

Semester – III

MC – 301: Software Engineering

Objective: To know the software engineering methodologies for the development of quality, cost effective and schedule meeting software.

Unit – I

Software Engineering and its models: Evolution of Software Engineering, Software development models, Capability maturity models, Software process technology

Unit – II

Principles of Software Requirements Analysis, Design and Testing: Engineering the product, Modeling the system architecture, Software prototyping and specification, Different types of project metrics, Software project estimation, Models for estimation, Automated tools for estimation,

Data design, Architectural design, Interface design, HCI design, Modular design, Testing techniques, Testing for specialized environments, Debugging

Unit – III

Software Project Planning: Different types of project metrics, Software project estimation, Models for estimation, Automated tools for estimation

Unit – IV

Risk management and Project Scheduling: Identification of Software risks, monitoring of risks, Management of risks, formulating a task set for the project, Choosing the tasks of software engineering, Scheduling methods, The Software project plan Software Quality Assurance, Formal technical reviews, Software reliability, Software quality standards

Unit – V

Software change management and Advance Software Engineering: Baselines, Version control, change control, Auditing and reporting, Web Software Engineering, Mobile Software Engineering, CASE Tools, Clean room Software engineering, Component based Software engineering, Re-engineering, Reverse engineering

Reference Books

1. **Ian Sommerville**, Software Engineering, Pearson Education, 2012, 9th Edition.
2. **Roger.S.Pressman**, Software Engineering - A Practitioners approach, Tata McGraw Hill, 7th Edition.
3. **PankajJalote**: An Integrated Approach to Software Engineering, Wiley India

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MC – 302: Machine Learning

Objective: To Study the **machine learning** Concepts to discover patterns in our data and then make predictions based on often complex patterns to answer business questions, detect and analyze trends and help solve problems.

Unit – I

Python for Machine Learning : Introduction to python, the concept of data types; variables, assignments; immutable variables; numerical types; arithmetic operators and expressions; understanding error messages; Conditions, Boolean logic, logical operators; ranges; Control statements: if-else, loops (for, while); short circuit evaluation; Strings and text files; manipulating files and directories, os and sys modules; text files: reading/writing text and Numbers from/to a file; creating and reading a formatted file (csv or tab-separated).

String manipulations: subscript operator, indexing, slicing a string; strings and number System: converting strings to numbers and vice versa. Binary, octal, hexadecimal numbers Lists, tuples, and dictionaries; basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and Replacing values, Oops, Python Numpy and Pandas, Data Preprocessing, Data Manipulation, Data Visualization

Unit – II

Overview and Introduction to Bayes Decision Theory: Machine intelligence and applications, pattern recognition concepts classification, regression, feature selection, supervised learning class conditional probability distributions, Examples of classifiers bayes optimal classifier and error, learning classification approaches.

Linear machines: General and linear discriminants, decision regions, single layer neural network, linear separability, general gradient descent, perceptron learning algorithm, mean square criterion and widrow-Hoff learning algorithm; multi-Layer perceptions: two-layers universal approximators, backpropagation learning, on-line, off-line error surface, important parameters.

Unit – III

Learning decision trees: Inference model, general domains, symbolic decision trees, consistency, learning trees from training examples entropy, mutual information, ID3 algorithm criterion, C4.5 algorithm continuous test nodes, confidence, pruning, learning with incomplete data.

Instance-based Learning: Nearest neighbor classification, k-nearest neighbor, nearest neighbor error probability,

Unit – IV

Machine learning concepts and limitations: Learning theory, formal model of the learnable, sample complexity, learning in zero-bayes and realizable case, VC-dimension, fundamental algorithm independent concepts, hypothesis class, target class, inductive bias, occam's razor, empirical risk, limitations of inference machines, approximation and estimation errors, Tradeoff.

Unit – V

Machine learning assessment and Improvement: Statistical model selection, structural risk minimization, bootstrapping, bagging, boosting.

Reference Books

1. E. Alpaydin, **Introduction to Machine Learning**, Prentice Hall of India, 2006.
2. T. M. Mitchell, **Machine Learning**, McGraw-Hill, 1997.
3. C. M. Bishop, **Pattern Recognition and Machine Learning**, Springer, 2006.
4. R. O. Duda, P. E. Hart, and D.G. Stork, **Pattern Classification**, John Wiley and Sons, 2001.
5. Vladimir N. Vapnik, **Statistical Learning Theory**, John Wiley and Sons, 1998.
6. Shawe-Taylor J. and Cristianini N., Cambridge, **Introduction to Support Vector Machines**, University Press, 2000.

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MC – 303: Visual Programming

Objective: it aims to teach basic of visual programming concepts and to design object oriented visual programs with Visual Studio programming development environment and coding.

Unit – I

GUI concept - Data types - GUI Architecture - Message Processing - Keyboard and Mouse Handling Displaying Text and Graphics - File and Printer Handling - DDE – DDL ODBC COM/DCOM / CORBA

Unit – II

NET Namespaces, Assemblies, .NET Memory Management, Process Management, Interoperation with COM. Transactions in NET, Structures Exception Handling, Code Access Security, Web Controls using the .NET framework, The NET Framework Class Library.

Unit – III

VB.NET - Variables and Operators, functions, Decision and Loop statements, Inheritance, Value Types, Operator Overloading, Exception Handling, Arrays and Collections, Properties, Delegates and Events, Windows Forms, Dialog Boxes and Controls, Graphical Output, Files, DATA ACCESS.

Unit – IV

C#.NET - Variables, Operators and Expressions, Writing Methods and Applying Scope, Decision statements, Iteration statements, Managing errors and Exceptions values and references, Value types with enumerations and Structures, Arrays and Collections parameter arrays, Inheritance, Garbage collection and Resource management.

Unit – V

Introducing ASP.NET - Understanding validation controls - Accessing Data with web forms- Building ASP.NET applications Building and XML web service handling XML.

Reference Books

1. Jeff Prosise, Programming Microsoft .NET, Microsoft Press
2. David S Plat, Introducing Microsoft .NET, 3 Edition, Microsoft Press
3. Jesse Liberty, Programming Visual Basic .NET 2" Edition, O'Reilly & Associates
4. Jesse Liberty, Programming C#, 3rd Edition, O'Reilly & Associates
5. Jesse Liberty. Dan Hurwitz, Programming ASP.NET, O'Reilly & Associates

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MC – 304: Web Technologies

Objective: - To study the World Wide Web as a platform for interactive applications, content publishing and social services. The development of web-based applications requires knowledge about the underlying technology and the formats and standards the web is based upon.

Unit – I

Introduction: Web Publishing, Web Browsers, Web Servers, URL; Essential Web Developer Tools; Web hosting. **HTML5 and CSS3:** Introduction, Basics – Structure, Essential Tags, Lists, Links; Formatting Text with HTML and CSS, Including Style Sheets in a Page, Varieties of Selectors, Units of Measure, Box Model, Using Images on Web Pages, Image Formats, Using Images – Basics, Text Alignments, Links, Scale, Backgrounds, Bullets; Image-map, Image Etiquettes. Tables, Creating Table, Parts of Table; Formatting Tables – Size, Borders, Cells; Alignment and Spacing; Spanning; Advanced Enhancements.

Unit – II

Using CSS to Position Elements: Positioning Schemes, Absolute Positioning, Fixed Positioning, Controlling Stacking, Creating Drop-Down Menus. **Designing HTML5 Forms:** Basics; Creating Controls, Buttons and Fields; Grouping Controls; Displaying Updates; Applying Styles. **Structuring a Page with HTML5:** History, Laying Out a Page, Structural Tags, Page Outline, Structural Elements. **Advanced CSS Page Layouts:** Laying Out Page, The Role of CSS in Web Design.

Unit – III

JavaScript and jQuery: JavaScript – Significance, Basics, Environment, Events, Validating Forms, Hiding and Showing Content, Adding New Content to a Page. **Using jQuery:** Introduction, JavaScript Libraries, Selecting Elements from the Document, Binding Events, Modifying Styles on the Page, Modifying Content on the Page, Special Effects, AJAX and jQuery.

Unit – IV

PHP: Introduction, Basics, Loops, Built-In Functions, User-Defined Functions, Processing Forms, Using PHP Includes, Database Connectivity, Regular Expressions, Sending Mail, Object-Oriented PHP, Cookies and Sessions, File Uploads.

Reference Books

1. Laura Lemay et.al., **Sams Teach Yourself HTML, CSS & JavaScript Web Publishing in One Hour a Day**, Pearson Education, 2016, 7th Edition.
2. Jon Duckett, **Web Design with HTML, CSS, JavaScript and jQuery** (set), Wiley, 2014
3. Robert W. Sebesta, **Programming the World Wide Web**, Pearson Education

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MC – 305: Program Elective – 2

Two elective courses from the list will be offered if minimum 1/3rd of MCA-II Semester students will opt for the same or it will be decided by the concerned department or authority.

MC – 306: Program Elective – 3

Two elective courses from the list will be offered if minimum 1/3rd of MCA-II Semester students will opt for the same or it will be decided by the concerned department or authority.

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MC – 307: Programming Lab – 1

- Visual programming
- Python

MC – 308: Programming Lab – 2

- Web technology

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LIST OF COURSES WITH CONTENTS FOR ELECTIVE - 1

MCPE – 101: Internet of Things

Objective: - Students will be explored to the interconnection and integration of the physical world and the cyber space. They are also able to design & develop IOT Devices.

Unit – I

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT–IoT Protocols, IoT communication models, IoT Communication APIs IoT enabled Technologies– Wireless Sensor Networks, Cloud Computing, Bigdata analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain. Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle.

Unit – II

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics of IoT System Management with NETCOZF, YANGNETCONF, YANG, SNMP NETOPEER

Unit – III

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

Unit – IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins. IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web API

Reference Books

1. ArshdeepBahga and Vijay Madiseti, Internet of Things - A Hands-on Approach, Universities Press, 2015.
2. Matt Richardson & Shawn Wallace, O'Reilly (SPD), Getting Started with Raspberry Pi, 2014.

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MCPE – 102: Management Information System

Objective: It aims to teach to help executives of an organization make decisions that advance the organization's strategy and to implement the organizational structure and dynamics of the enterprise for the **purpose** of managing the organization in a better way for a competitive advantage.

Unit – I

Foundations of information systems: - Decision Making Process – Simon's Model – Global business Environment and organizations – Introduction to IS in business – Solving problems with IS – Introduction to MIS.

Unit – II

Information Technology: A managerial overview - Computer Software – hardware – Database Management-normalization Process – Types of Data Model.

Unit – III

Business Application of information Technology: Internet – intranet and Extranets – Decision Support System – Transaction Processing System – EJS – Enterprise wide Information Systems.

Unit – IV

Building Information systems and Implementation – Tools and Techniques for Building System Analysis and Design – Methodologies – Implementation Techniques.

Unit – V

Management of Information system: functional Subsystems of MIS – marketing, finance, URD, Manufacturing – strategic Information Systems.

Reference Books

1. Obrien, J.A, "Management Information Systems", 4th Edition, TMFI, 1999.
2. Landon K.C, & Landon J.P., MIS – Macmillan – New York, 1998.
3. Davis G.D and Olson M.H, "Management Information System", 2nd edition, TMH,

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MCPE – 103: Principles of Compiler Design

Objective: To study the general features of Compilers.

Unit – I

Lexical Analysis: Introduction on the phase of the compiler - Lexical Analysis, Regular Expression, Automata, Deterministic Automata equivalent to NFA's. Minimizing the states of DFA, Implementation of Lexical Analyzer.

Unit – II

Syntax Analysis: Topdown Parsing Concepts, Recursive Descent Parsing, Predictive Parsers, Nonrecursive Predictive Parsing - Bottom Up Parsing, Handle pruning, Shift reduce parsing - Operator Precedence Parsing - Error recovery in Parsing, LR Parsers, Parser Generators - YACC.

Unit – III

Intermediate Code Generation: Syntax directed Definitions, Construction of Syntax trees - Top down Translation, Bottom up Evaluation of Inherited Attributes, Recursive Evaluators, Assigning Space at Computer Construction time - Type checking - Overloading of functions and operators, polymorphic function.

Unit – IV

Storage Organization: Storage Organization, Storage Allocation strategies, Parameter Passing, Symbol tables, Dynamic Storage Allocation, Intermediate Languages - Representation of Declarations, Assignment statement, Boolean Expression, Back Patching, Procedure calls.

Unit – V

Code Generation and Optimization: Design of the code generators, Runtime storage management, Basic blocks and Flow graphs, Register Allocation and Assignment, DAG representation of Basic blocks, Peephole optimization, Code optimization - The principle Sources of Optimization, Optimization of basic blocks, Global data flow Analysis, Loop optimizations.

Reference Books

1. Alfred Aho, Ravi Sethi, Jeffrey D Ullman, "Compilers Principles, Techniques and Tools" 1986 Addison Wesley.
2. Dhamdhere D.M, "Compiler Construction Principles and Practice 1981 ,Macmillan India.
3. Reinhard Wilhelm, Dieter Mauser , " Compiler Design", 1995, Addison Wesley.

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MCPE – 104: Microprocessors and Applications

Objective: To study the basic concepts of 8085 microprocessor and to interface various peripherals with it.

Unit – I

Introduction to Micro Computers: Micro computers, Microprocessors and Assembly Language Microprocessors Architecture and Micro Computer Systems - 8085 Microprocessor, Architecture -Instruction and Timings.

Unit – II

Programming 8085: 8085 Basic Instructions. Programming Techniques with Additional Instructions -Counters and Timing Delays - Stack and Subroutines.

Unit – III

Interfacing Peripherals (I/O'S): Parallel & Serial: Parallel I/O & interfacing Applications - Interrupts:8085 interrupts. Serial I/O: Basic Concepts - 8085, Serial I/O lines: SOD and SID.

Unit – IV

Data Transfer Techniques Using Programming Devices: Basics in programmable I/Os - Data Transfer using 8155 - Programmable keyboard display controller 8279 - Programmable interrupt controller 8259A.

Unit – V

Interfacing DMA & Data Converters: Direct Memory Access - 8257 DMA - Interfacing Data Converters - 8257 DMA controller - Interfacing Data Converters: DIA converter - A/D converters - Comparative study of microprocessors. Microprocessors - 8086, 80286, 80386, 80486 & Pentium.

Reference Books:

1. Ramesh S. Gaonkar, " Microprocessor, Architecture, Programming and Applications", 1989, Wiley Eastern Ltd.,
2. Douglas V Hall, "Microprocessors and Interfacing ", 1997, Tata McGraw Hill Edition.
3. Hany Fainhead, "The 386/486 PC - A Paver Users Guide".
4. Yu - Cheng Liu, Glenn A Gibsen, "Microcomputer Systems", 1986, Prentice - Hall Of India PVT Ltd.

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MCPE – 105: Client / Server Technology

Objective: To provide knowledge of developing systems in distributed environments.

Unit – I

Overview of Client/Server Computing: What is Client/Server Computing Application Tasks: Rightsizing, Benefits of Client/Server Computing, Evolution of Client Server Computing, Hardware and Software Trends, Evolution of operating systems, Networking Trends, Business considerations.

Unit – II

Client/Server Applications: Components, Classes, Categories Understanding client/Server Computing: Obstacles, Open Systems and Standards, Standards setting organizations. Factors for success, RPC messaging Peer to Peer.

Unit – III

Client Hardware and Software: Client Components, Client Operating Systems, GUI, Database Access, Application Logic. Server Hardware and Environment, Categories of Servers. SQL DB Servers, Network management and Network Computing Environment, Network operating systems, Loadable Module, Middleware, Data warehousing.

Unit – IV

Client/Server requirements: GUI Design standards interface Independence, Platform independence, Transaction Processing, Connectivity, Reliability, Back up and Recovery mechanisms, TP Monitors, Groupware, and Distributed Object Components.

Unit – V

Future Trends - CORBA, COM, OLE, WEB Server, Mobile Computing, Net Management Standard, intelligent Wiring Hubs, Wireless LANS, ATM Switching, Object Technology, CASE Tools, Repositories, Multimedia, Workgroup Computing.

Reference Books

1. Dawna Travis Dewire, 'Client/SerVer Computing', 1993, McGraw Hill
2. Bruce Elbert & Bobby Martyna, "Client/Server Computing:Architecture. Applications and Distributed Systems Management", 1994, Artech House.
3. Robert Orgall, Dan Harkay & Jeri Edwards, "The Essential Client/Server Survival Guide".

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MCPE – 106: Neural Networks

Objective: To study the algorithms and physical components applied in neural networks.

Unit – I

Introduction: Artificial Neural Network - Principles and promises - Pattern and Pattern Recognition tasks - Conventional methods Promises of neural networks - Scope.

Unit – II

Characteristics, Neuron Models: Basics of ANNs - Characteristics of biological neural networks - Artificial neural networks - Terminology - Models of neuron - Topology - Activation and Syntactic Dynamics.

Unit – III

Pattern Recognition Methods and Concepts in ANN: Functional units of ANN for pattern recognition tasks - Pattern recognition by feedforward and feed backward ANNs - Pattern Association Pattern classifier - Perception Pattern Mapping Backpropagation learning algorithm.

Unit – IV

Storage, Clustering and Mapping: Pattern storage (STM) - Pattern Clustering Competitive learning feature mapping Kohonen's Self-organizing networks.

Unit – V

Architecture, Memory and Applications: Neural Architecture for complex pattern recognition task - Associative memory Data and Image compression Pattern Classification - Spatio temporal patterns (Avalanche) - Pattern variability (Neocognitron) - Other Applications.

Reference Books

1. J.Hertz, A.Korth and R.G.Palmer, "An Introduction to the Theory of Neural Computation", Addison Wesley, 1991.
2. Philip D. Wassermann, "Neural Computing Theory and Practice", Van Nostran Reinhold.
3. James A.Freeman and David M.Skapura, "Neural Networks; Algorithms and Applications", Addison Wesley, 1991.
4. B.Muller and J.Reinhardt, "Neural Networks: An Introduction", Addison Wesley 1990.
- 5 L.B.Almedia and C.J. Wel. Lekans, "Neural Networks", Addison Wesley, 1990.

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MCPE – 107: Marketing Management

Objective: To gain a basic understanding about the marketing function and about the marketing strategy formulation.

Unit – I

Introduction Buyer Behavior: Core concepts of marketing: Needs, wants and demands, product, value, satisfaction. Marketing and markets. Evolution of marketing: production concept, product concepts, selling concepts and marketing concepts. Buyer behavior: Model, influencing factors, buying decision process, buying roles and buying stages.

Unit – II

Segmentation - N.P.D-P.L.C.: Segmentation: Approach, factors and procedure. Targeting and Positioning. New Product de NPD model, reasons for success and failures. Product Life Cycle: PLC concepts and strategies to be followed in various stages.

Unit – III

Product and Pricing Strategies: Product: Classification, mix decisions and line decisions, branding decisions and packaging. Pricing: Objectives, influencing factors, methods and strategies.

Unit – IV

Channel and Promotion Strategies: Channel: Nature, function, dynamics, design and management decisions. Promotion: Advertising decisions objectives, budget, message, media and evaluation of advertisements. Personal selling principles. Sales Promotion - objectives and types.

Unit – V

Marketing Control and Strategies: Marketing control: Annul plan control, Profitability control, Efficiency control and strategies control. Marketing strategies: for leaders, followers, challengers, niche players and global markets.

Reference Books

1. Kotler, Philip, Marketing Management: The Millennium edition, PHI pvt. Ltd: New Delhi. 10th edition, 1999.
2. Ramaswamy V.S. and Namakumari .S, "Marketing Management: Planning, implementation and control", Macmillan, New Delhi, 2 edition, 1997.
3. Kotter, Philip and Armstrong, Gary, "Principles of Marketing" PHIpvt. Ltd.: New Delhi. 7L edition. 1996.

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MCPE – 108: Parallel Computing

Objective: To study the concepts and ideas in **parallel computing** and its applications.

Unit – I

Introduction: Advent of practical parallel processing. Parallel Processing terminology, The sieve of Eratosthenes.

PRAM Algorithms: The PRAM model of parallel computation, PRAM algorithms, reducing the number of processors, problems defying fast solutions on PRAMS.

Unit – II

Processor Arrays, multiprocessors, Multicomputer, Processor organizations, processor arrays, Multiprocessors, multicomputer, Flynn's taxonomy, speed up and parallelizability.

Unit – III

Mapping Scheduling and Algorithms; Data Mapping on processor arrays and multicomputer, classifying parallel algorithms, reduction, broadcast, prefix sums matrix multiplication, solving linear system of equations.

Unit – IV

sorting, Searching and Graph Algorithms; Enumeration sort, Lower bounds on parallel sorting, Odd – Even transposition sort, bitonic merge, quick sort based algorithms, complexity of parallel search, searching on graph, connected components, all pairs shortest path, single source shortest path, minimum cost spanning tree.

Reference Books

1. Hwang, Kai: "Advance Computer Architecture", McGraw Hill.
2. Hwang, K. , Briggs, F.A. : "Computer Architecture and Parallel Processing", McGraw Hill.
3. Evans, D.J. : "Parallel Processing System", Cambridge University.

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MCPE – 109: Computer Graphics and Multimedia

Objective: To study the software and hardware aspects of computer graphics,

Prerequisite: Mathematics, Matrix Theory, Analytical Geometry, Trigonometry

Unit – I

Graphics Devices – Line and Circle Drawing Algorithms: Overview of Graphic Systems - Display Devices Hard copy Devices - Interactive Input devices -- Display Processors, graphics Software - Line drawing various algorithms and comparisons Circle drawing algorithms.

Unit – II

Filling Transformation and Segments: Attributes - Area filling algorithms - Scan conversion algorithms - Transformations Two dimensional - Basic Composite and Other Transformations - Matrix representations Windowing and Clipping - Viewport Transformations - Segments.

Unit – III

Graphics and 3D Graphics: Interactive input methods - Input Devices - Input Functions - Three Dimensional Concepts - 3D Transformations-Curves Projections - Hidden Surface Elimination algorithms.

Unit – IV

Multimedia Introduction: Multimedia applications - System architecture - Objects of Multimedia Systems -Multimedia databases Compression and File formats Image compression CCITT' - JPEG-Video image compression - MPEG DVI Technology - Audio compression - RTF format TIFF file format -- RIFF FILE format - MIDI - JPEG DIB - TWAIN, Video & Audio Codecs.

Unit – V

Application Classes: Types of systems Virtual reality design - Components Databases Authoring Systems - Hyper media - User interface design Display/Playback issues - Hypermedia linking and embedding - Production of Multimedia systems.

Reference Books

1. Donald Hearn, M.Pauline Baker, 'Computer Graphics', 1992, PHI,
- 2 William M.New Man, Robert F. Sproull, " Principles of Interactive Graphics", 1979, McGraw Hill.
3. Fred Hofstern, Multimedia Literacy", 1995, McGraw Hill.
4. Burger, "Desktop Multimedia Bible", 1993, Addison Wesley.
5. Matthew E.Hodges and Russell M.Sasnett, "Multimedia Computing", 1990, Addison
6. John F. Koegel Beford, "Multimedia Systems", 1994, Addison Wesley, University of Massachusetts, Lowell.
7. Simon Gibbs, Dennis Tsichritzis, "Multimedia Programming", 1995, Addison Wesley, University of Geneva.

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MCPE – 110: Accounting and Financial Management

Objective: To present the whole range of book-keeping concepts and to give a comprehensive coverage to management accounts.

Unit – I

Basic Concepts: Assets Current assets, Fixed assets - Liabilities, Current liabilities - other liabilities Owner's equity - Trading account - Accounting records and Systems - Control accounts and Subsidiary Ledgers Limitations. Preparation of income statement - Interpretation and use of these fixed statements by Management.

Unit – II

Depreciation: Fixed assets and Depreciation - Methods for Depreciation, Assets Acquisition, Disposal, Intangible. assets, Inventory methods, Sources of working capital, Fund flows, Cash flows.

Unit –III

Financial Statement Analysis: Ratio analysis - Use of ratios in interpreting Trading Accounts and Financial Statements, Limitations.

Unit – IV

Management Accounting: Variable costs - Fixed costs - Cost Volume Profit Analysis - Break even marginal and full costing contribution, Standard costing Analysis of variance computer accounting and algorithms.

Unit – V

Budgets and Capital Budgeting: Characteristics of Budgets, Definition, Advantages, Preparation, Forecasting - Long term, Short term - Methods of capital investment decision making, Discounted cash flows, Internal rate of return, Payback, Rate of return, Sensitivity Analysis, Cost of capital.

Reference Books

1. Maheswari S.N. and Maheswari 5K., "An Introduction to Accountancy", 5 edition. Vikas Publishing, New Delhi.
2. Manmohan and Goyal, " Principles of Management and Accounting", 5 Edn., Sahirva Bhawan,Agra
3. J.Batty,i' Management Accountancy%', 3 Edn., 1970, Macdonald & Evan Ltd., London
4. Hampton,"Financial Management", 1980, PHI
- 5 S.C.Kuchhal, "Financial Management", 1979, Chaitanya Pub. House
- 6 Anthony R.N., " Management Accounting", 1970, Homewood Illion

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LIST OF COURSES WITH CONTENTS FOR ELECTIVE - 2

MCPE – 201: Operation Research

Objective: To understand the general concept of operations research relating to the optimization criteria in computer applications and helps software in this area.

Unit – I

Constrained and Unconstrained Optimization: Use of Optimization Techniques in computer applications. One dimensional unconstrained optimization - Fibonacci method - Golden section method - Quadratic approximation method - constrained optimization with Lagrangian multipliers - simple problems.

Unit – II

Linear Programming: Formulation of linear programming problems - Simplex method - BIG M method Two Phase method - Primal Dual problems, Sensitivity Analysis, Transportation problem Assignment problem.

Unit – III

Dynamic Programming: DPP Formulation Investment problem General allocation problem - Stage coach problem - Production scheduling - LPR

Unit – IV

Inventory Control: Functions of inventories - Infinite delivery rate with no backordering - Finite delivery rate with no backordering - Infinite delivery rate with ordering - Finite delivery rate with backordering Probabilistic models - Single period models.

Unit – V

Queuing Theory: Notation and assumption - Characteristics of Queue - Poisson input process - exponential service times - Queuing models - M/M/C MIM/St MIMI 1 .IN - MIM/SIN - Simple problems.

Reference Books

1. Billy.E.Gillet, "Introduction to Operations Research - A Computer Oriented Algorithmic Approach", 1976, McGraw Hill.
2. Rao.S.S, "Optimization Theory and Applications", 1981 , Wisely Eastern.
3. Taha .H.A, "Operations Research an Introduction", 3 Edition, 1982, Macmillan Pub.
4. Ackoff Sasieni M.V, "Fundamentals of Operations Research", 1968, Wisely Eastern.
5. Bunday D.Bruab, "Basic Optimization on Methods", 1984, Edward Arnold Pub.
6. Kanti Swaroop et al, "Operations Research", 1995, Sultan Chand.

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MCPE – 202: Data Warehousing and Data Mining

Objective: To understand the general concept of Data Warehousing and Data Mining.

Unit – I

Introduction: Data Mining-motivation, importance-DM Functionalities, Basic Data Mining Tasks. DM Vs KDD, DM Metrics, DM Applications, Social implications.

Unit – II

Data Warehousing: Difference between Operational Database and Data warehouse- Multidimensional Data Model: From tables to data Cubes, Schemas, Measures-DW **Architecture:** Steps for design and construction of DW, 3-tier DW Architecture-DW **Implementation:** Efficient computation of DATA Cubes, Efficient Processing of OLAP queries, Metadata repository.

Unit – III

Data processing, Data Mining Primitives, Languages, Data cleaning, Data Integration and Transformation, Data Reduction. Discretization and concept Hierarchy Generation. Task-relevant data, Background Knowledge, Presentation and Visualization of Discovered Patterns. Data Mining Query Language-other languages for data mining

Unit – IV

Data Mining Algorithms: Association Rule Mining: MBA Analysis, The Apriori Algorithm, Improving the efficiency of Apriori. Mining Multidimensional Association rules from RDBMS and DXV. Classification and Predication: Decision Tree. Bayesian Classification back propagation, Cluster Analysis: Partitioning Methods. Hierarchical Method, Grid-based methods, Outlier Analysis.

Unit – V

Web, Temporal and Spatial Data Mining: Web content Mining, Web Structure Mining, Web usage mining. Spatial Mining: Spatial DM primitives, Generalization and Specialization, Spatial rules, spatial classification and clustering algorithms. Temporal Mining: Modeling Temporal Events, Times series, Pattern Detection, Sequences.

Reference Books

1. Jiawei I-Ian, & Micheline Kamber, "data Mining: Concepts and Techniques". Harcourt India Private Limited, First Indian Reprint, 2001
2. Margaret H. Dunham, "Data Mining: Introductory and Advanced Topics". Pearson Education, First Indian Reprint, 2003
3. Arun K. Pujari, "Data Mining Techniques", University Press (India) Limited, First Edition, 2001
4. Efraim O. Mallach, "Decision Support and Data Warehouse Systems", McGraw-Hill International Edition, 2000.

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MCPE – 203: Software Architecture and Software Testing

Objective: To Study an introduction to methods and theory for development of data warehouses and data analysis using data mining.

Unit – I

Definition - software components, COTS and infrastructure - Moving from project. centric to architecture-centric software engineering - software variability management.

Unit - II

Software architecture design method: Top-down versus bottom-up design - functionality-based architecture design - variability analysis - architecture evaluation and assessment - scenario-based evaluation simulation-based evaluation - experience-based evaluation architectural styles architectural patterns applying design patterns - convert quality requirements to functionality.

Unit – III

Design Patterns-Evolution Patterns-Software artifact evolution processes: Interdependence, dependence or Independence - Case studies: examples and experiences Use of Java Beans.

Unit – IV

History of Software Testing: Overview of Verification and Validation With the Software Life-Cycle- Formal Methods as Opposed to Software Testing- Importance of Systematic Methods for Testing- Techniques for Program Analysts- Software Testing Techniques Test Data Generation- Software Quality Assurance- Software Metrics- Comparison of Software Testing Techniques.

Unit – V

Software Reliability: Comparison of Software and Hardware Reliability- Development of Software Reliability Models- Parameter Estimation of Models and Prediction of Reliability Levels- Comparison of Models- Relation Between Software Reliability and Software Testing Techniques- Application of Software Testing and Reliability to Safety Critical Systems.

Reference Books

1. Len Bass, Paul Clements, and Rick Kazman, Software Architecture in Practice. 2nd Ed. Addison-Wesley Longman, Inc., Reading, MA. 2003.
2. Jacobson, Ivar, Griss, Martin, Jonsson, Patrik, Software Reuse. Architecture, Process and Organization for Business Success. Addison-Wesley Longman, Inc., Harlow, UK, 1997
3. Mary Shaw and David Garian, Software Architecture, Perspectives on an Emerging Discipline. Prentice Hall, 1996
4. J. Bosch, Product-line Architectures in Industry: A Case Study, Proceedings of the 21st International Conference on Software Engineering, pp. 544-554, May 1999.
5. J. Bosch, Design & Use of Software Architectures - Adopting and Evolving a Product -Line Approach, Addison Wesley, ISBN 0-201-6749

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MCPE – 204: Systems Programming

Objective: To study the components and concepts of System Programming.

Unit – I

Introduction: Language Processing - Its activities, Fundamentals of Language Processing Development Tools- System Software and Machine Architecture - Hypothetical Computer - CISC and RISC Machines.

Unit – II

Assembler and Macro Processors: Basic Assembler functions - Machine-dependent and Machine-independent Assembler features - Assembler Design options - Implementation Examples - Basic Macro Processor Functions Machine- independent Macro Processor features - Design options and Examples.

Unit – III

Loaders and Linkers: Basic Loader Functions - Machine-dependent and Machine-independent Loader features Design options - Linkage Editors, Dynamic Linking and Bootstrap Loaders. Implementation Examples -MS-DOS linker, SUN-OS linkers and Cray MPP linker.

Unit – IV

Translators and Software Tools: Comparison of Compilers and Interpreters - Software Tools - Tools for Programming Development - Editors - Debug monitors Programming Environments - User Interfaces.

Unit – V

Case Studies: Introduction to Device Drivers Windows NT internals - UNIX Shell Programming and Batch Processing in MS-DOS.

Reference Books

1. Leland L. Beck, " System Software - An Introduction to Systems Programming", 3rd Edition, 1999, Addison Wesley.
2. D.M.Dhamdhore, "Systems Programming and Operating Systems", 2 Edition, 1997. TMH.
3. Donovan J.J. "Systems Programming", 1972, McGraw Hill.
4. David K I-Hsiao, u Systems Programming - Concepts of Operating & Database Systems 1975, Addis On Wesley.

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MCPE – 205: Big Data Analytics

Objective: Ability to pursue new business models or to achieve a significant competitive advantage on the company's traditional business.

Unit – I

Introduction to Big Data: Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce.

Unit – II

Introduction Hadoop: Big Data – Apache Hadoop & Hadoop Eco System – Moving Data in and out of Hadoop – Understanding inputs and outputs of Map Reduce - Data Serialization. Hadoop Architecture: Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands, Anatomy of File Write and Read., Name Node, Secondary Name Node, and Data Node, Hadoop Map Reduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.

Unit – III

Hadoop Ecosystem and Yarn: Hadoop ecosystem components - Schedulers - Fair and Capacity, Hadoop 2.0 New Features Name Node High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN.

Unit – IV

Hive and Hiveql, Hbase: Introduction to No Query Language, Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting And Aggregating, Map Reduce Scripts, Joins & Sub queries, HBase concepts Advanced Usage, Schema Design, Advance Indexing - PIG, Zookeeper - how it helps in monitoring a cluster, Hbase uses Zookeeper and how to Build Applications with Zookeeper.

Reference Books

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, 2015.
2. Chris Eaton, Dirk deroos et al. , "Understanding Big data", McGraw Hill, 2012.
3. Tom White, "HADOOP: The definitive Guide" , O Reilly, 2012.
4. VigneshPrajapati, "Big Data Analytics with R and Haoop", Packet Publishing 2013.
5. Tom Plunkett, Brian Macdonald et al, "Oracle Big Data Handbook", Oracle Press, 2014.
6. JyLiebowitz, "Big Data and Business analytics",CRC Press, 2013.

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MCPE – 206: Human Resource Management

Objective: The objective of the course is to sensitize students to the systems and strategies in managing people professionally in view of the rapidly evolving aspirations of individuals, and changing business contexts.

Unit – I

Foundations and Principles of Managing People in Organizations: Concepts and Perspectives; Contemporary issues and challenges in managing human resources;

Unit – II

Job Analysis; Human Resource Planning: Demand and Supply Forecasting, Downsizing and Retention; Talent Acquisition: Recruitment, Selection and Induction; Performance Management: Systems and Strategies; Learning, Training and Development: Process and methods; Compensation and Rewards Management;

Unit – III

Industrial Relations: Dynamics of Employer, Employee and the State; Trade Unions: Past, present and the future; Industrial Harmony: Workers' Participation, Collective Bargaining, Grievance, Discipline; Dispute Resolution and Conflict Management; Employee Engagement; International Dimensions of HRM.

Reference Books

1. Armstrong, M. & S. Taylor. (2017). *Armstrong's Handbook of Human Resource Management Practice* (14thed.). London: Kogan Page.
2. Aswathappa, K. (2017) *Human Resource Management: Text and Cases*. (8thed.) New Delhi: McGraw Hill.
3. Bohlander, G.W., & Snell, S.A. (2016) *Principles of Human Resource Management* (16thed.). New Delhi: Cengage India.
4. Carbonara, S. (2013) *Manager's Guide to Employee Engagement*. New York: McGraw Hill.
5. Cascio, W. (2015). *Managing Human Resources: Productivity, Quality of Work Life, Profits* (10thed.). New York: McGraw Hill.

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MCPE – 207: Cryptography and Network Security

Objective: To give an exposure on symmetric key cryptosystems, stream ciphers, public key cryptosystem, factoring and related topics.

Unit – I

Introduction to information systems, Types of information Systems, Development of Information Systems, Introduction to information security, Need for Information security, Threats to Information Systems, Information Assurance, Cyber Security, and Security Risk Analysis.

Unit – II

Application security (Database, E-mail and Internet), Data Security Considerations-Backups, Archival Storage and Disposal of Data, Security Technology-Firewall and VPNs, Intrusion Detection, Access Control. Security Threats -Viruses, Worms, Trojan Horse, Bombs, Trapdoors, Spoofs, E-mail viruses, Macro viruses, Malicious Software, Network and Denial of Services Attack, Security Threats to E-Commerce- Electronic Payment System, e- Cash, Credit/Debit Cards. Digital Signature, public Key Cryptography.

Unit – III

Developing Secure Information Systems, Application Development Security, Information Security Governance & Risk Management, Security Architecture & Design Security Issues in Hardware, Data Storage & Downloadable Devices, Physical Security of IT Assets, Access Control, CCTV and intrusion Detection Systems, Backup Security Measures

Unit – IV

Security Policies, Why Policies should be developed, WWW policies, Email Security policies, Policy Review Process-Corporate Policies-Sample Security Policies, Publishing and Notification Requirement of the Policies. Information Security Standards-ISO, IT Act, Copyright Act, Patent Law, IPR. Cyber Laws in India; IT Act 2000 Provisions, Intellectual Property Law: Copy Right Law, Software License, Semiconductor Law and Patent Law.

Reference Books

1. Charles P. Pfleeger, Shari LawerancePfleeger, "Analysing Computer Security", Pearson.
2. V.K. Pachghare, "Cryptography and information Security", PHI Learning Private Limited, Delhi India.
3. Dr. Surya Prakash Tripathi, RitendraGoyal, Praveen Kumar Shukla, "Introduction to Information Security and Cyber Law", Willey.
4. Schou, Shoemaker, "Information Assurance for the Enterprise", Tata McGraw Hill.
5. Chander, Harish, "Cyber Laws And It Protection", PHI.

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MCPE – 208: Natural Language Processing

Unit – I

Overview and Language Modeling: Origins and challenges of NLP-Language and Grammar-Processing Indian Languages- NLP Applications-Information Retrieval. Language Modeling: Various Grammar- based Language Models-Statistical Language Model.

Unit – II

Word Level and Syntactic Analysis: Word Level Analysis: Regular Expressions-Finite-State Automata-Morphological Parsing-Spelling Error Detection and correction- Words and Word Classes-Part-of Speech Tagging. Syntactic Analysis: Context-free Grammar-Constituency-Parsing-Probabilistic Parsing.

Unit – III

Semantic Analysis and Discourse Processing: Semantic Analysis: Meaning Representation-Lexical Semantics- Ambiguity-Word Sense Disambiguation. Discourse Processing: cohesion-Reference Resolution- Discourse Coherence and Structure.

Unit – IV

Natural Language Generation and Machine Translation: Natural Language Generation: Architecture of NLG Systems- Generation Tasks and Representations- Application of NLG. Machine Translation: Problems in Machine Translation- Characteristics of Indian Languages- Machine Translation Approaches-Translation involving Indian Languages.

Reference Books

1. Edward Loper, Ewan Klein, and Steven Bird, Natural Language Processing with Python, , O'Reilly Publication 2009.;
2. Christopher D. Manning, Hinrich Schütze ,Foundations of Statistical Natural Language Processing , MIT press,1999.
3. Dan Jurafsky, James H. Martin, Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition, Prentice Hall, 2009.

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MCPE – 209: Image Processing

Unit – I

Introduction: -Fundamental Steps in Digital Image Processing, Components of an Image Processing System, Image Sensing and Acquisition, Image Sampling and Quantization. **Image**

Enhancement in the Spatial Domain: - Basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations. Basics of Spatial Filtering: Smoothing Spatial Filters, Sharpening Spatial Filters.

Unit – II

Image Transforms such as FT, DCT, and HAAR Transform etc.

Image Enhancement in the Frequency: Introduction to the Fourier Transform and the Frequency Domain, Smoothing Frequency- Domain Filters, Sharpening Frequency Domain Filters.

Unit – III

Image Restoration: Model Of the Image Degradation/Restoration Process, Restoration in the Presence of Noise Only Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Linear, Position-Invariant Degradations, Estimating the Degradation Function.

Image Compression: Fundamentals, Image Compression Models, Error Free Compression, Lossy Compression.

Morphological Image Processing Preliminaries, Dilation and Erosion, Opening and Closing the Hit – or Morphological Algorithms

Unit – IV

Image Segmentation: Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation, The Use of Motion in Segmentation.

Representation and Description: Representation, Descriptors, Use Of principal Components for description, Relational Descriptors.

Reference Books

1. R.C.Gonzalez and R.E.Woods, **Digital Image Processing**, Prentice Hall.
2. B.Chanda, and D.Dutta Majumder, **Digital Image Processing and Analysis**, Prentice-Hall Pvt.Ltd, 2000

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MCPE – 210: High Performance Computing

Objective: To introduce various High-performance computing environments and implementation issues.

Unit – I

Introduction to Parallel Computing Introduction Computational Demands - Two real-time needs - Parallel Processing Terminology - Data, Temporal and Control Parallelisms - Flynn's Taxonomy Processor arrays, Multiprocessors, Multicomputer - Fundamental Algorithms - Broadcasting and All-prefix-sums Criteria for Complexity Analyses.

Unit – II

Parallel Algorithms: Parallel algorithms on various models with complexity analyses for selection, merging sorting and searching problems. Introduction to Parallel Programming Languages - CS and Sequent C - Comparison of Parallel Computing with Supercomputing and Distributed Computing.

Unit – III

Introduction to Distributed Computing Message Passing Model - Message passing, general programming models and PVM-Remote Procedure Call - Parameter passing, locating the server, Semantics in the presence of failures, security, Problem Areas.

Unit – IV

Grid Computing: Introduction - Definition, Evolution and Elements - Current Perspective - Definition, block Diagram, Grid Computing Business areas and Applications - Grid Computing Infrastructure and vulnerability security Issues-Resource Management.

Unit – V

Cluster Computing: Introduction - Cluster Computer and its Architecture, Parallel Applications and Their Development - Strategies for Developing Parallel Applications - Code Granularity and Levels of Parallelism - Parallel Programming Models and Tools Parallel Languages, Message Passing, Virtual Shared Memory, Parallel Object-Oriented Programming, Programming Skeletons - Methodical Design of Parallel Algorithms - Partitioning, Communication, Agglomeration or Mapping.

Reference Books

1. A.Y.Zomaya, "Parallel and Distributed Computing handbook", 1995, McGrawHill Professional.
2. Michael J.Quinn, "Parallel Computing: Theory and Practice", Second Edition, 1994, Tata McGrawHill, Inc
3. M. Sasaikumar, Dinesh Shikhare, P.Ravi Praksh , "Introduction to Parallel Processing", 2000, PHI.
4. Joshy Joseph, Creig Fellenstein, "Grid Computing", 2003, PHI

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LIST OF COURSES WITH CONTENTS FOR ELECTIVE - 3

MCPE – 301: Embedded Systems

Unit – I

Introduction to embedded systems hardware needs; typical and advanced, timing diagrams, memories (RAM, ROM, and EPROM) Tri state devices, Buses, DMA, UART and PLD's Built-in on the microprocessor. Interrupts basics, ISR; Context saving, shared data problem. Atomic and critical section, Interrupt latency.

Unit – II

Survey of software architectures, Round Robin, Function queue scheduling architecture, Use of real time operating system. RTOS, Tasks, Scheduler, Shared data reentrancy, priority inversion, mutex binary semaphore and counting semaphore. Inter task communication, message queue, mailboxes and pipes, timer functions, events Interrupt routines in an RTOS environment.

Unit – III

Embedded systems of forwarded sign RTOS Hard real-time and soft real time system principles, Task division, need of interrupt routines, shared data. Embedded Software development tools.

Unit – IV

Host and target systems, cross compilers, linkers, locators for embedded systems. Getting embedded software into the target system. Debugging techniques. Testing on host machine, Instruction set emulators, logic analyzers In-circuit emulators and monitors.

Reference Books

1. David A . Simon, An Embedded Software Primer, Pearson Education.
2. Daniel W. Ewis, Fundamentals of Embedded Software Where C and Assembly Meet, Pearson Education.
3. Oliver H. Baileg, Embedded System: Desktop Integrations, Wordware Publishing Inc.
4. Tammy Noergaard Newnes, Embedded System Architecture.

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MCPE – 302: Modeling and Computer Simulation

Objective: To introduce the concept of System Modeling and Computer Simulation.

Unit – I

Introduction to simulation and simulation Software: Systems - Models - Types, Components, Steps in Modeling - Simulation - Definition Examples - Steps in Computer Simulation - Advantages and Disadvantages of Simulation - Techniques - Monte Carlo Simulation - Types of Simulation - Lag Models - Cobweb Models - Simulation Languages - GPSS, DYNAMO.

Unit – II

Simulation of Statistical Queuing Manufacturing and Material Handling: Useful Statistical Models - Discrete Distribution - Continuous Distributions Poisson Empirical Distribution - Manufacturing and Material Handling System - Models - Goals and Performances Measure - Issues in Simulating - Queuing System Characteristics Transient and Steady-State Behavior of Queues - Long-Run Measures - Infinite Population Markovian Models.

Unit – III

Random Numbers: Generation of Pseudo Random Numbers - Mid-Square Method - Linear Congruential Generators - Generating Random Variates from Continuous and Discrete Probability Distributions.

Unit – IV

System Dynamics and Object-Oriented Approach in Simulation: Generalization of Growth Models - System Dynamics Diagram Decision Function Multi Segment Model - Representation of Time Delays * Inventory and Flow Distribution Systems - World Model - Object Oriented Approach - Rule Based Approaches for Simulation - Casual Loops - Flow Diagrams- Levels and Rates ^m - Simple examples of Animation.

Unit – V

Analysis of Simulation: Analysis of Simulation - Input - Output - Verification and Validation of Simulation Models Comparison and Evaluation of Alternative System Design.

Reference Books

1. J.Banks, John.S.Carson and B.L.Nelson, "Discrete Event System Simulation",
2. Geoffrey Gordon, "System Simulation", 2nd Edn., 1989, PHI
3. A.Milan and W.D. Kelton, "Simulation Modeling & Analysis", 1991, McGraw Hill
4. Narsingh Deo, "System Simulation with Digital Computers", 1993, PIII
5. Nancy Roberts et al, "Introduction to Computer Simulation - A System Dynamics Approach", 1983, Addison Wisely

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MCPE – 303: Principles of Programming Languages

Unit – I

Preliminary Concepts: High Level Languages, Issues in Programming - Case studies, Programming paradigms, Language implementation. Syntactic Structure - Language representation, Abstract Syntax tree, -Lexical syntax, Context Free Grammars, Variants of CFG, Issues Involved and Normal Forms for CFG.

Unit – II

Imperative Languages: Structured Programming - Need and Design issues. Block types arrays, records, sets, pointers, procedures, parameter passing, scope rules(in C).

Unit – III

Object Oriented Languages: Grouping of data and Operations - Constructs for Programming Information Hiding, Program Design with Modules, Defined types, Template programming - concept of Object, inheritance, Derived classes and Information hiding C++ as example language).

Unit – IV

Functional Programming: Functional Programming - Features, Implementation, Types - values and operations, Product of types. Lists and Operations on Lists, Functions from a domain to a range, Function Application, Lexical Scope. Bindings of values and functions (Using Haskell as example language)

Unit – V

Logic Programming: Formal Logic Systems, Working with relations and their implementation. (Using Prolog as example). Database query Languages, Exception handling (Using SQL as example)

Reference Books

1. Pratt, Zeilinkowitz, "Programming Languages: Design and Implementation Edition, 1998, PHI
2. Ravi Sethi, "Programming Language Concepts and Constructs", Addison Wesley, 1989
3. Doris Appleby, Julius J. Vandekopple, "Programming Languages: Paradigms and Practice", McGraw Hill, 1997
4. Damir Medak and Gerhard Navratil, "Haskell-Tutorial", Available on the Web, Feb 2003.
5. Paul Hudak, John Peterson and Joseph H. Fasel, "A gentle Introduction to Haskell-98", Available on the Web, Oct 1999.

MCPE – 304: Soft Computing

Unit – I

Introduction to soft computing: Concept of computing systems, soft computing versus Hard computing, characteristics of soft computing, some applications of soft computing techniques.

Unit – II

Fuzzy logic: Introduction to Fuzzy logic, Fuzzy sets and membership functions, Operations on Fuzzy sets, Fuzzy relations, rules, propositions, implications and inferences, Defuzzification techniques, Fuzzy logic controller design, Some applications of Fuzzy logic.

Unit – III

Genetic Algorithms: Concept of "Genetics" and "Evolution" and its application to probabilistic search techniques, Basic GA framework and different GA architectures, GA operators: Encoding, Crossover, Selection, Mutation, etc. Solving single-objective optimization problems using GAs.

Unit – IV

Multi-objective Optimization Problem Solving: Concept of multi-objective optimization problems (MOOPs) and issues of solving them, Multi-Objective Evolutionary Algorithm (MOEA), Non-Pareto approaches to solve MOOPs, Pareto-based approaches to solve MOOPs, Some applications with MOEAs.

Unit – V

Artificial Neural Networks: Biological neurons and its working, Simulation of biological neurons to problem solving, Different ANNs architectures, Training techniques for ANNs, Applications of ANNs to solve some real life problems.

Reference Book

1. Introduction to soft computing, Samir Roy, Udit Chakraborty, Pearson Publication
2. Principle of soft computing S.N Deepa Wiley International .

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MCPE – 305: Cloud and Grid Computing

Unit – I

Introduction: Evolution of Distributed computing: Scalable computing over the Internet – Technologies for network-based systems – clusters of cooperative computers – Grid computing Infrastructures – cloud computing – service oriented architecture – Introduction to Grid Architecture and standards – Elements of Grid – Overview of Grid Architecture. Grid Services: Introduction to Open Grid Services Architecture (OGSA) – Motivation – Functionality Requirements – Practical & Detailed view of OGSA / OGSF – Data intensive grid service models – OGSA services.

Unit – II

Virtualization: Cloud deployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software – Pros and Cons of cloud computing – Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data center automation.

Unit – III

Programming Model 9 Open source grid middleware packages – Globus Toolkit (GT4) Architecture, Configuration – Usage of Globus – Main components and Programming model – Introduction to Hadoop Framework – MapReduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job – Design of Hadoop file system, HDFS concepts, command line and java interface, dataflow of File read & File write.

Unit – V

Security 9 Trust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure – Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.

Reference Books

1. Kai Hwang, Geoffrey C. Fox and Jack J. Dongarra, "Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet", First Edition, Morgan Kaufman Publisher, an Imprint of Elsevier, 2012.
2. Jason Venner, "Pro Hadoop- Build Scalable, Distributed Applications in the Cloud", A Press, 2009.
3. Tom White, "Hadoop The Definitive Guide", First Edition. O'Reilly, 2009.
4. Bart Jacob (Editor), "Introduction to Grid Computing", IBM Red Books, Vervante, 2005.
5. Ian Foster, Carl Kesselman, "The Grid: Blueprint for a New Computing Infrastructure", Morgan Kaufmann, 2nd Edition.
6. Frederic Magoules and Jie Pan, "Introduction to Grid Computing" CRC Press, 2009.
7. Daniel Minoli, "A Networking Approach to Grid Computing", John Wiley Publication, 2005

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MCPE – 306: Android Application

Unit – I

Introduction to Android Operating System: Android OS design and Features – Android development framework, SDK features, Installing and running applications on Eclipse platform, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools Android application components – Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes Android Application Lifecycle – Activities, Activity lifecycle, activity states, monitoring state changes.

Unit – II

Android User Interface: Measurements – Device and pixel density independent measuring units Layouts – Linear, Relative, Grid and Table Layouts User Interface (UI) Components – Editable and non editable Text Views, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers Event Handling – Handling clicks or changes of various UI components Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities

Unit – III

Intents and Broadcasts: Intent – Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity Notifications – Creating and Displaying notifications, Displaying Toasts.

Unit – IV

Persistent Storage: Files – Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences – Creating shared preferences, saving and retrieving data using Shared Preference Database – Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and deleting data, Registering Content Providers, Using content Providers (insert, delete, retrieve and update). Advanced Topics: Alarms– Creating and using alarms Using Internet Resources – Connecting to internet resource, using download manager Location Based Services – Finding Current Location and showing location on the Map, updating location.

Reference Books

1. RetoMeier,,Professional Android 4 Application Development, Wiley India, (Wrox) , 2012.
2. James C Sheusi,,Android Application Development for Java Programmers, Cengage Learning, 2013
3. Wei-MengLee,,Beginning Android 4 Application Development, Wiley India (Wrox), 2013

MCPE – 307: Mobile Computing

Unit – I

Introduction: Mobile Computing – Mobile Computing Vs wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes

Unit – II

Mobile Internet Protocol and Transport Layer: Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP- Adaptation of TCP Window – Improvement in TCP Performance. Mobile Telecommunication System: Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS)

Unit – III

Mobile Ad-Hoc Networks: Ad-Hoc Basic Concepts – Characteristics – Applications – Design Issues – Routing – Essential of Traditional Routing Protocols – Popular Routing Protocols – Vehicular Ad Hoc networks (VANET) – MANET vs VANET – Security.

Unit – 4

Mobile Platforms and Applications: Mobile Device Operating Systems – Special Constrains & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – M Commerce – Structure – Pros & Cons – Mobile Payment System – Security Issues.

Mobile Platforms And Applications: Mobile Device Operating Systems – Special Constrains & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – M Commerce – Structure – Pros & Cons – Mobile Payment System – Security Issues.

Reference Books

1. Prasant Kumar Pattnaik, Rajib Mall, "Fundamentals of Mobile Computing", PHI Learning Pvt. Ltd, New Delhi – 2012.
2. Jochen H. Schiller, "Mobile Communications", Second Edition, Pearson Education, New Delhi, 2007.
3. Dharma Prakash Agarwal, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
4. UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, 2003
5. William.C.Y.Lee, "Mobile Cellular Telecommunications-Analog and Digital Systems", Second Edition, TataMcGraw Hill Edition, 2006.
6. C.K.Toth, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2002.

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MCPE – 308: E – Commerce

Unit – I

IT and business, various applications of IT in business field. History of e-commerce, definition, classification- B2B, B2C, C2C, G2C, B2G sites, e-commerce in education, financial, auction, news, entertainment sectors, Doing ecommerce., EDI and its components

Unit – II

Electronic payment systems – credit cards, debit cards, smart cards, e-credit accounts, e-money, EFT, security concerns in e commerce, authenticity, privacy, S-HTTP, Secure e-mail protocols, integrity, non-repudiation, encryption, secret key cryptography, public key cryptography, SET, SSL, digital signatures, firewalls.

Unit – III

Internet Marketing Phase, Marketing on the web, marketing strategies, creating web presence, advertising, customer service and support, web branding strategies, web selling models.

Unit – IV

E-commerce; case study of two internationally successful e-commerce web sites and two Kerala-based e-commerce web sites; IT act (India) and e-commerce.

Reference Books

1. C. S. V. Murthy, E-Commerce, Himalaya Publishing House.
2. NIIT, Basics of E-Commerce, PHI.
3. Erfan Turban et. al., Electronic Commerce–A Managerial Perspective, Pearson Education.
4. R Kalokota, Andrew V. Winston, Electronic Commerce – A Manager's Guide, Pearson Education.

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