# SCHEME OF INSTRUCTION

## MCA (MASTER OF COMPUTER APPLICATIONS)

### Proposed scheme with effect from the academic year 2018-2019

## Semester -V

| S.No | Course Code | Course Title | Scheme of Instruction | | | Contact Hrs/Wk | Scheme of Examination | | Credits |
|------|-------------|--------------|---|---|---|---|---|---|---|
| | | | L | T | P | | CIE | SEE | |
| **Theory** | | | | | | | | | |
| 1. | PC501IT | Information Security | 3 | 1 | 0 | 4 | 30 | 70 | 3 |
| 2. | PC502IT | Object Oriented System Development | 3 | 1 | 0 | 4 | 30 | 70 | 3 |
| 3. | PC503IT | Big Data Analytics | 3 | 1 | 0 | 4 | 30 | 70 | 3 |
| 4. | PE# | Professional  Elective-II | 3 | 1 | 0 | 4 | 30 | 70 | 3 |
| 5. | PE# | Professional  Elective-III | 3 | 1 | 0 | 4 | 30 | 70 | 3 |
| **Practicals** | | | | | | | | | |
| 6. | PC551IT | Object Oriented System Development Lab | 0 | 0 | 3 | 3 | 25 | 50 | 2 |
| 7. | PC552IT | Big Data Analytics Lab | 0 | 0 | 3 | 3 | 25 | 50 | 2 |
| 8. | PC553IT | Project Seminar | - | - | 2 | 2 | 25 | - | 1 |
| | | **Total** | 15 | 5 | 08 | 28 | 225 | 450 | 20 |

**Professional Elective-II**

PE 510 IT   Electronic Commerce
PE 511 IT   Human Computer Interaction
PE 512 IT   Software Reuse Techniques
PE 513 IT   XML &Web Services
PE 514 IT   Cloud Computing
PE 515 IT   System Administration

**Professional Elective- III**

PE 516 IT   Soft Computing
PE 517 IT   Mobile Computing
PE 518 IT   Software Project Management
PE 519 IT   Rich Internet Applications
PE 520 IT   Software Quality  and  Testing
PE 521 IT   Research Methodology

**PC 501 IT**                                **INFORMATION SECURITY**
*Credits: 3*

*Instruction: (3L +1T) hrs per week*                 *Duration of SEE: 3 hours*
*CIE: 30 marks*                                       *SEE: 70 marks*

**UNIT-I**
Introduction: History, Critical characteristics of information, NSTISSC security model, Components of an information system, Securing the components, Balancing security and access, The SDLC, The security SDLC. Need for Security: Business needs, Threats, Attacks- secure software development.

**UNIT-II**
Legal, Ethical and professional Issues: Law and ethics in information security, Relevant U.S laws-international laws and legal bodies, Ethics and information security.
Risk Management: Overview, Risk identification, Risk assessment, Risk control strategies, selecting a risk control strategy, Quantitive versus qualitative risk control practices, Risk management discussion points, Recommended risk control practices.

**UNIT-III**
Planning for Security: Security policy, Standards and practices, Security blue print, Security education, Continuity strategies.
Security Technology: Firewalls and VPNs,  Physical design, Firewalls, Protecting remote connections

**UNIT-IV**
Security Technology: Intrusion detection, access control and other security tolls: Intrusion detection and prevention systems, Scanning and analysis tools, Access control devices.
Cryptography: Foundations of cryptology, Cipher methods, Cryptographic Algorithms, Cryptographic tools, Protocols for secure communications, Attacks on cryptosystems.

**UNIT- V**
Implementing Information Security: Information security project management, Technical topics of implementation, Non technical aspects of implementation, Security certification and accreditation.
Security and Personnel: Positioning and staffing security function, Employment policies and practices, Internal control strategies. Information security maintenance : Security management models, The maintenance model, Digital forensics

**Suggested Reading:**
1.  Michel E Withman and Herbert J Mattord, Principles and Practices of Information Security, Cengage Learning, 2009.
2.  Thomas R Peltier, Justin Peltier, John Blackley, Information Security Fundamentals, Auerbach Publications, 2010.
3.  Detmar W Straub, Seymour Goodman, Richard L Baskerville, Information Security, Policy, Processes and Practices, PHI , 2008.
4.  Mark Merkow and Jim Breithaupt, Information Security Principle and Practices, Pearson Education, 2007.

**PC 502 IT**  **OBJECT ORIENTED SYSTEM DEVELOPMENT**
*Credits: 3*

*Instruction: (3L +1T) hrs per week*  *Duration of SEE: 3 hours*
*CIE: 30 marks*  *SEE: 70 marks*

## UNIT – I

UML Introduction **:** , Introduction to UML, Hello World. Basic Structural Modeling: Classes, Relationships, Common Mechanisms, Diagrams, Class Diagrams.

Advanced Structural Modeling **:** Advanced Classes, Advanced Relationships, Relationships, Interfaces, Types and Roles, Packages, Instances, Object Diagrams , Components.

## UNIT – II

Basic Behavioral Modeling**:** Interactions, Use Cases, Use Case Diagrams, Interaction Diagrams, Activity Diagrams.

Advanced Behavioral Modeling**:** Events and signals, State Machines, Processes and Threads, Times and space, State Chart Diagrams.

## UNIT – III

Architectural Modeling**:** Artifacts, Deployment Collaborations, Patterns and Frame works, Artifact diagrams, Deployment diagrams, Systems and models.

## UNIT – IV

Unified Software Development Process**:**  The Unified Process, The Four Ps, A Use- Case- Driven Process, An Architecture, An Architecture – Centric Process, An Iterative and incremental Process.

## UNIT – V

Core Workflows**:** Requirements Capture, Capturing Requirements as Use Cases, Analysis, Design, Implementation, Test.

**Suggested Reading:**

1. Grady Booch, James Rumbaugh, Ivor Jacbson," The Unified Modeling Language – User Guide,
   ", 2nd Edition, Pearson Education, India, 2007.
2. Ivor Jacbson, Grady Booch, James Rumbaugh, "The Unified Software Development Process", Pearson Education, India, 2008.

**PC 503 IT**                                    **BIG DATA ANALYTICS**
                                                      *Credits: 3*

*Instruction: (3L +1T) hrs per week*                 *Duration of SEE: 3 hours*
*CIE: 30 marks*                                       *SEE: 70 marks*

## UNIT – I:
**Getting an overview of Big Data**:  Introduction to Big Data, Structuring Big Data, Types of Data, Elements of Big Data, Big Data Analytics, Advantages of Big Data Analytics.
**Introducing Technologies for Handling Big Data:** Distributed and Parallel Computing for Big Data, Cloud Computing and Big Data, Features of Cloud Computing, Cloud Deployment Models, Cloud Services for Big Data, Cloud Providers in Big Data Market.

## UNIT – II:
**Understanding Hadoop Ecosystem:** Introducing Hadoop, HDFS and MapReduce, Hadoop functions, Hadoop Ecosystem.
**Hadoop Distributed File System**- HDFS Architecture, Concept of Blocks in HDFS Architecture, Namenodes and Datanodes, Features of HDFS. MapReduce.
**Introducing HBase** - HBase Architecture, Regions, Storing Big Data with HBase, Combining HBase and HDFS, Features of HBase, Hive, Pig and Pig Latin, Sqoop, ZooKeeper, Flume, Oozie.

## UNIT- III:
**Understanding MapReduce Fundamentals and HBase:** The MapReduce Framework ,Exploring the features of MapReduce, Working of MapReduce, Techniques to optimize MapReduce Jobs, Hardware/Network Topology, Synchronization, File system, Uses of MapReduce, Role of HBase in Big Data Processing- Characteristics of HBase.
**Understanding Big Data Technology Foundations:** Exploring the Big Data Stack, Data Sources Layer, Ingestion Layer, Storage Layer, Physical Infrastructure Layer, Platform Management Layer, Security Layer, Monitoring Layer, Visualization Layer.

## UNIT – IV:
**Storing Data in Databases and Data Warehouses:** RDBMS and Big Data, Issues with Relational Model,   Non – Relational Database, Issues with Non Relational Database, Polyglot Persistence, Integrating Big Data with Traditional Data Warehouse, Big Data Analysis and Data Warehouse.

## UNIT –V:

**NoSQL Data Management:** Introduction to NoSQL, Characteristics of NoSQL, History of NoSQL, Types of NoSQL Data Models-  Key Value Data Model, Column Oriented Data Model, Document Data Model, Graph Databases, Schema-Less Databases, Materialized Views, CAP Theorem.

**Suggested Reading:**

1. BIG DATA, Black Book TM, DreamTech Press, 2016 Edition.
2. Seema Acharya, Subhasni Chellappan , "BIG DATA and ANALYTICS",  Wiley publications, 2016
3. **Nathan Marz and James Warren, "BIG DATA- Principles and Best Practices of Scalable Real-Time Systems", 2010**

**PE 510 IT**                                   **E- COMMERCE**
                                          *Credits: 3*

*Instruction: (3L +1T) hrs per week*              *Duration of SEE: 3 hours*
*CIE: 30 marks*                                   *SEE: 70 marks*

## UNIT – I
Electronic Commerce – Electronic Commerce Frame Work , Electronic Commerce and Media Convergence, Anatomy of E- Commerce appellations, Electronic Commerce Consumer applications, Electronic Commerce Organization Applications.

Consumer Oriented Electronic Commerce – Consumer- Oriented Applications, Mercantile Process Models, Mercantile Models from the Consumers's Perspective., Mercantile Models from the Merchants's Perspective.

## UNIT – II
Electronic Payment systems – Types of Electronic Payment Systems, Digital Token – Based Electronic Payment Systems , Smart Cards Electronic Payment Systems, Credit Card- Based Electronic Payment Systems, Risk and Electronic Payment systems , Designing Electronic Payment Systems .

## UNIT – III
Inter Organizational Commerce And EDI- Electronic Data Interchange , EDI applications in business, EDI:Legal, Security, and Privacy issues, EDI and Electronic Commerce

EDI Implementation,MIME , and Value added net works.-Standardization and EDI, EDI Software Implementation, EDI Envolope for Message Transport, Value-Added Networks, Internet-Based EDI.

Intraorganizational Electronic Commerce – Internal Information Systems, Work Flow Automation and Coordination, Customization and internal Commerce, Supply chain Management.

## UNIT – IV
Corporate Digital Library – Dimensions of Internal electronic Commerce Systems, Types of Digital Documents, Issues behind Document Infrastructure, Corporate Data Warehouse

Advertising and Marketing on the Internet – Information based marketing, advertising on Internet, on-line marketing process, market research.

## UNIT –V
Consumer Search and Resource Discovery – Search and Resource Discovery paradigms, Information search and Retrieval, Electronic Commerce catalogues or Directories, information filtering, Consumer-Data Interface3:Emerging Tools.

Multimedia and Digital Video- key multimedia concepts, Digital Video and Electronic Commerce, Desktop video processing, Desktop video conferencing.

**Suggested Reading:**

1. Ravi Kalakota & A . B. Whinstong – " *Frontiers of Electronic Commerce*", Pearson Education, India, 2006.
2. Daniel Minoli, Emma Minoli: *" Web Commerce Technology Handbook"* Tata McGraw Hill 2007
3. J Christopher W, Theodore HKC, Global Electronic Commerce: Theory and Case Studies. Universities Press, 2001

**PE 511 IT**                    **HUMAN COMPUTER INTERACTION**
*Credits: 3*

*Instruction: (3L) hrs per week*                    *Duration of SEE: 3 hours*
*CIE: 30 marks*                    *SEE: 70 marks*

## UNIT- I

**Interaction Paradigms:** Computing Environments, Analyzing Interaction Paradigms, Interaction Paradigms
**Interaction Frameworks and Styles**: Frameworks for Understanding Interaction, Coping with Complexity, Interaction Styles.

## UNIT- II

**Interaction Design Process:** Iterative Design, User-Centered Design, Interaction Design Models, Overview of Interaction Design Models
**Discovery**: Discovery Phase Framework, Collection, Interpretation , Documentation
**Design**: Conceptual Design, Physical Design, Evaluation, Interface Design Standards, Designing the Facets of the Interface.

## UNIT- III

**Design Principles:** Principles of Interaction Design, Comprehensibility, Learnability, Effectiveness/Usefulness, Efficiency/Usability, Grouping, Stimulus Intensity , Proportion , Screen Complexity, Resolution/Closure, Usability Goals
**Interaction Design Models:** Model Human Processor, Keyboard Level Model, GOMS, Modeling Structure, Modeling Dynamics, Physical Models
**Usability Testing:** Usability, Usability Test, Design the Test, Prepare for the Test, Perform the Test, Process the Data

## UNIT- IV

**Interface Components:** The WIMP Interface, Other Components
**Icons**: Human Issues Concerning Icons, Using Icons in Interaction Design, Technical Issues Concerning Icons
**Color:** The Human Perceptual System, Using Color in Interaction Design, Color Concerns for Interaction Design, Technical Issues Concerning Color

## UNIT- V

**Text**: Human Issues Concerning Text, Using Text in Interaction Design, Technical Issues Concerning Text
**Speech and Hearing**: The Human Perceptual System, Using Sound in Interaction Design, Technical Issues Concerning Sound
**Touch and Movement:** The Human Perceptual System, Using Haptics in Interaction Design, Technical Issues Concerning Haptics

**Suggested Reading:**

1. Steven Heim, *The Resonant Interface: HCI Foundations for Interaction Design*, Addison-Wesley, 2007
2. J. Preece, Y. Rogers, and H. Sharp, *Interaction Design: Beyond Human-Computer Interaction*, Wiley & Sons, 2nd Edition, 2007
3. Ben Shneiderman , Catherine Plaisant, *Designing the User Interface: Strategies for Effective Human-Computer Interaction*, Addison-Wesley, 5th Edition, 2009.

**PE 512 IT**                     **SOFTWARE REUSE TECHNIQUES**

*Credits: 3*

*Instruction: (3L) hrs per week*                  *Duration of SEE: 3 hours*
*CIE: 30 marks*                                    *SEE: 70 marks*

**UNIT-I**
Software reuse success factors, Reuse driven software engineering business, Object oriented software engineering, applications and component sub systems, use case components, object components.

**UNIT-II**
Design Patterns – Introduction, Creational patterns, factory, factory method, abstract factory, singleton, builder prototype.

**UNIT-III**
Structural Patterns- Adapters, bridge, composite, decorator, façade, flyweight, proxy.
Behavioral Patterns – Chain of responsibility, command, and interpreter.

**UNIT-IV**
Behavioral Patterns – Iterator, mediator, memento, observer, state, strategy, template, visitor, other, design patterns- Whole part, master- slave, view handler, forwarder- receiver, client – dispatcher- server, publisher – subscriber.

**UNIT-V**
Architectural patterns – Layers, pipes and filters, black board, broker ,model - view controller, presentation- abstraction – control, micro kernel, reflection.

**Suggested Reading:**
1. Ivar Jacabson, Martin Griss, Patrick Hohson – Software Reuse. Architecture, Process and Organization for Bussiness Success, ACM Press, 1997.
2. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides – Design Patterns- Addison, 1995, Pearson Education.
3. Frank Buschmann etc. – Pattern Oriented Software Architecture – Volume 1, Wiley 1996.
4. James W Cooper – Java Design Patterns, a tutorial, Addison 2000, Pearson Education.

**PE 513 IT**                    **XML AND WEB SERVICES**
                                   *Credits: 3*

*Instruction: (3L) hrs per week*                 *Duration of SEE: 3 hours*
*CIE: 30 marks*                                  *SEE: 70 marks*

**UNIT- I** :

Introduction : Role Of XML - XML and The Web - XML Language Basics - SOAP - Web Services - Revolutions Of XML - Service Oriented Architecture (SOA).

**UNIT- II** :

XML Technology : XML Technology**,** XML - Name Spaces - Structuring With Schemas and DTD - Presentation Techniques - Transformation - XML Infrastructure.

**UNIT- III**:

SOAP: Overview Of SOAP - HTTP - XML-RPC - SOAP: Protocol - Message Structure - Intermediaries - Actors - Design Patterns And Faults - SOAP With Attachments.

**UNIT- IV**:

WEB Services: Overview - Architecture - Key Technologies - UDDI - WSDL - ebXML - SOAP And Web Services In E-Com - Overview Of .NET And J2EE.

**UNIT- V**:

XML Security: Security Overview - Canonicalization - XML Security Framework - XML Encryption - XML Digital Signature - XKMS Structure - Guidelines For Signing XML Documents - XML In Practice.

**Suggested Reading:**

1. Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson Education, 2002.
2. Ramesh Nagappan , Robert Skoczylas and Rima Patel Sriganesh, Developing Java Web Services, Wiley Publishing Inc., 2004.
3. Sandeep Chatterjee, James Webber, Developing Enterprise Web Services, Pearson  Education, 2004.
4.  McGovern, et al., Java Web Services Architecture, Morgan Kaufmann Publishers,2005.
   Gustavo A, Fabio C, Harumi K, Vijay M. Web Services: Concepts, Architectures and Applications. Springer (Universities Press), 2004

**PE 514 IT**                  **CLOUD COMPUTING**
*Credits: 3*

*Instruction: (3L) hrs per week*            *Duration of SEE: 3 hours*
*CIE: 30 marks*                             *SEE: 70 marks*

**UNIT-I**

**The Evolution of Cloud Computing:** Hardware Evolution, Internet Software Evolution, Establishing a Common Protocol for Internet, Evolution of IPv6, Finding a common method to Communicate Using the Internet Protocol, Building a Common Interface to the Internet.

**Cloud Formations:** From One Computer to the Grid of Many, Server Virtualization, Parallel Processing, Symmetric Multiprocessing Systems, Massively Parallel Processing Systems.

**UNIT II**

**Web services and the cloud:** Communication-as-a-Service(CaaS), Infrastructure-as-a-Service(IaaS), Monitoring-as-a-Service(MaaS), Platform-as-a-Service(PaaS0,Software-NIS-a-Service(SaaS)

**Building Cloud Networks:** The Evolution from the MSP Model to cloud, Computing and Software-as-a-Service, The cloud Data Center, Collaboration, Service-Oriented Architectures as a Step Toward Cloud Computing, Basic Approach to a Data Center-Based SOA

The Role of Open Source Software in Data Centers, Where Open Source Software Is Used Case Studies: Amazon web services, Google App Engine.

**UNIT III**

**Virtualization:** Introduction, types and technologies, Accomplishing Virtualization, importance of virtualization in Cloud Computing,

**Case studies:** Xen Virtual machine monitor-Xen API, VMware- VMware products- VMware Features, Microsoft Virtual Server-Features of Microsoft Virtual server

**UNIT IV**

Federation in the Cloud, Presence in the Cloud I Privacy and Its Relation to Cloud-Based Information System. Cloud Security Challenges I Software-as-a-Service Security I Security-as-a-Service, the New MSSP.

**UNIT V**

**Common Standards in Cloud Computing:** The Open Cloud Consortium, The Distributed Management Task Force, Standards of Application Developers I Standards for messaging, Internet Messaging Access.      Protocol(IMAP) I Standards for Security.

Examples of End-User Access to Cloud Computing.

**Mobile Internet Devices and the Cloud:** Mobile Operating Systems for Smartphones. Mobile Platform Virtualization I Collaboration Applications for Mobile Platforms.

**Suggested Reading:**

1. John W. Rittinghouse, James F. Ransome, *Cloud Computing: Implementation, Management, and Security*, CRC Press 2009.
2. Ivanka Menken , *Cloud Computing Specialist Certification kit Virtualization*,
3. William von Hagen*, Professional Xen Virtualization*, Wrox Publications, First Edition, 2008.
4. Chris Wolf, Erik M. Halter, *Virtualization: From the Desktop to the Enterprise*, Apress, 2005.
5. David Marshall, Wade A. Reynolds, *Advanced Server Virtualization: VMWare and Microsoft Platform in Virtual Data Center*, Auerbach Publications, 2006.

**Web Resources:**
1. http://aws.amazon.com
2. http://code.google.com/appsengine

**PE 515 IT**                             **SYSTEM ADMINISTRATION**
                                              *Credits: 3*

*Instruction: (3L) hrs per week*                    *Duration of SEE: 3 hours*
*CIE: 30 marks*                                     *SEE: 70 marks*

## UNIT- I

Functions of system administration, UNIX: Files, Processes Devices, file system, essential administrative tools: Grep, awk, files and directory commands, starting and shutdown process.

## UNIT- II

User accounts, security, managing system resources : System performance, managing CPU usage, memory, disk I/O automating tasks with scripts.

## UNIT- III

File system and Disks: Mounting, adding disks, CD-Rom devices, and backup and restore terminals modems and printers.

## UNIT- IV

TCP/IP Network Management: TCP/IP networking, adding a new host, NFS/NIS, monitoring the network, E-mail,configuring and building Kernel for Linux.

## UNIT- V

Database administration skills covering installation, configuration and tuning a database, administering servers and server groups, managing and optimizing schemas, tables, indexes, and views, creating logins, configuring permissions, assigning roles and performing other essential security tasks, backup and recovery strategies, automation and maintenance.

**Suggested Readings:**

1. Aeleon Frisch, Essential System Administration, O'Reilly, 1995, Second Edition.
2. Aeleon Frisch, Essential Windows Administration, O'Reilly, 1998, First Edition.
3. Nemeth, Unix System Administration, Pearson Education, 2000.

**PE 516 IT**                                    **SOFT COMPUTING**
*Credits: 3*

*Instruction: (3L) hrs per week*                    *Duration of SEE: 3 hours*
*CIE: 30 marks*                                      *SEE: 70 marks*

## UNIT-I
Fundamentals of Neural Networks: Basic Concepts of Neural Networks, Human Brain, Model of an Artificial Neuron, Neural Network Architectures, Characteristics of Neural Networks, Learning Methods, Taxonomy of Neural Network Architectures, History of Neural Network Research, Early Neural Network Architectures, Some Application Domains.
Back Propagation Networks: Architecture of a Back Propagation Network, Back Propagation Learning, Illustration, Applications.

## UNIT-II
Associative Memory: Autocorrelators, Heterocorrelators, Wang Et Al's Multiple Training Encoding Strategy, Exponential BAM, Associative Memory for Real-Coded Pattern Pairs, Applications, Recent Trends.
Adaptive Resonance Theory: Introduction, ART1, ART2, Applications, Sensitives of Ordering of Data.

## UNIT-III
Fuzzy Set Theory: Fuzzy Versus Crisp, Crisp Sets, Fuzzy Sets, Crisp Relations, Fuzzy Relations.
Fuzzy Systems: Crisp Logic, Predicate Logic, Fuzzy Logic, Fuzzy Rule Based Systems, Defuzzification Methods, Applications.

## UNIT-IV
Fundamentals of Genetic Algorithms: Genetic Algorithms: History, Basic Concepts, Creation of Off springs, Working Principle, Encoding, Fitness Function, Reproduction.
Genetic Modeling: Inheritance Operators, Cross Over, Inversion, And Deletion, Mutation Operator, Bit-Wise Operators, Bit-Wise Operators used in GA, Generational Cycle, Convergence of Genetic Algorithms, Applications, Multi- Level Optimization, Real Life Problem, Differences and Similarities Between GA and Other Traditional Methods, Advances in GA.

## UNIT-V
Integration of Neural Networks, Fuzzy Logic and Genetic Algorithms: Hybrid Systems, Neural Networks, Fuzzy Logic, and Genetic Algorithms Hybrids, Preview of Hybrid Systems
Genetic Algorithms Based Back propagation Networks: Ga Based Weight Determination, Applications.
Fuzzy Logic Controlled Controlled Genetic Algorithms: Soft Computing Tools, Problem Description of Optimum Design, Fuzzy Constraints, Illustrations, GA in Fuzzy Logic Controller Design, Fuzzy Logic Controller, FLC-GA Based Structural Optimization, Applications.

**Suggested Reading:**
1. S.Rajasekaran, G.A. Vijayalakshmi Pai, Neural Networks, fuzzy logic, and genetic algorithms - Genetic Algorithm,  PHI Learning Private Limited-2010
2. S.N.Sivanandam, S.N.Deepa Wiley India , Principles of SOFT COMPUTING, Second Edition 2011.

**PE 517 IT**                              **MOBILE COMPUTING**
                                              *Credits: 3*

*Instruction: (3L) hrs per week*                    *Duration of SEE: 3 hours*
*CIE: 30 marks*                                      *SEE: 70 marks*

**UNIT-I**

**Introduction:** Wireless Transmission, Frequencies for Radio Transmission, Signals, Antennas, Signal Propagation, Multiplexing, Modulations, Spread Spectrum, MAC, SOMA, FDMA, TDMA, CDMA, Cellular Wireless Networks.

**UNIT-II**

**Telecommunication Systems:** GSM, GPRS, Satellite Networks, Basics, Parameters and Configurations, Capacity Allocation, FAMA and DAMA, Broadcast Systems, DAB, DVB, CDMA and 3G.

**UNIT-III**

**Wireless LAN:** IEEE 802.11 Architecture, Services, MAC – Physical Layer, IEEE 802.11a – 802.11b standards, Bluetooth.

**UNIT-IV**

**Routing Ad-hoc Network Routing Protocols:** Ad-hoc Network Routing Protocols, Destination Sequenced Distance Vector Algorithm, Cluster Based Gateway Switch Routing, Global State Routing, Fish-eye state Routing, Dynamic Source Routing, Ad-hoc on-demand Routing, Location Aided Routing, Zonal Routing Algorithm.

**Mobile IP -** Dynamic Host Configuration Protocol.

**Traditional TCP -** Classical TCP Improvements – WAP, WAP 2.0.

**UNIT-V**

**Publishing & Accessing Data in Air:** Pull and Push Based Data Delivery models, Data Dissemination by Broadcast, Broadcast Disks, Directory Service in Air, Energy Efficient Indexing scheme for Push Based Data Delivery.

**File System Support for Mobility:** Distributed File Sharing for Mobility support, Coda and other Storage Manager for Mobility Support.

**Mobile Transaction and Commerce:** Models for Mobile Transaction, Kangaroo and Joey transactions, Team Transaction, Recovery Model for Mobile Transactions, Electronic Payment and Protocols for Mobile Commerce.

**Suggested Reading:**

1. Jochen Schiller, *Mobile Communications*, Pearson Education, 2nd Edition, 2009.
2. Kurnkum Garg, *Mobile Computing*, Pearson Education , 2010
3. Asoke K Talukder, Roopa R Yavagal, *Mobile Computing*, TMH 2008.
4. Raj Kamal, *Mobile Computing*, Oxford, 2009.
5. "*A Survey of Mobile Transactions appeared in Distributed and Parallel databases*" 16,193-230, 2004, Kluwer Academics Publishers.
6. S. Acharya, M. Franklin and S. Zdonil, "*Balancing Push and Pull for Data Broadcast, Proceedings of the ACM SIGMOD*", Tuscon, AZ, May 1997.
7. S.Acharya, R. Alonso, M.Franklin and S.Zdonik, "*Broadcast Disks: Data Management for Assymetric Communication Environments, Proceedings of the ACM SIGMOD Conference*", San Jose, CA, May 1995.

**PE 518 IT**            **SOFTWARE PROJECT MANAGEMENT**
*Credits: 3*

*Instruction: (3L) hrs per week*                    *Duration of SEE: 3 hours*
*CIE: 30 marks*                                       *SEE: 70 marks*

## UNIT-I

Conventional Software Management, Evolution of Software Economics, Improving Software Economics, Old Way & New.

## UNIT-II

Life – Cycle phases, Artifacts of the process, Model Based Software Architectures, Workflows of the Process, Checkpoints of the process.

## UNIT-III

Iterative Process Planning, Project Organizations & Responsibilities, Process Automation, Project Control of Process Instrumentation, Tailoring the Process.

## UNIT-IV

Modern Project profiles, Next Generation Software Economics, Modern process Transitions, Managing Contacts, Managing People & Organizing Terms.

## UNIT-V

Process improvement & mapping to the CMM, ISO 12207 – an overview, programme management.

**Suggested Reading:**

1. Walker Royce, *Software Project Management – A Unified frame work*, Pearson Education, Addision, 1998,
2. Bob Hughes and Mike Cotterell , *Software Project Management*, Tata Mc Graw Hill, 3$^{rd}$ Edition, 2010.
3. Watt.S. Humphery, *Managing Software Process* , Addison - Wesley, 2008.

**PE 519 IT**                          **RICH INTERNET APPLICATIONS**
*Credits: 3*

*Instruction: (3L) hrs per week*                    *Duration of SEE: 3 hours*
*CIE: 30 marks*                                        *SEE: 70 marks*

**UNIT-I**
Web 2.0  Folksonomies and Web 2.0, Software as a service. Multiple delivery channels
(Voice – VOXML, and ANT (HTML), Social Net working.

**UNIT - II**
Client side programming – Overview of Java Script, Objects in Java Script, Regular expressions,
Overview of XML, DTD and XML Schema, DOM and SAX Parsers,CSS,XSLT.

**UNIT- III**
Web Services- SOA,SOAP,WSDL,REST Services.
JSON Format- Ajax introduction, XML HTTP object comparison with I frames.

**UNIT-IV**
Building Rich Internet Application- Flash Player, Flex framework, MXML introduction, Action
Script Introduction, working with Action Script, Flex Data binding, Common UI Components
using Datagrids. Tree controls, Pop up controls etc.

**UNIT-V**
Mashup using Flex and Ajax. Web services in Flex. Semantic web(Web 3.0). Resource
Description Frame work, use and examples, Ontologies, Web ontology language(OWL).

**Suggested Reading:**
1.  Ivan Bayross,Web Enabled Commercial Applicaton Development using HTML, DHTML,
    Javascript , Perl CGI ,BPB Publications, 2007.
2.  Colin Moock, Essential Actionscript 3.0 , O'Reilly publications, 2007.
3.  Steven Holzner, Ajax Bible Wiley India Edition, 2007.
4.  Justin Gehtland et al, A Web 2.0 Primer Pragmatic Ajax, SPD Publications, 2006.

**PE 520 IT**                           **SOFTWARE QUALITY  AND  TESTING**
*Credits: 3*

*Instruction: (3L) hrs per week*                     *Duration of SEE: 3 hours*
*CIE: 30 marks*                                       *SEE: 70 marks*

## UNIT-I

Software Quality, Quality Management, Software Quality Metrics, Product Quality Metrics, In Process Quality Maintenance, Examples.

## UNIT - II

Quality tools in Software Development, Seven Basic Tools, Check List, Pareto Diagram, Histogram, Run Charts, Scatter Diagram, Control Chart, Cause and Effect Diagram, Defect Removal, Effect Removal Effectiveness, Quality Planning, Cost Effectiveness of Phase Effect Removal.

## UNIT – III

Software Testing Background, Software Development Process, Realities of Software Testing, Examining the Specification, Testing the Software with Blinders on Examining the Code, Testing the Software with X-ray.

## UNIT - IV

Configuration Testing, Compatibility Testing, Usability Testing, Testing the Documentation, Website Testing, Automated Testing and Test Tools Bug Bashes and Beta Testing.

## UNIT - V

Planning Your Test Effort, Writing and Tracking Test Cases, Reporting Measuring SQA.

**Suggested Reading:**

1. Stepen H. Khan, *Metrics and Models in Software Quality Engineering*, Pearson Education, India,1995.
2. Ron Patton, *Software Testing*, Sams Pubishing, 2001.
3. Boris Beizzer, *Software Testing Techniques*, Sams Pubishing, 2001.
4. Allan Gilles, *Software Quality Theory And Management*, Thomson International Press, 1997.

**PE 521 IT**

# RESEARCH METHODOLOGY

*Credits: 3*

*Instruction: (3L) hrs per week*              *Duration of SEE: 3 hours*
*CIE: 30 marks*                                      *SEE: 70 marks*

## UNIT-I

**Research Methodology :** Objectives and Motivation of Research, Types of Research, Research Approaches ,Significance of Research, Research Methods Versus Methodology, Research and Scientific Method, Importance of Research Methodology, Research Process, Criteria of Good Research, Problems Encountered by Researchers in India, Benefits to the Society in general.

Defining the Research Problem: Definition of Research Problem, Problem Formulation, Necessity of Defining the Problem, Technique Involved in Defining a Problem.

## UNIT-II

**Literature Survey :** Importance of Literature Survey, Sources of Information, Assessment of Quality of Journals and Articles, Information through Internet.

**Literature Review :** Need of Review, Guidelines of Review, Record of Research Review.

## UNIT-III

**Research Design:** Meaning of Research Design, Need of Research Design, Features of a Good Design, Important Concepts Relating to Research Design, Different Research Designs, Basic Principles of Experimental Designs, Developing a Research Plan, Design of Experimental Set-up, Use of Standards and Codes.

## UNIT-IV

Exploration of the Data, Description and Analysis of Data, Sample Design and Sampling, Role of Statistics for Data Analysis, Functions of Statistics, Estimates of Population, Parameters, Parametric V/s Non Parametric Methods, Descriptive Statistics, Points of Central Tendency, Measures of Variability, Measures of Relationship, Inferential Statistics-Estimation, Hypothesis Testing, Use of Statistical Software.

Data Analysis: Deterministic and random data, uncertainly analysis, tests for significance: Chi-square, student's 't' test Regression modeling, direct and interaction effects. ANOVA, F-test, Time Series analysis, Autocorrelation and autoregressive modeling.

**UNIT-V :**

**Research Report Writing :** Format of the Research report, Style of writing report, References/ Bibliography / Webliography, Technical paper writing / Journal report writing.

**Research Proposal Preparation:** Writing a Research Proposal and Research Report, Writing a Research Grant Proposal.

**Suggested Reading:**

1. C.R.Kothari, Research Methodology, Methods & Technique; New age International Publishers, 2004
2. R.Ganesan; Research Methodology for Engineers; MJP Publishers; Chennai, 2011.
3. Y.P.Agarwal; Statistical Methods; Concepts, Application and Computation; Sterling Publishers Pvt. Ltd; New Delhi; 2004
4. Dr.Vijay Upagade and Dr.Aravind Shende, Research Methodology, S.Chand & Company Ltd., New Delhi; 2009.
5. P.Ramdass and A Wilson Aruni; Research and Writing across the disciplines; MJP Publishers;

**PC 551 IT**

## OBJECT ORIENTED SYSTEM DEVELOPMENT LAB
*Credits: 1*

*Instruction: (2 P) hrs per week*          *Duration of SEE: 3 hours*
*CIE: 25 marks*                                           *SEE: 50 marks*

**Course Objectives:**

To understand the software engineering methodologies for project development.

To gain knowledge about open source tools for Computer Aided Software Engineering

To develop test plans and perform validation testing.

**Course Outcomes :**

Student will be able to

Use open source case tools to develop software

Analyze and design software requirements in efficient manner.

Implement the design , debug and test the code

Prepare the following documents for each experiment and develop the software using software Engineering  methodology

**1.Problem Analysis and Project Planning -**Thorough study of the problem –Identify Project scope, Objectives and Infrastructure.

**2. Software Requirement Analysis -** Describe the individual Phases/modules of the project and Identify deliverables.

**3. Data Modelling - Use work products –** data dictionary, use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.

**4. Software Development and Debugging –** implement the design by coding

**5. Software Testing -** Prepare test plan, perform validation testing, coverage analysis, memory leaks, develop test case hierarchy, Site check and site monitor

**Sample Experiments:**

**Academic domain**

1. Course Registration System
2. Student marks analyzing system

**Railway domain**

3. Online ticket reservation system
4. Platform assignment system for the trains in a railway station

**Medicine domain**

5. Expert system to prescribe the medicines for the given symptoms
 6. Remote computer monitoring

**Finance domain**

7. ATM system
8. Stock maintenance

**Human Resource  management**

9. Quiz System
10. E-mail Client system

**SOFTWARE REQUIRED:**
**Open source Tools:** StarUML / UMLGraph / Topcased

**PC 552 IT**                    **BIG DATA ANALYTICS LAB**
                              *Credits: 1*

*Instruction: (2 P) hrs per week*                    *Duration of SEE: 3 hours*
*CIE: 25 marks*                                      *SEE: 50 marks*

1.  (i) Perform setting up and Installing Hadoop in its three operating modes:

    Standalone,

    Pseudo distributed,

    Fully distributed

    (ii)Use web based tools to monitor your Hadoop setup.

2.  Implement the following file management tasks in Hadoop:

    Adding files and directories

    Retrieving files

    Deleting files

3.  Run a basic Word Count Map Reduce program to understand Map Reduce Paradigm.
4.  Write a Map Reduce program that mines weather data. Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.
5.  Implement Matrix Multiplication with Hadoop Map Reduce
6.  Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.
7.  Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes.

**PC 553 IT**                    **PROJECT SEMINAR**

*Instruction: (2P) hrs per week*
*CIE: 25 Marks*

Oral presentation is an important aspect of technical  education. The objective of the Seminar Course is to motivate a student to do a systematic and independent study of state-of-topics in a board area of his/her interest.

 Seminar topics may be chosen by the student with the suggestions from the family members. Students are to be exposed to following aspects of seminar presentation.

Students are to be exposed to following aspects of seminar presentations.

- Literature survey
- Organization of material to be presented
- Preparation of power point  Presentation
- Technical writing

**Each student is required to**

1. Submit one page synopsis of the seminar talk for display on notice board of the department.
2. Give a 20 minutes presentation with the aid of a PC, followed by a 10 minutes discussion.
3. Submit the report on the seminar topic presented along with list of reference and slides used.

Seminar is to be scheduled from the third week to the last week of the semester and any change in schedule should be discouraged.

CIE  marks will be awarded jointly or independently by at least two faculty members. The award will be on the basis of the oral presentation made, written materials submitted, active participation of the student in the proceedings as well as involvement in the discussions.