structure of simple Java Program, Java tokens, Statements, Java Virtual machine, Command line arguments, Programming style, Constants & variables, Type casting; Various Operators in Java, Conversions in expressions, Operator, precedence and associatively. Decision making and branching: The if Statement, the switch statement, the? Operators, the while statement, the do statement. The for statement, jumps in loops, labeled loops, classes, objects and, methods, Constructors, method overloading, static members, nesting of methods.

UNIT-II

Inheritance: Overriding methods, final variables and methods, final classes, abstract methods and classes. Arrays and ve3ctors: arrays, vectors, wrapper classes, conversion from and to primitive classes, interfaces, packages, Multithreaded programming: creating threads, extending the thread class, stopping and blocking thread, life cycle of a thread, using thread methods, thread exceptions, thread priority , synchronization, the runnable interface, managing errors and exceptions, File : I/O exceptions, creation of files, concatenating & buffering files

UNIT-III

Event: event Source, event listener, overview of event classes(action event, adjustment event, item event, focus event, text event, mouse event), handling keyboard event. Abstract Window Tool: windows fundamental, creating Frame window, handling event in frame window, displaying information within

window, label, button, checkbox and text field controls, String: string constructor, operations on string, strung searching, overview of java library (math class, system class) Overview of collections.

UNIT-IV

String and Applets: Interface Components with swing: Swing buttons, text Input, making choices, using radio and checkbox, scroll bars, Applets: Applet Basics, life cycle of an Applet, applet initializations and termination, simple applet display method, status window, passing parameter to applet,

Text Books:

1. E. Balagurusamy, "Programming with Java a Primer" TMH ISBN-13: 978-0-07-061713-1
2. Isbn-10: 0-07-061713-9.
3. Patrick Naughton and Herbert Schildt "Java: the Complete Reference" TMH Publication ISBN 0-07-463769-X.
4. Yashavant kanetkar "Let us Java" BPB Publications.
5. Ivan Bayross "Web Enabled Commercial Application Development Using HTML DHTML
4. Javascript Perl CGI" BPB Publications
5. Cay Horstmann "Big Java" Wiley Publication
6. Peter Norton "Java Programming" Techmedia Publications.
7. Joseph Weber "Using Java 1.2" PHI Isbn-81-203-1558-8.