School: Computer Sciences & Engineering				Programme: MCA
Course Code: TPCA201	**Year : First Year**			**Semester - II**
Course: Advanced Java	**L**	**T**	**P**	**C**
	3	1	4	**6**
Theory: 3 Hrs/Week	**Max. University Theory Examination: 50 Marks**			
Max. Time for Theory Exam.: 3 Hrs	**Continuous Internal Assessment: 50 Marks**			

Objectives	
1	To provide an insight on the concept of different functions of JDBC
2	To explain the concept of multithreading for implementing concurrent applications
3	To give a detail view of web programming using servelet and JSP
4	To implement client server architecture using JAVA API.

Course Outcomes	
On successful completion of the course students will be able to:	
1	Implement the role of JDBC for the management and delivery of data for given application.
2	Develop Web based applications by Servlet and JSP to have an interactive application such as Client Server Architecture.
3	Understand and implement the concept of Remote method invocation.
4	To be able to design client server applications using networking API.

Unit Number	Details	Hours
1	**JDBC** The design of JDBC, Basic JDBS program Concept, Drivers, Executing SQL commands, Executing queries, MetaData.	10
2	**Multithreading** Basics, Life cycle of thread, Creating Threads, Priorities and Synchronization, Inter Thread Communication, Run able Interface	9
3	**Servlet** Introduction, Life cycle of servlet, Types of servlet, Session Tracking, Cookie class, Servlet- Jdbc.	9
4	**Introduction to JSP** Getting Familiar with JSP Server, First JSP, Adding Dynamic contents via expressions, Scriptlets, Mixing Scriptlets and HTML, Directives, Declaration, Tags and Session.	10
5	**Remote Method Invocation** Introduction to remote object, RMI architecture, Stubs and skeleton, Registry, Setting up RMI, Using RMI with applet. **Networking** The java.net package, Connection oriented transmission – Stream Socket Class, Creating a Socket to a remote host on a port, (creating TCP client and server), Simple Socket Program Example.	10
	Total	**48**

Resources	
Recommended Books	1. Complete Reference – Herbelt Shieldt 2. Programming in java - Black Book Series 3. Cay S. Horstmann, Gray Cornell Core Java – Volume 2 Fundamentals Eighth Edition, Pearson Education
Reference Books	1. Cay S. Horstmann, Gray Cornell Core Java – Volume 1 Fundamentals Eighth Edition, Pearson Education

School: Computer Sciences & Engineering				Programme: MCA
Course Code: TPCA202	**Year : First Year**			**Semester - II**
Course: Distributed Operating System	**L**	**T**	**P**	**C**
	3	1	4	**6**
Theory: 3 Hrs/Week	**Max. University Theory Examination: 50 Marks**			
Max. Time for Theory Exam.: 3 Hrs	**Continuous Internal Assessment: 50 Marks**			

Objectives	
1	To understand the fundamentals of a Distributed system.
2	To comprehend with the concept of remote procedure call and its implementation
3	To understand the working of shared memory used by a distributed system.
4	To be able to demonstrate the principle of synchronization

Course Outcomes	
On successful completion of the course students will be able to:	
1	Explain the principles and issues in Inter Process Communication in a DOS.
2	Use the concepts of Remote Procedure call in Distributed applications
3	Implement shared memory resources using distributed algorithms
4	Practice the distributed object technologies and use them in developing applications

Unit Number	**Details**	**Hours**
1	**Fundamentals:** Distributed computing, system model, distributed operating system, designing operating system, Introduction to DCE **Message Passing :** Desirable features message passing system, Issues in message passing, synchronization, buffering, multi-datagram messages , Encoding and decoding of message data, Process addressing, Failure handling, Group communication	**10**

2	Remote procedure call: RPC model, Transparency of RPC, implementing RPC mechanism, Stub generation, Marshaling arguments and Results, Server Management, Parameter-passing Semantics, call Semantics, Communication protocols for RPCs, Complicated RPC Client server binding, Exception Handling , Security, special types of RPCs, RPCs in Heterogeneous Environments, Lightweight RPC, Optimizations for better performance.	10
3	Distributed Shared Memory: General architecture of DSM systems, Design and implementation of DSM, Granularity, structure of shared memory space, consistency models, Replacement Strategy, Thrashing, other approaches to DSM, Heterogeneous DSM, and Advantages of DSM. Synchronization: Clock synchronization, event ordering, mutual exclusion, Deadlock, Election Algorithm.	9
4	Resource and Process Management: Desirable Features of global Scheduling algorithm, Task assignment approach, Load balancing3 approach, load sharing approach, Introduction to process management, process migration, Threads	8
5	Distributed File Systems: Introduction, good features of DFS, File models, File Accessing models, File sharing Semantics, File-Caching Schemes, File Replication, Fault Tolerance, Atomic Transactions and design principles.	8
Total		**45**

Resources	
Recommended Books	1. Pradeep K Sinha "Distributed Operating Systems: Concepts and design" IEEE computer society press. 2. A. Tanuenbaum "Distributed Operating System" Pearson Edition 3. PUDER, ROMER "Distributed Systems Architecture : Middleware approach" ELSEVIER publication
Reference Books	1. G. Coulouris, J. Dollimore and T. Kindberg "Distributed Systems : Concepts and design" Pearson Edition. 2. Singhal, N. Shivaratri Advanced Concepts in Operating Systems" TMH

School: Computer Sciences & Engineering				Programme: MCA
Course Code: TPCAE03	Year : First Year			Semester - II
Course: Software Project Management	L	T	P	C
	3	1	0	4
Theory: 3 Hrs/Week	Max. University Theory Examination: 50 Marks			
Max. Time for Theory Exam.: 3 Hrs	Continuous Internal Assessment: 50 Marks			

Objectives	
1	To outline the need for Software Project Management
2	To highlight different techniques for software cost estimation.
3	To highlight different techniques for activity planning.
4	To understand the Project Cycle.
5	To understand project planning and risk management.

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand Evaluation and Planning of Project
2	Calculate Project Estimation by using various models
3	Understand Project management and Control
4	Implement best methods for staff selection and communication

Unit Number	Details	Hours
1	**Project Evaluation and Project Planning:** Importance of Software Project Management, Activities Methodologies, Categorization of Software Projects ,Setting objectives ,Management Principles, Management Control, Project portfolio Management, Cost-benefit evaluation technology, Risk evaluation, Strategic program Management, Stepwise Project Planning.	**10**
2	**Project Cycle and Effort Estimation:** Software process and Process Models, Choice of Process models, mental delivery , Rapid Application development, Agile methods, Extreme Programming, SCRUM, Managing interactive processes, Basics of Software estimation, Effort and Cost estimation techniques, COSMIC Full function points, COCOMO II A Parametric Productivity Model, Staffing Pattern.	**10**
3	**Activity Planning and Risk Management:** Objectives of Activity planning, Project schedules, Activities, Sequencing and scheduling, Network Planning models, Forward Pass & Backward Pass techniques, Critical path (CRM) method, Risk identification, Assessment, Monitoring, PERT technique, Monte Carlo simulation, Resource Allocation, Creation of critical patterns, Cost schedules.	**10**
4	**Project Management and Control:** Framework for Management and control, Collection of data Project termination, Visualizing progress, Cost monitoring, Earned Value Analysis- Project tracking, Change control- Software Configuration Management, Managing contracts, Contract Management.	**9**

5	**Staffing in Software Projects:** Managing people, Organizational behavior, Best methods of staff selection, Motivation, The Oldham-Hackman job characteristic model, Ethical and Programmed concerns , Working in teams, Decision making, Team structures, Virtual teams, Communications genres, Communication plans.	**9**
	Total	**48**

Resources	
Recommended Books	1. Robert K. Wysocki "Effective Software Project Management" – Wiley Publication,2011. 2. Walker Royce: "Software Project Management"- Addison-Wesley, 1998. 3. Gopalaswamy Ramesh, "Managing Global Software Projects" – McGraw Hill Education (India), Fourteenth Reprint 2013.
Reference Books	1. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.

School: Computer Sciences & Engineering				Programme: MCA
Course Code: TPCAE04	Year : First Year			Semester - II
Course: Software Engineering	L	T	P	C
	3	1	0	4
Theory: 3 Hrs/Week	Max. University Theory Examination: 50 Marks			
Max. Time for Theory Exam.: 3 Hrs	Continuous Internal Assessment: 50 Marks			

Objectives	
1	To understand user conceptual models and development of better specification
2	To understand the principles of designing a software
3	To learn the different software life cycle models.
4	Understanding different software testing techniques

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand basic concepts of software engineering
2	Compare different software engineering process models
3	Create architectural design for a given project
4	Apply different testing techniques

Unit Number	Details	Hours
1	**Software Process:** Introduction ,S/W Engineering Paradigm , life cycle models (water fall, incremental, spiral, evolutionary, prototyping, object oriented) , System engineering, computer based system, verification, validation, life cycle process, agile life cycle model, development process, system engineering hierarchy.	9

2	**Software requirements:** Functional and non-functional , user, system, requirement engineering process, feasibility studies, requirements, elicitation, validation and management, software prototyping, prototyping in the software process, rapid prototyping techniques, user interface prototyping, S/W document. Analysis and modeling, data, functional and behavioral models, structured analysis and data dictionary.	10
3	**Design Concepts and Principles:** Design process and concepts, modular design, design heuristic, design model and document, Architectural design, software architecture, data design, architectural design, transform and transaction mapping, user interface design, user interface design principles. Real time systems, Real time software design, system design, real time executives, data acquisition system, monitoring and control system.	10
4	**Software Configuration Management:** The SCM process, Version control, Change control, Configuration audit, SCM standards. **Software Project Management:** Measures and measurements, S/W complexity and science measure, size measure, data and logic structure measure, information flow measure. Estimations for Software Projects, Empirical Estimation Models, Project Scheduling.	10
5	**Testing:** Taxonomy of software testing, levels, test activities, types of s/w test, black box testing testing boundary conditions, structural testing, test coverage criteria based on data flow, mechanisms, regression testing, testing in the large. S/W testing strategies, strategic approach and issues, unit testing, integration testing, validation testing, system testing and debugging. **Trends in Software Engineering:** Reverse Engineering and Re-engineering – wrappers – Case Study of CASE tools.	9
	Total	**48**

Resources	
Recommended Books	1. Pressman R. S., "Software Engineering – A Practitioner's Approach", Tata McGraw Hill 2. Jalote P., "An Integrated approach to Software Engineering", Narosa
Reference Books	1. Sommerville, "Software Engineering", Addison Wesley 2. Fairley R., "Software Engineering Concepts", Tata McGraw Hill. 3. James Peter, W Pedrycz, "Software Engineering", John Wiley &Sons.

School: Computer Sciences & Engineering				Programme: MCA
Course Code: TPCA203	**Year : First Year**			**Semester - II**
Course: Pervasive Computing	**L**	**T**	**P**	**C**
	3	1	0	**4**
Theory: 3 Hrs/Week	**Max. University Theory Examination: 50 Marks**			
Max. Time for Theory Exam.: 3 Hrs	**Continuous Internal Assessment: 50 Marks**			

Objectives	
1	To introduce pervasive computing abilities
2	To introduce tools and techniques used while solving problems using pervasive computing.
3	To study algorithmic examples in distributed, concurrent and parallel environments

Course Outcomes	
On successful completion of the course students will be able to:	
1	To discover the characteristics of pervasive computing applications including the major system components and architectures of the systems
2	To analyze the strengths and limitations of the tools and devices for development of pervasive computing systems
3	To explore the characteristics of different types of mobile networks on the performance of a pervasive computing system
4	To analyze and compare the performance of different data dissemination techniques and algorithms for mobile real-time applications
5	To develop an attitude to propose solutions with comparisons for problems related to pervasive computing system through investigation

Unit Number	Details	Hours
1	**Introduction to Pervasive Computing:** Concept of Distributed Computing, Mobile Computing, Pervasive Computing, Wearable Computing, Modeling the Key Ubiquitous/Pervasive Computing Properties, Architectural design for UbiCom systems, Mobile Adaptive Computing, Mobility Management and Caching, Location Management Case Studies	**9**
2	**Pervasive Computing Devices:** Smart Environment : CPI and CCI (Smart Devices : Application and Requirements , Device Technology and Connectivity, Human Computer Interaction, Everyday applications in the virtual, human and physical world; Smart devices and services: Service Architecture Models, Service Provision Life Cycle, Virtual Machines and Operating Systems.	**10**
3	**Human Computer Interaction:** explicit HCI, Implicit HCI, User Interface and Interaction for four hand-held widely used devices, Hidden UI via basic smart devices, Hidden UI via wearable and Implanted devices, Human centered design (HCD), user models, iHCI design.	**8**
4	**Middleware for Pervasive:** What is Mobile Middleware,Adaptive middleware, Context aware middleware, Service Discovery: Services, garbage collection, eventing, security, Interoperability; Mobile Agents: Agent architecture, Migration strategies, Communication Strategies **Security in Pervasive Computing:** Security and Privacy in Pervasive Networks, Experimental Comparison of Collaborative Defense Strategies for Network Security.	**10**
5	**Challenges and Outlook:** Overview of challenges, smart devices, Smart Interaction, Smart physical environment device interaction, Smart human-device interaction, Human Intelligence versus machine intelligence, social issues. Case Study- Wearable Computing/ Cyber Physical System.	**8**
	Total	**45**

Resources	
Recommended Books	**1.** Stefan Poslad, "Ubiquitous Computing, Smart devices, environment and interaction", Wiley. **2.** Frank Adelstein, Sandeep Gupta, Golden Richard III, Loren Schwiebert, "Fundamentals of Mobile and Pervasive Computing", Tata McGraw Hills
Reference Books	1. Jochen Burkhardt, Horst Henn, Stefan Hepper, Klaus Rindtor , Thomas Schaeck, "Pervasive Computing", Pearson, Eighteenth Impression, 2014.