

SRI VENKATESWARA UNIVERSITY, TIRUPATI

Department of Computer Science

ADOPTION OF CBCS SYSTEM FOR TWO YEAR MCAPROGRAMME WITH EFFECT FROM 2020-21

MCA III SEMESTER

MCA 301: Software Engineering

UNIT I

Software and Software Engineering: Introduction, Software, Software Myths, Software Engineering-Process:- Software Engineering, Software Processes models; Evolutionary process Models, Component based development; Formal Methods Model, Fourth generation Techniques. An Agile view of processes and Development: Software Engineering practice – Software Engineering, communication, planning, modeling, construction practices and deployment.

UNITII

System Engineering: Computer-based systems, the system engineering Hierarchy, business process engineering, product engineering and system modeling. Building the analysis model, Requirement analysis, modeling approaches, data modeling, Behavioral model.

UNIT –III

Design Engineering: Design process and quality, design concepts the design model, and pattern-used software design. Architectural design: Software architecture, data design, architectural styles and patterns, architectural design mapping data flow into software architecture. Component-based software engineering, Critical systems development, Software reuse, User interface design, web apps design issues and architecture design.

UNIT –IV

Testing strategies: Strategies and issues, testing strategies for and object-oriented software. Validation testing and system testing. Software testing tactics: Fundamentals, black-box and white-box testing white-box testing basis path testing. Control structure testing, Black-box testing, Object-oriented testing methods. Testing methods applicable at the class level inter class testing case design.

UNIT V

Product Metrics: Software quality, framework, metrics for analysis model design model, source case and testing. Managing Software Projects: The management spectrum, the W⁵ HH principle, metrics in process, software measurement, Estimation: Observations, Decomposition Techniques, Empirical Models, Estimation For Object-Oriented Projects Other Estimation Techniques, Project Scheduling, Risk Management, Reengineering.

Text Books:

1. Roger, S, Pressman, Software Engineering, A Practitioner's Approach, Six Edition, McGraw-Hill, International Edition, 2005.
2. Ian Sommerville, Software Engineering, Pearson Education, 8th Edition.
- 3.

Reference Books:

1. James F Peters, Software Engineering, John Wiley
2. Waruan S Jawadekar, Software Engineering, Tata McGraw Hill, 2004.
3. Carlo Ghezzi, Mehdi Jazayeri, Dino Manrioli, Fundamentals of Software Engineering, PHI, 2001
PankajJalote, An Integrated approach to Software Engineering Narosa

MCA 302: Computer Graphics

UNIT I

Overview of Graphics systems, Application areas of Computer Graphics, video-display devices, Raster-scan systems, random scan systems, graphics monitors and workstations and input devices. Output primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms.

UNIT II

Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms. 2-D Geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates.

UNIT III

2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm.

UNIT IV

3-D Object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-spline curves, Bezier and B-spline surfaces. Basic illumination models, polygon rendering methods.

UNIT V

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

Computer Animation: Design of animation sequence, general computer animation functions, Raster animations, Computer animation languages, Key frame systems

Text Books:

1. Donald Hearn and M.Pauline Baker, Computer Graphics C Version, Second Edition, Pearson Educations.2005.

Reference Books:

1. Steven Harrington (1987), Computer Graphics – A Programming Approach, Second Edition, McGraw – Hill International Editions.
2. William M. Newman and Robert F. Sprowli (1979), Principles of Interactive Computer Graphics, second Edition, McGraw – Hill International Editions.

MCA 303:Web Technologies

UNIT I

Introduction to Internet-Browser Architecture-IE: Chrome-Search Engines-Introduction to HTML-5-HTML-5 Tags-Audio, Video Tags – HTML-5 Forms-Controls-CSS Styling-CSS Tags-Attributes.

UNIT II

Java Script-JQuery: JavaScript Programming Scripts- Control structures- Functions-Document, Browser, Date, Math, String objects-Events- JQuery Libraries-JQuery Objects, Functions – JQuery Events-Animations.

UNIT III

AJAX Concepts: Simple AJAX objects-Ajax Libraries-Examples, Webservers IIS, Tomcat-Hosting Website in a Web servers.

UNIT IV

Introduction to PHP: Control Structures-Arrays-Functions-Database connectivity-Introduction to ZEND Framework and applications

UNIT-V

Introduction to Java Servlets: Servlet classes and interfaces - Java Database Connectivity- Introduction to JSP-Java Server Page scriptlets -JSP Objects-JSP Web applications.

Text Books:

Deitel, Deitel and Goldberg Internet & World Wide Wide how to program”by End. Pearson Education

Ivan Bayross, Webenabled commercial Application Development in Java 2.0 BPB.

HTML 5 Black book, Kogent Learning Solutions Inc.

Reference Books:

Raj Kamal Internet and web Technologies, Tata McGraw Hill, 2002.

Chirs Bates, Web Programming, John Wiley, 2nd Edition

MCA 304A: Data Warehousing and Datamining

UNIT I

Data warehousing and OLAP:Data Warehouse basic concepts, Data Warehouse Modelling, Data Cube and OLAP: Characteristics of OLAP systems, Multidimensional view and Data cube, Data Cube Implementations, Data Cube operations, Implementation of OLAP and overview on OLAP Software.

UNIT II

Data Mining and its Applications :Introduction, What is Data Mining, Motivating Challenges, Data Mining Tasks, Which technologies are used for data mining, Kinds of pattern that can be mined, Data Mining Applications, Data Pre-processing, Data cleaning, data integration, data reduction and data transformation.

UNIT III

Association Analysis: Basic Concepts and Algorithms :Frequent Item set Generation, Rule Generation, Compact Representation of Frequent Item sets, Alternative methods for generating Frequent Item sets, FP Growth Algorithm, Evaluation of Association Patterns

UNIT IV

Classification: Methods, Improving accuracy of classification:Basics, General approach to solve classification problem, Decision Trees, Rule Based Classifiers, NearestNeighbour Classifiers. Bayesian Classifiers, Estimating Predictive accuracy of classification methods, Improving accuracy of classification methods, Evaluation criteria for classification methods, Multiclass Problem.

UNIT V

Clustering Techniques: Overview: Features of cluster analysis, Types of Data and Computing Distance, Types of Cluster Analysis Methods, Partitional Methods, Hierarchical Methods, Density Based Methods, Quality and Validity of Cluster Analysis

Text Books:

1.Jiawei Han and MichelineKamber: Data Mining - Concepts and Techniques, 2nd Edition, Morgan Kaufmann Publisher, 2006.

2.Pang-Ning Tan, Michael Steinbach, Vipin Kumar: Introduction to Data Mining, Addison- Wesley, 2005.

Reference Books:

1. Arun K Pujari: Data Mining Techniques University Press, 2nd Edition, 2009.

2. G. K. Gupta: Introduction to Data Mining with Case Studies, 3rd Edition, PHI, New Delhi, 2009.

3. Alex Berson and Stephen J.Smith: Data Warehousing, Data Mining, and OLAP Computing McGrawHill Publisher, 1997

MCA 304B:Big Data Analytics

UNIT I

What is Big Data : Varieties of Data – Unstructured data – Trends in Data Storage - Basically Available Soft State Eventual Consistency (BASE) - Industry Examples of Big Data.

NIT - II

Big Data Technology: New and older approaches – Data Discovery –Terminologies used in Big Data Environments- Open Source technologies for Big Data Analytics – Cloud and Big Data – Big Data Foundation – Computation – Limitations – Big Data Emerging Technologies.

UNIT III

Business Analytics –Consumption of Analytics – Creation to Consumption of Analytics – Data visualization by Organizations – 90/10 rule of critical thinking – Decision sciences and analytics – Learning over knowledge – Agility – Scale and convergence – Privacy and security in Big Data.

UNIT IV

Predictive Analytics – Target Definition - Linear Regression – Logistic Regression - Decision trees – Neural Networks – Support Vector machines - Classification trees – Ensemble methods – Association Rules – Segmentation , Sequence Rules, Social Network analytics.

UNIT V

Hadoop – Why Hadoop? – Why not RDBMS? – RDBMS Versus Hadoop - Components of Hadoop – Hadoop File System – Hadoop Technologies Stack – Managing Resources and Applications with Hadoop YARN - Dataware housing Hadoop Concepts – Applications of Hadoop using PIG,YARN,HIVE.

Text Books

1. Big Data and Analytics, seemaAcharya ,Subhashinichellapan, Wiley publicaitons
2. Baesens, 2014, Analytics in a Big Data World: The Essential Guide to Data Science and Its applications, Wiley India Private Limited

Reference Books

“Big Data Analytics: Systems, Algorithms, Applications” **Prabhu, C.S.R., SreevallabhChivukula, A., Mogadala, A., Ghosh, R., Livingston, L.M.J.**

MCA 304C: System Programming

UNIT I

Background introduction, system software and machine architecture, SIC, RISC, and CISC architecture. Assembler: basic assembler functions, machine dependent and independent assembler features, assembler design options, and implementation examples.

UNIT II

Loading and linkers basic loader junction, machine dependent and independent loader features, loader design options and implementation examples. Macro processors, basic macro processor functions machines – independent macro processor features, macro processor design options, implementation examples.

UNIT III

Compilers: basic compiler functions, machine dependent and independent compiler features, compiler design options and implementation examples. Other system software: text editors and interactive debugging systems

UNIT-IV

Introduction to Device Drivers, Design issues-Types of Drivers, Character driver-1 and Design issues, Character Driver-2- A/D converter and its design issues, Block driver-1 and its design issues.

UNIT-V

Introduction to Linux- Linux Architecture- X-windows- Linux administration tools - Commands to use Linux OS- Executing Linux Shell scripts – Shell Programming concepts-Shell scripts.

Text Books:

1. Leland .Beck, System Software: An Introduction to systems programming :3/e, Pearson Educations Asia,2003.
2. George pajari, Writing Unix Drivers, Addison – Wesley, 1991.

Reference Books:

1. Richard Petersen, Linux complete Reference, McGraw Hill Education (India) Private Limited; 6 edition (21 November 2007)
2. Dhamdhere, System programming and operation Systems Book 2/E, Tata McGraw, Hill, 1999

MCA 305A:Cryptography and Network Security

UNIT I

Cryptography – Terminology, Conventional Encryption Model, Steganography, Classical Encryption Techniques, DES Data Encryption Standard, Block Cipher Design principles and Modes of Operation.

UNIT II

Conventional Encryption Algorithms: Triples DES, International Data Encryption Algorithm, Blowfish, RC5, Characteristics of advanced symmetric Block Ciphers, Confidentiality using Conventional Encryption.

UNIT III:

Public-Key Cryptography, Introduction to Number Theory: Prime Numbers, Modular Arithmetic, Euler’s Theorem, Primary and Factorization, discrete logarithm, D-H Key sharing technique, RSA and its variants-Homomorphic Encryption Techniques Message Authentication and Hash Functions – Hash and MAC algorithms..

UNIT IV

Digital, Signatures and authentication Protocols, Digital Signature Standard, Network Security Practice, Authentication Applications. Basic overview of Electronic Mail Security: pretty Good Privacy’s/MIME: IP Security, Web Security – Intruders, Viruses and Worms – Firewalls.

UNIT V

Mobile Security, Risk Model, EcoSystem, Service Risks, App Risks, Countermeasures- Cloud Computing Security- Threats-Security in Cloud.Security at service layers. Introduction to Block chain, Crypto currency, BitCoin Security and working, *Ethereum*.

Text Books

1. Cryptography and Network Security – by William Stallings, Principles and Practice, 7th Edition,Pearson
2. Cryptography and Network Security, by John Wiley, Edn.,2001
- 3.

Reference Books

1. Bruce Schneier, Applied Cryptography, John Wiley, Second Edn,2001.
2. Charke Kaufman, Rodia Perlman and Mike Speciner, Network Security

MCA 305B: Artificial Intelligence

UNIT I

Introduction Concept of AI, history, current status, scope, agents, environments, Problem Formulations, Review of tree and graph structures, State space representation, Search graph and Search tree

UNIT II

Random search, Search with closed and open list, Depth first and Breadth first search, Heuristic search, Best first search, A* algorithm, Game Search.

UNIT III

Probability, conditional probability, Constraint Satisfaction, Propositional Logic & Satisfiability, Uncertainty in AI, Bayes Rule, Bayesian Networks- representation, construction and inference, temporal model, hidden Markov model.

UNIT IV

MDP formulation, utility theory, utility functions, value iteration, policy iteration and partially Observable MDPs.

UNIT V

Passive reinforcement learning, direct utility estimation, adaptive dynamic programming, temporal difference learning, active reinforcement learning- Q learning. Introduction to Machine learning ,Deep Learning.

Text Books

1. Stuart Russell and Peter Norvig, “Artificial Intelligence: A Modern Approach” , 3rd Edition, Prentice Hall
2. Elaine Rich and Kevin Knight, “Artificial Intelligence”, Tata McGraw Hill

Reference Books

1. Saroj Kaushik, “Artificial Intelligence”, Cengage Learning India, 2011
2. David Poole and Alan Mackworth, “Artificial Intelligence: Foundations for Computational Agents”, Cambridge University Press 2010.

MCA 305C: Mobile Application Development

UNIT I

Introduction to mobile applications – Embedded systems - Market and business drivers for mobile applications – Publishing and delivery of mobile applications – Requirements gathering and validation for mobile applications

UNIT II

Basic Design :Introduction – Basics of embedded systems design – Embedded OS - Design constraints for mobile applications, both hardware and software related – Architecting mobile applications – User interfaces for mobile applications – touch events and gestures – Achieving quality constraints – performance, usability, security, availability and modifiability.

UNIT III

Advanced Design: Designing applications with multimedia and web access capabilities – Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing.

UNIT IV

Technology I - Android : Introduction – Establishing the development environment – Android architecture – Activities and views – Interacting with UI – Persisting data using SQLite – Packaging and deployment – Interaction with server side applications – Using Google Maps, GPS and Wifi – Integration with social media applications.

UNIT V

Technology II–IOS: Introduction to Objective C – iOS features – UI implementation – Touch frameworks – Data persistence using Core Data and SQLite – Location aware applications using Core Location and Map Kit – Integrating calendar and address book with social media application

Text Books

1. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012
2. Charlie Collins, Michael Galpin and Matthias Kappler, "Android in Practice", DreamTech, 2012

Reference Books

1. <http://developer.android.com/develop/index.html>
2. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, "Beginning iOS
3. Development: Exploring the iOS SDK", Apress, 2013.

MCA IV SEMESTER
MCA 401A: Cloud Computing

UNIT I

Cloud Architecture and Model: Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture, Cloud Models: Characteristics – Cloud Services – Cloud models (IaaS, PaaS, SaaS) – Public Vs Private Cloud – Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

UNIT II

Virtualization: Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-center Automation. VMWare, Virtual Box Virtualization software.

UNIT III

Cloud Infrastructure: Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources. Federation in the Cloud – Four Levels of Federation – Federated Services and Applications – Future of Federation

UNIT IV

Programming Model: Parallel and Distributed Programming Paradigms – MapReduce , Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support – Software environments for service development; Amazon, Azure, GoogleApp Engine, AWS - Cloud Environments - Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim. Cloud Storage – Storage-as-a-Service – Advantages of Cloud Storage – Cloud Storage Providers – S3.

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