

**Government College of Engineering, Karad**

**Second Year (Sem – III) M. C. A.**

**MC 1301 : Operating System**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

1. Student should aware of understanding of design issues associated with operating systems.
2. Student should aware of concepts of memory management including virtual memory.
3. Be familiar with various types of operating systems including Unix.

**Course Contents**

	Course Contents	Hours
<b>Unit 1</b>	<b>Operating system structures:</b> System components, operating system services, system programs, system structures. <b>Process Management:</b> Process Concept, Process scheduling, operations on processes, cooperating processes, interprocess communication, threads overview.	<b>(06)</b>
<b>Unit 2</b>	<b>CPU Scheduling:</b> Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Algorithm evaluation. <b>Process Synchronization:</b> The critical –Section problem, synchronization hardware, and semaphore, classic problems of synchronization, critical regions.	<b>(08)</b>
<b>Unit 3</b>	<b>Deadlock:</b> System Model, Deadlock Characterization, Resource-Allocation Graph, Methods for Handling Deadlock, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection.	<b>(06)</b>
<b>Unit 4</b>	<b>Memory Management:</b> Concept, Memory Management Techniques, Swapping, Contiguous Memory Allocation, Memory Protection, Memory Allocation, Fragmentation, Paging, Basic Method, Segmentation with Paging, Virtual Memory Concept, Demand Paging, Page Replacement.	<b>(08)</b>
<b>Unit 5</b>	<b>File System:</b> File concept:-File attributes, file operations; Access methods; File System Implementation, Allocation Methods, Free Space Management.	<b>(06)</b>
<b>Unit 6</b>	<b>I/O Systems and Mass Storage:</b> I/O Hardware, Polling, Interrupts, DMA, Disk Structure, Disk scheduling, FCFS Scheduling, SSTF Scheduling, SCAN scheduling.	<b>(06)</b>

**Text Books**

1. Operating Systems: Concepts: By Abraham Siberschatz, Peter Galvin- Willey- Sixth edition.
2. Operating Systems: Seventh Edition by William Stallings, Pearson Publications.

**Reference Books**

1. Operating Systems: Andrew S. Tanenbaum-Pearson Education- Second Edition.
2. System Programming and Operating Systems by D.M. Dhamdhare-TMH –Second Edition.
3. Operating Systems: Internals and Design Principles, Seventh Edition by William Stallings, Pearson Publications

**Useful Links**

1. <http://nptel.ac.in/syllabus/syllabus.php?subjectId=106102132>, Prof. Sorav Bansal, IIT Delhi
2. <http://nptel.ac.in/courses/106108101/>, Prof. P.C.P. Bhatt, IISc Bangalore
3. [www.ocw.mit.edu](http://www.ocw.mit.edu)

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO 1	√		√	√	√			√	√	√
CO 2		√	√		√		√		√	
CO 3	√			√	√	√	√	√		√

## Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

**Government College of Engineering, Karad**

**Second Year (Sem – III) M. C. A.**

**MC 1302 : Computer Networks**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

- Students will come to know about various protocols, models in Networks
- Students will be aware of Network hardware, Media Types (cables , Wireless)
- Students will be able to design, implement and analyze simple computer networks.
- Students will know the different strategies of operations of TCP/UDP, FTP, HTTP, SMTP, SNMP

**Course Contents**

		Hours
<b>Unit 1</b>	<b>Introduction: Computer Network:</b> Overview of Computer Network, Network hardware and software, Reference model- OSI and TCP/IP and their comparison Network layer-network layer design issues, various routing Algorithms and congestion control algorithms, Networking layer in the internet.	<b>(08)</b>
<b>Unit 2</b>	<b>Transport layer:</b> The transport services, elements of transport protocols, internet transport protocols, ATM – AAL layer protocols, Performance issues.	<b>(08)</b>
<b>Unit 3</b>	<b>TCP/IP:</b> TCP/IP architecture, the internet protocols, IPv4 , Ipv6, DHCP and Mobile IP , internet routing protocols , multicast routing ,The network layer in ATM networks	<b>(08)</b>
<b>Unit 4</b>	<b>The Application layer:</b> Network security – principle of cryptography, secret key and public key algorithm, digital scanners, Domain name system-The DNS name space, resource records, name server, simple network management Protocol.	<b>(08)</b>
<b>Unit 5</b>	<b>SNMP model:</b> SNMP model, Electronic mail- architecture and services, Message formats and message transfer, email privacy Usenet news- user view of Usenet and Usenet implementation.	<b>(04)</b>
<b>Unit 6</b>	<b>Multimedia Information and Networking:</b> Lossless data compression, Video on Demand, Transmission in ATM network, Communication satellites. Additional issues related to security	<b>(04)</b>

**Text Books**

- Andrew. S. Tanenbaum, “Computer Networks”, PHI
- Alberto,Leon –Garcia and Indra widjaja, “Communication Networks- Fundamental concepts and key architectures”, Tata Mc-Graw Hill

**Reference Books**

- Behrouz A. Forouzan “Data Communications and Networking ” , Tata Mc Graw Hill
- Achyut Godbole, “Data Communications and Networks”, Tata Mc Graw Hill
- Craig Zacker, “Complete Reference Networking”, Tata Mc Graw Hill

**Useful Links**

- <http://www.nptel.ac.in>

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO 1	√		√	√	√				√	√
CO 2		√	√		√		√	√		√
CO 3	√		√	√	√	√	√	√	√	√
CO 4		√	√		√		√	√		√

## Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

**Government College of Engineering, Karad****Second Year (Sem – III) M. C. A.****MC 1303 : Enterprise Resource Planning**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
Tutorials	01 Hrs/week	CT – 2	15
Total Credits	04	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

- To get knowledge of enterprise activities and work flow
- To study different web portals.
- To get knowledge of enterprise level IT based solutions.

**Course Contents**

		Hours
<b>Unit 1</b>	<b>Enterprise Resource Planning:</b> Introduction to ERP ,Disadvantages of non-ERP systems ,Need of ERP Advantage of ERP , Risks of ERP, Growth of ERP.	<b>(04)</b>
<b>Unit 2</b>	<b>ERP Modules:</b> Finance, Production Planning, Control and Management, Sales and Distribution, Human Resource Management, Inventory Control System, Quality Management, Plant Maintenance.	<b>(09)</b>
<b>Unit 3</b>	<b>ERP Implementation Life Cycle:</b> Evaluation and selection of ERP package, Project planning, Implementation, Team Training and Testing, End User Training and Going Live Post Evaluation and Maintenance.	<b>(06)</b>
<b>Unit 4</b>	<b>ERP Market and Vendors:</b> ERP Marketplace and Marketplace Dynamics, Comparison of Current ERP Packages and Vendors, like; SAP, Oracle, PeopleSoft, BAAN etc.	<b>(04)</b>
<b>Unit 5</b>	<b>ERP and related technologies:</b> Business Process Re-Engineering (BPR), Management Information System (MIS), Decision Support System (DSS), Executive Support System (ESS) Data Warehousing, Data Mining, On-Line Analytical Processing (OLAP) ,Supply Chain Management, Customer Relationship Management	<b>(09)</b>
<b>Unit 6</b>	<b>CaseStudies:</b> ERP systems implemented in – for example :TISCO, SKF Automotive Bearings Co. Ltd.,Customization of ERP for different types of Industries, Post Implementation review of ERP packages - in Manufacturing, Services and Others Organizations,	<b>(08)</b>

**Tutorials**

A set of Tutorial / problems based on above syllabus is to be performed and submitted.

**Text Books**

- Enterprise Resource Planning –Concepts &Practice (Second Edition) By V.K.Garg&N.K.Venkitakishnan
- Enterprise ResourcePlanning by Alexis Leon.

**Reference Books**

- ERPWARE – E R P Implementation Framework By V. K. Garg &N. K. Venkitakishnan.
- Enterprise ResourcePlanning by Mahadev Jaiswal, Ganesh Vanupalli.

**Useful Links**

- <http://www.nptel.ac.in>,
- [www.ocw.mit.edu](http://www.ocw.mit.edu)

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO 1		√		√	√	√	√	√		
CO 2	√	√	√	√	√	√	√		√	
CO 3	√	√			√	√	√			√

## Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

**Government College of Engineering, Karad**

**Second Year (Sem – III) M. C. A.**

**MC 1304 : Advanced Database System**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

1. Evaluate and Apply Advanced Database Development Techniques.

2. Evaluate Database Systems.

3. Administer Database Systems

4. Design & Implement Advanced Database Systems.

**Course Contents**

		Hours
<b>Unit 1</b>	<b>Distributed Database:</b> Distributed database concepts, overview of client-server architecture and its relationship to distributed databases, concurrency control heterogeneity issues, persistent programming languages, object identity and its implementation, clustering, indexing, client server object bases, cache coherence.	<b>(08)</b>
<b>Unit 2</b>	<b>Parallel databases:</b> Parallel architectures, performance measures, shared nothing/shared disk/shared memory based architectures, data partitioning, intra-operator parallelism, pipelining, scheduling, load balancing, query processing- index based, query optimization: cost estimation, query optimization: algorithms	<b>(08)</b>
<b>Unit 3</b>	<b>Advanced transaction models:</b> Save points, sagas, nested transactions, multi-level transactions, Recovery, multilevel recovery, shared disk systems, distributed systems 2PC, 3PC, replication and hot spares, data storage, security and privacy- multidimensional k- anonymity, data stream management	<b>(08)</b>
<b>Unit 4</b>	<b>XML:</b> Introduction to XML, Structure of XML Data, XML Document Schema, DTD, Querying and Transformation: XQuery, FLOWR, XPath, XML validation, Storage of XML Data.	<b>(05)</b>
<b>Unit 5</b>	<b>Database Cloud Services:</b> XML web services, API to XML, Web based system, Implementation of XML validations, Use of web servers. XML and DTD implementation, Use of Web service for database like Amazon web service, Microsoft Azure, Google cloud	<b>(06)</b>
<b>Unit 6</b>	<b>SQL standards:</b> SQL 1999, SQL: 2003, Object Data Management Group (ODMG) version 3.0 standard, Standards for interoperability and integration e.g. Web Services, SOAP.	<b>(05)</b>

**Text Books**

1. Database system concepts', 5th Edition –Abraham Silberschatz, Henry Korth, S, Sudarshan, (McGraw Hill International).
2. Database Management Systems - Raghu Ramkrishnan, Johannes Gehrke Second Edition, (McGraw Hill International)

**Reference Books**

1. Fundamentals of Database Systems - Remez Elmasri , Shamkant Navathe

**Useful Links**

1. <http://nptel.ac.in/courses/106106093/>, Database Design, Dr. S. Srinath, IIT Madras
2. <https://www.youtube.com/watch?v=EUzsy3W4I0g&list=PL9426FE14B809CC41>, Database Management System – NPTEL (YouTube Playlist)
3. [www.ocw.mit.edu](http://www.ocw.mit.edu)

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO 1	√		√	√	√		√		√	√
CO 2		√		√		√		√	√	√
CO 3	√	√	√		√			√		
CO 4	√			√		√	√		√	√

## Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	05	05		10
Understand	05	05	02	10
Apply	05	05	03	20
Analyse				
Evaluate			02	20
Create			03	
TOTAL	15	15	10	60



**Government College of Engineering, Karad****Second Year (Sem – III) M. C. A.****MC 1305 : Software Testing**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

- Students will be able to demonstrate knowledge of basic principles of software testing.
- Students will be familiar with the test case design methods.
- Students will be able to develop test cases for manual as well as automation testing.

**Course Contents****Hours**

<b>Unit 1</b>	<b>Introduction:</b> Testing as an Engineering Activity, Basic Definitions, Software Testing Principles, The Tester's Role in a Software Development Organization, Origins of Defects, Defect Classes, The Defect Repository, Defect Examples.	<b>(05)</b>
<b>Unit 2</b>	<b>Test Case Design:</b> Introduction to Testing Design Strategies, The Smarter Tester, Black Box Approach to Test Case Design, Random Testing, Requirements based testing, Positive and negative testing, Boundary Value Analysis, decision tables, Equivalence Partitioning, Graph based testing, compatibility testing, user documentation testing, domain testing, White-Box Approach to Test design, static testing vs. structural testing, code functional testing, Control Flow Graphs, Covering Code Logic, Paths.	<b>(08)</b>
<b>Unit 3</b>	<b>Levels of testing:</b> The Need for Levels of Testing, Unit Tests - Unit Test Planning, Designing the Unit Tests, The Test Harness, Running the Unit tests and Recording results. Integration tests – Designing Integration Tests, Integration Test Planning, scenario testing System Testing – types of system testing - Acceptance testing –performance testing. Regression Testing, internationalization testing, ad-hoc testing, Alpha – Beta Tests.	<b>(07)</b>
<b>Unit 4</b>	<b>Test management:</b> People and organizational issues in testing – organization structures for testing teams, testing services, Test Planning, Test Plan Components, Test Plan Attachments, Locating Test Items. Test management, test process, Reporting Test Results. Introducing the test specialist, Skills needed by a test specialist, Building a Testing Group.	<b>(06)</b>
<b>Unit 5</b>	<b>Controlling and Monitoring:</b> Software test automation – scope of automation, design and architecture for automation, requirements for a test tool. Challenges in automation, Reports and Control Issues, Criteria for Test Completion – SCM .	<b>(07)</b>
<b>Unit 6</b>	<b>Types of reviews :</b> Developing a review program – Components of Review Plans, Reporting Review Results, evaluating software quality, defect prevention, TMM (testing maturity model) Introduction to CAST (Computer Aided Software Testing Tool)	<b>(07)</b>

**Text Books**

- Iene Burnstein “Practical Software Testing” Springer International Edition Chennai, 2003
- Srinivasan Desikan and Gopalaswamy Ramesh, “ Software Testing – Principles and Practices”, Pearson education, 2006
- Aditya P. Mathur, “Foundations of Software Testing”, Pearson Education, 2008

**Reference Books**

- Boris Beizer, “Software Testing Techniques”, Second Edition, Dreamtech, 200 UNIT III
- Elfriede Dustin, “Effective Software Testing”, First Edition, Pearson Education, 200 UNIT III
- Renu Rajani, Pradeep Oak, “Software Testing – Effective Methods, Tools and Techniques”, Tata McGraw Hill, 2004

**Useful Links**

- [http://www.softwaretestingmentor.com/istqb-videos/Software Testing](http://www.softwaretestingmentor.com/istqb-videos/Software%20Testing) by Manish Varma
- <http://nptel.ac.in/courses/106101061/18> Software Testing by Prof. Rushikesh Joshi

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO 1	√		√	√	√	√		√		√
CO 2		√			√		√		√	√
CO 3	√	√	√			√			√	

## Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	05	05		10
Understand	05	05	02	10
Apply	05	05	03	20
Analyse				
Evaluate			02	20
Create			03	
TOTAL	15	15	10	60

**Government College of Engineering, Karad****Second Year (Sem – III) M. C. A.****MC 1306 : Computer Network Lab**

Laboratory Scheme		Examination Scheme	
Practical	02 Hrs/week	CA	25
Total Credits	01		

**Course Outcomes (CO)**

- Students will be able to demonstrate fundamental concepts of computer networks
- Students will be able to understand topologies, devices, transmission medias in network
- Students will be able to use different network commands, software to analyze the network
- Students will be able to use Network simulator for simulation of network effectively.

**Course Contents**

<b>Experiment 1</b>	Study of different types of cables.
<b>Experiment 2</b>	Network devices in details
<b>Experiment 3</b>	Study of Network address.
<b>Experiment 4</b>	Connect the computers in Peer to Peer and Client - Server architecture
<b>Experiment 5</b>	To Share Printer and Folder in Network.
<b>Experiment 6</b>	Study of Network Commands
<b>Experiment 7</b>	Configure a Network Topology using packet tracer software
<b>Experiment 8</b>	Install Wireshark software to capture packet and Configure it to capture Ethernet packet. Verify Ethernet frame structure.
<b>Experiment 9</b>	To familiarize with the network packet sniffer, ethereal. Analyzing HTTP request and response messages. Locating methods like GET, HEAD, POST etc.
<b>Experiment 10</b>	To familiarize with the network packet sniffer, ethereal. Analyzing HTTP request and response messages. Locating methods like GET, HEAD, POST etc.
<b>Experiment 11</b>	Applications using TCP and UDP Sockets like DNS, SNMP, File Transfer
<b>Experiment 12</b>	To visit server room and prepare report on <ol style="list-style-type: none"> <li>Proxy Server</li> <li>Server Configuration</li> <li>Router Configuration</li> <li>Firewall Configuration</li> <li>Network setup details (Topology, Back up, IP range, network software, UPS)</li> </ol>

**List of Submission:**

Minimum 10 experiments to be performed and evaluated Journal

**Tutorials**

A set of Tutorial / problems based on above syllabus is to be submitted



**Government College of Engineering, Karad**

**Second Year (Sem – III) M. C. A.**

**MC 1307 : Advanced Database Management System Lab**

Laboratory Scheme		Examination Scheme	
Practical	02 Hrs/week	CA	25
Total Credits	01		

**Course Outcomes (CO)**

- Students will be able to demonstrate advanced concepts of databases
- Students will be able to understand distributed and parallel databases
- Students will be able to construct simple and moderately advanced database queries using Structured Query Language (SQL).
- Students will be able to understand different database tools.

**Course Contents**

		Hours
<b>Experiment 1</b>	Distributed Database for Bookstore	
<b>Experiment 2</b>	Deadlock Detection Algorithm for distributed database using wait- for graph	
<b>Experiment 3</b>	Object Oriented Database – Extended Entity Relationship (EER)	
<b>Experiment 4</b>	Parallel Database – University Counselling for Engineering colleges	
<b>Experiment 5</b>	Parallel Database – Implementation of Parallel Join & Parallel Sort	
<b>Experiment 6</b>	Active Database – Implementation of Triggers & Assertions for Bank Database	
<b>Experiment 7</b>	Deductive Database – Constructing Knowledge Database for Kinship Domain (Family Relations)	
<b>Experiment 8</b>	Study and Working of WEKA Tool	
<b>Experiment 9</b>	Query Processing – Implementation of an Efficient Query Optimizer	
<b>Experiment 10</b>	Designing XML Schema for Company Database	

**List of Submission:**

Minimum 10 experiments to be performed and evaluated Journal

**Tutorials**

A set of Tutorial / problems based on above syllabus is to be submitted

**Text Books**

- Database system concepts', 5th Edition – Abraham Silberschatz, Henry Korth, S, Sudarshan, (McGraw Hill International).
- Database Management Systems - Raghu Ramkrishnan, Johannes Gehrke Second Edition, (McGraw Hill International)

**Reference Books**

- Fundamentals of Database Systems - Ramez Elmasri , Shamkant Navathe

**Useful Links**

- Distributed Database: [https://www.tutorialspoint.com/distributed\\_dbms/index.htm](https://www.tutorialspoint.com/distributed_dbms/index.htm)
- Parallel Database: <https://www.tutorialride.com/parallel-databases/parallel-databases-tutorial.htm>
- WEKA: <https://opensourceforu.com/2017/01/an-introduction-to-weka/>



**Government College of Engineering, Karad****Second Year (Sem – III) M. C. A.****MC 1308 : Software Testing Lab**

Laboratory Scheme		Examination Scheme	
Practical	02 Hrs/week	CA	25
		ESE	50
Total Credits	01		

**Course Outcomes (CO)**

1. Students will be able to demonstrate knowledge of basic concepts of software testing.
2. Students will be able to develop test cases for manual as well as automation testing.
3. Students will be able to use test case management tools, automation testing software.

**Course Contents****Hours**

	Course Contents	Hours
<b>Experiment 1</b>	Identify test cases using manual testing.	
<b>Experiment 2</b>	Estimate & write test cases for random input triangle problem.	
<b>Experiment 3</b>	Construct equivalence classes and generate test cases for standard input problems.	
<b>Experiment 4</b>	Apply black box testing (Equivalence Class Partitioning & Boundary Value Analysis) for given problem	
<b>Experiment 5</b>	Demonstrate SaaS Test Management tool : Testuff	
<b>Experiment 6</b>	Demonstrate Selenium: An Automation Functional Testing Tool	
<b>Experiment 7</b>	Apply White Box Testing for given source code.	
<b>Experiment 8</b>	Identify test cases for the following applications using Imacro	
<b>Experiment 9</b>	Write the program for quick sorting & debug (analyse) it using eclipse debugger view	
<b>Experiment 10</b>	Identify test cases for the following applications using Load Impact	
<b>Experiment 11</b>	Identify test cases for the following application using LoadUI Web	

**List of Submission**

Minimum 10 experiments to be performed and evaluated Journal

**Useful Links**

1. <http://www.softwaretestingmentor.com/istqb-videos/> Software Testing by Manish Varma
2. <http://nptel.ac.in/courses/106101061/18> Software Testing by Prof. Rushikesh Joshi





**Government College of Engineering, Karad**

**Second Year (Sem – III) M. C. A.**

**MC 1309 : Advanced Java Programming Lab**

Laboratory Scheme		Examination Scheme	
Practical	02 Hrs/week	CA	25
Tutorials	02 Hrs/week	ESE	50
Total Credits	03		

**Course Outcomes (CO)**

1. Develop Java Applet Programming using various techniques
2. Develop applications using Abstract Window Toolkit
3. Update and retrieve the data from the databases using JDBC-ODBC.
4. Develop server side programs using Servlets.  
Develop Java Server Pages applications using JSP Tags

**Course Contents**

**Hours**

<b>Unit 1</b>	<p><b>Basics of Java:</b> Java's importance to the Internet, Java's Magic: The Byte Code, Java buzzwords, Data types, basic syntax of Java, Classes in Java: Introduction to Methods, Constructors, This Keyword, Overloading Methods, Overloading Constructors, Using objects as parameters, A closer look at argument passing, Returning, objects, Understanding Static, Command Line Arguments. Inheritance: Basics, Using Super, Method Overriding, Abstract methods and Class, Using Final with Inheritance, Packages, Importing Packages and Interfaces. Cookies Management</p>	<b>(06)</b>
<b>Unit 2</b>	<p><b>Servlets:</b> Introduction To Web Application Development, Server Side Programming, Introduction To Servlets, Servlet Lifecycle, Servlet With HTML, Server Side Includes, HTTP Tunneling, Servlets With JDBC, Steps to configure Tomcat for server.</p>	<b>(06)</b>
<b>Unit 3</b>	<p><b>Database Programming using JDBC:</b> Introduction to JDBC, JDBC Drivers &amp; Architecture, CRUD operation Using JDBC, Connecting to non-conventional Databases.</p>	<b>(07)</b>
<b>Unit 4</b>	<p><b>Basics of JSP:</b> Life cycle of JSP, JSP API JSP in Eclipse and other IDE's, Scripting elements, Directive Elements, Exception Handling, Action Elements <b>Network Programming</b> Understand how the internet works ,Explain Client/Server computing, Describe the classes of the java.net package ,Describe Java's Web-related classes.</p>	<b>(07)</b>
<b>Unit 5</b>	<p><b>Applets and AWT:</b> Applets: An Overview of Applets, the Life Cycle of an Applet, creating applets, the Graphics Class, Using Colors, Displaying Text, Using Applets in a Web Page, Introduction to Abstract Window Toolkit (AWT), Swing: Labels, Buttons, Canvases, Check Boxes, Choices, Text Fields And Text Areas, Lists, Panels, Windows and Frames, JApplet class, Menus And Menu Bars.</p>	<b>(07)</b>
<b>Unit 6</b>	<p><b>Struts :</b> Introduction to the Apache Struts o MVC Architecture , Struts Architecture , Struts Controller , Struts Action Class, Introduction to Struts Validator Framework, Custom Validators Example ,Developing Application with Struts Tiles. <b>Java Beans</b> Define JavaBeans o Describe the Software Component Model o Understand BDK(Bean Development Kit) ,List the tools for bean development ,Create your own bean ,Describe Custom Bean properties and events, Understand Introspection Reports ,Implement various types of properties ,Describe event listeners ,List the benefits of using JavaBeans</p>	<b>(07)</b>

**Tutorials**

A set of Tutorial/ problems based on above syllabus is to be submitted



**Government College of Engineering, Karad****Second Year (Sem – III) M. C. A.****MC 1310:Professional Communications**

Laboratory Scheme		Examination Scheme	
Practical	02 Hrs/week	CA	50
Tutorials	02 Hrs/week		
Total Credits	03		

**Course Outcomes (CO)**

At the end of the course student will be able to

1. Learn professional skills to communicate effectively & confidently.
2. Learn to Induce basic mathematical sense to create a sound foundation for cognitive skills.
3. To Develop advanced language skills through an activity based, regularly evaluated and continuously proctored course module.

**Course Contents**

		Hours
<b>Unit 1</b>	<b>Learning the fundamentals of grammar</b> Module-I: Phonics & Syllable, Root words, Module-II: Parts of Speech Module-III: Tense	<b>(06)</b>
<b>Unit 2</b>	<b>Writing Skills</b> Module-I: Email Module-II: Passage writing Module-III: Letter Module-IV: Story/Blog	<b>(06)</b>
<b>Unit 3</b>	<b>Fill in the blanks</b> Module-I: Article Based Module-II: Preposition Based Module-III: Vocabulary based Module-IV: Cloze test	<b>(06)</b>
<b>Unit 4</b>	<b>Managerial Skill development</b> Module-I: Basic Employability Skills Module-II: Leadership Development Module-III: Team Management & Team Building Module-IV: Corporate Expectations	<b>(06)</b>
<b>Unit 5</b>	<b>Speaking</b> Module-I: Group Discussions Module-II: JAM / Role Play Module-III: Debate	<b>(06)</b>
<b>Unit 6</b>	<b>Logical Reasoning</b> Module-I: Logical Revision-1-Blood Relation, Direction Sense, Number-Letter series Module-II: Seating Arrangement Module-III: Complex Arrangement  <b>Quantitative Aptitude</b> Module-I: Revision-1-Percentage, P&L, TRW, Pipes & Cisterns Module-II: Revision-2-STD-I & STD-II Module-III: Ration & Proportion, Mixture & alligations	<b>(10)</b>

**Tutorials**

A set of Tutorial/ problems based on above syllabus is to be submitted

**Government College of Engineering, Karad**

**Second Year (Sem – IV) M. C. A.**

**MC 1401 : Information Security**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

1. Upon completion of this material, students should be able to define information security
2. Students will be able to recount the history of computer security and how it evolved into information security.
3. Students will be able to define key terms and critical concepts of information security
4. Students will be able to classify technologies for network, transport and application layer security.

**Course Contents**

		Hours
<b>Unit 1</b>	<b>Information Security:</b> Introduction: Security mindset, Computer Security Concepts (CIA), Threats, Attacks, and Assets, Model for Information Security	<b>(06)</b>
<b>Unit 2</b>	<b>Symmetric Cryptography:</b> Concepts and Techniques, Symmetric key Ciphers- Substitution and transposition techniques – Ciesar cipher, playfair, mono-alphabetic, steganography, DES structure, DES Analysis, Security of DES, variants of DES, Block cipher modes of operation , Block cipher design principles.	<b>(06)</b>
<b>Unit 3</b>	<b>Asymmetric key cryptography:</b> AES structure, Analysis of AES , Key distribution Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Analysis of RSA, Diffie-Hellman Key exchange	<b>(06)</b>
<b>Unit 4</b>	<b>Practical Cryptography:</b> Encryption, authentication, hashing, Digital Signatures and Certificates, Network security issues, Sniffing, IP spoofing	<b>(07)</b>
<b>Unit 5</b>	<b>Security at layers(Network, Transport, Application):</b> Network security issues, Sniffing, IP spoofing. IPsec, Secure Socket Layer(SSL), Transport Layer Security(TLS), Secure Electronic Transaction(SET), Pretty Good Privacy(PGP), S/MIME	<b>(07)</b>
<b>Unit 6</b>	<b>Intruders, Virus and Firewalls:</b> Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls	<b>(08)</b>

**Text Books**

1. Cryptography and Network Security : William Stallings, Pearson Education, 4th Edition
2. Principles of Information Security : Michael E. Whitman, Herbert J. Mattord, CENGAGE Learning, 4th Edition.

**Reference Books**

1. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning
2. Cryptography and Network Security : C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
3. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
4. Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH
5. Handbook of Security of Networks, Yang Xiao, Frank H Li, Hui Chen, World Scientific, 2011.
6. Cryptography and Network Security : Atul Kahate, Mc Graw Hill, 2nd Edition

**Useful Links**

1. <http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/> Computer Systems Security by Prof. Nikolai Zeldovich
2. <http://nptel.ac.in/courses/106106129/> Information Security by Professors at IIT Madras
3. [http://vlab.co.in/ba\\_labs\\_all.php?id=2](http://vlab.co.in/ba_labs_all.php?id=2) Information Security Virtual Labs by Professors at IIIT Hyderabad
4. <http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/> Computer Systems Security by Prof. Nikolai Zeldovich

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO 1	√		√	√	√	√		√		√
CO 2		√			√		√		√	√
CO 3	√	√	√	√		√			√	
CO 4	√		√		√			√		

## Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

**Government College of Engineering, Karad**

**Second Year (Sem – IV) M. C. A.**

**MC 1402 : Data Mining**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

1. Describe the designing of Data Warehousing so that it can be able to solve the root problems.
2. To understand various tools of Data Mining and their techniques to solve the real time problems.
3. To develop ability to design various algorithms based on data mining tools.
4. To develop further interest in research and design of new Data Mining techniques.

**Course Contents**

		Hours
<b>Unit 1</b>	<b>Introduction:</b> Classification, cluster analysis, outlier analysis, regression for predictive analysis, data mining applications.	<b>(06)</b>
<b>Unit 2</b>	<b>Data Pre-processing</b> Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.	<b>(08)</b>
<b>Unit 3</b>	<b>Data Warehousing and Online Analytical Processing:</b> Data Warehouse: Basic Concepts, Modeling: Data warehouse architecture, Data Cube and OLAP, Design and Usage, partitioning strategies, data marting.	<b>(08)</b>
<b>Unit 4</b>	<b>Association:</b> Basic concepts, frequent itemsets mining methods-Apriori algorithm, FP tree.	<b>(04)</b>
<b>Unit 5</b>	<b>Classification:</b> Basic Concepts, Decision Tree Induction, ID3, C4.5, SLIQ algorithms, Bayes' Classification Methods, Rule-Based Classification.	<b>(06)</b>
<b>Unit 6</b>	<b>Cluster Analysis and Outlier Detection:</b> Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Evaluation of Clustering. Outliers and Outlier Analysis, Outlier Detection Methods, Statistical Approaches.	<b>(08)</b>

**Text Books**

1. Data mining - Concepts & Techniques, Jiawei Han, Micheline Kamber, Jian Pei, 3<sup>rd</sup> Ed. 2012, MK publications.
2. Data Warehousing in the Real World-Sam Anahory, Dennis Murray, 3<sup>rd</sup> Ed. 2008, Pearson Education.

**Reference Books**

1. Mastering Data Mining- Michael J. A. Berry, Gordon S. Linoff, 2<sup>nd</sup> Edition Wiley publications.
2. Fundamentals of Database Systems, Navathe and Elmasry, Addison Wesley, 2000
3. Oracle 8i Data Warehousing, Michale Corey, Michale Abbey, Tata McGraw Hill

**Useful Links**

1. <http://nptel.ac.in/courses/106106093/35>Data Mining, Shrinath Shrinivasa IIT Madras
2. <http://www.kdnuggets.com/2014/09/most-viewed-data-mining-talks-videlectures.html> Data Mining, Grant Marshall, KDnugget

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO 1	√			√	√			√	√	√
CO 2		√		√	√		√		√	
CO 3	√		√		√	√	√	√		√
CO 4			√		√	√	√	√		√

## Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5	5	5	10
Understand	3	5	2	10
Apply	5	2	3	20
Analyse	2	-	-	-
Evaluate	-	3	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

**Government College of Engineering, Karad**

**Second Year (Sem – IV) M. C. A.**

**MC 1413 : Elective-I Digital Forensics**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

1. Understand general knowledge and comprehension of digital forensic as a profession.
2. Apply the technical tools and techniques used in the field of digital forensics
3. Evaluate an emerging issue in computer and cyber forensics.
4. Analyze the position or arguments around the issue, and present his/her knowledge in a written logical professional manner.

**Course Contents**

		Hours
<b>Unit 1</b>	<b>Introduction of Cyber Crime:</b> Types, The Internet spawns crime, Computers' roles in crimes, Prevention of Cyber crimes, A global Perspective on cybercrimes, <b>Digital Forensics:</b> Historical Background of Digital Forensics, Importance of Digital Forensics, Digital Forensics Rules, Digital Forensics Investigation, DF Investigation Processes/Models/Framework.	<b>(04)</b>
<b>Unit 2</b>	<b>Digital Evidences:</b> Digital Evidences and its rules, Digital Evidence Characteristics, Types, Challenges in Evidence Handling, Volatile Evidences, Evidence Handling Procedures. <b>Incident Response:</b> Overview of Incident Response, People involved in Incident Response Process, Incident Response Methodology, Activities in Initial Response, Phase after detection of an incident.	<b>(08)</b>
<b>Unit 3</b>	<b>Data Collection:</b> Introduction to Data Collection, People Involved in Data Collection Techniques, Live Data Collection, Data Collection from Windows, Unix. <b>Forensic Duplication:</b> Forensic Duplication Rules,Need of Forensic Duplication, Forensic Duplicates as Admissible Evidence, Important Terms, Forensic Duplication Tools, Creating a Forensic Duplicate of a Hard Drive,	<b>(08)</b>
<b>Unit 4</b>	<b>Network Forensics:</b> Introduction to Intrusion Detection System, Types of Intrusion Detection System, Advantages and Disadvantages of IDS, Understanding Network Intrusions and Attacks, Recognizing Pre-Intrusion/Attack Activities, Port Scans, Address Spoofing, Attacking with Trojans, Viruses and Worms, Collecting Network-Based Evidence. <b>Email Forensics, Mobile Phone Forensics, Cloud Forensics</b> Digital Forensics Tools.	<b>(08)</b>
<b>Unit 5</b>	<b>Data Analysis:</b> Data Analysis Techniques, Forensic Analysis of File Systems <b>Report Writing:</b> Goals of Report, Investigative Report Layout, Guidelines for Report Writing.	<b>(04)</b>
<b>Unit 6</b>	<b>Cyber Law:</b> Introduction to Cyber Laws, Why do we need Cyberlaw: The Indian Context, Three Bodies of Law, Types, Levels, Computers Related Laws, Cybercrime and the Indian ITA 2000 and amendments, The Indian Penal Code (IPC) 1860, Mapping of Cybercrime with IT Act, Technology and Students: Indian Scenario	<b>(08)</b>

**Text Books**

1. Digital Forensic: The Fascinating World of Digital Evidences by Dr. Nilakshi Jain, Dr.Dhananjay R. Kalbande, Wiley 2016, ISBN: 978-8126565740
2. Digital Forensics with Open Source Tools by Cory Altheide and Harlan Carvey, Syngress, April 2011, ISBN: 978-1597495868

**Reference Books**

1. Digital Evidence and Computer Crime: Forensic Science, Computers and the Internet by Eoghan Casey, Academic Press; 3rd edition ISBN: 978-0123742681
2. Computer Forensics: Investigating Data and Image Files by EC-Council Press, Cengage Learning; 1 edition ISBN: 978-1435483514
3. Guide to Computer Forensics and Investigations by Bill Nelson, Amelia Phillips, Christopher Stuart, Cengage; 5 edition (January 15, 2015), ISBN: 978-1285060033
4. Mobile Forensic Investigations: A Guide to Evidence Collection, Analysis and Presentation by Lee Reiber, McGraw-Hill Education (16 December 2015), ISBN: 978-0071843638
5. Digital Forensics with Kali Linux by Shiva V.N. Parasram, Packt Publishing Limited (19 December 2017), ISBN-13: 978-1788625005

**Useful Links**



1.	Indian Computer Emergency Response Team <a href="https://www.cert-in.org.in/">https://www.cert-in.org.in/</a>
2.	CDAC, Cyber Security and Cyber Forensics, <a href="https://www.cdac.in/index.aspx?id=cyber_security">https://www.cdac.in/index.aspx?id=cyber_security</a>
3.	Maharashtra Judicial Academy and Indian Mediation Centre and Training Institute <a href="http://mja.gov.in/Site/Home/Index.aspx">http://mja.gov.in/Site/Home/Index.aspx</a>
4.	Secure India- A Group of Cyber Security Specialists <a href="http://www.secureindia.in/">http://www.secureindia.in/</a>
5.	Resource Centre for Cyber Forensics – India <a href="http://www.cyberforensics.in">http://www.cyberforensics.in</a>
6.	Cyber Law of India <a href="http://www.cyberlawsindia.net">http://www.cyberlawsindia.net</a>
7.	International Forensic Sciences Education Dept. (Forensic Sciences and Investigation Courses) <a href="http://www.ifs.edu.in">http://www.ifs.edu.in</a> <a href="http://www.forensic.co.in/">http://www.forensic.co.in/</a>
8.	Computer Forensic Training Center Online <a href="http://www.cftco.com/">http://www.cftco.com/</a>
9.	Digital Forensic Magazine <a href="http://www.digitalforensicsmagazine.com/">http://www.digitalforensicsmagazine.com/</a>
10.	The Journal of Digital Forensics, Security and Law <a href="https://commons.erau.edu/jdfsl/">https://commons.erau.edu/jdfsl/</a>
11.	Journal of Digital Forensic Practice <a href="https://www.tandfonline.com/loi/udfp20">https://www.tandfonline.com/loi/udfp20</a>
12.	Electronic Crime Scene Investigation: A Guide for First Responders - <a href="https://www.ncjrs.gov/">https://www.ncjrs.gov/</a>
13.	CERIAS Forensics Research ( <a href="http://www.cerias.purdue.edu/research/forensics/">http://www.cerias.purdue.edu/research/forensics/</a> ) Scientific Working Group on Digital Evidence ( <a href="https://www.swgde.org/">https://www.swgde.org/</a> )

### Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO 1	√			√	√		√			
CO 2		√	√							
CO 3	√					√	√			
CO 4					√	√				

### Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember				
Understand	02	02	02	10
Apply	05	05	03	20
Analyse	04	04	03	20
Evaluate	04	04	02	10
Create				
TOTAL	15	15	10	60

**Government College of Engineering, Karad****Second Year (Sem – IV) M. C. A.****MC 1423 : Elective-I Embedded Systems**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

- Students will be able to demonstrate knowledge of basic principles of Embedded Systems.
- Students will be able to inculcate knowledge of Memory, Processes, and IO.
- Students will be able to design circuits.

**Course Contents****Hours**

<b>Unit 1</b>	<b>Introduction to Embedded Systems</b> Introduction to Embedded systems: Processor Embedded into a system, Embedded hardware Units and Devices in Systems, Embedded software, Examples, Embedded System on Chip (SOC) and VLSI Circuit Design Technology, Design Process, Classification of Embedded Systems, Skills required for an Embedded System Designer.	<b>(08)</b>
<b>Unit 2</b>	<b>Embedded processing</b> 8051 and Advanced Processor Architectures: Memory Organization and Real world Interfacing, Processor and Memory Organization, Instruction level Parallelism, Performance Matrix. Processor and Memory Selection, Devices and Communication Buses, IO Types, Serial Communication, Parallel Device Ports, Wireless Device, Real Time Clock, Networked Embedded System.	<b>(08)</b>
<b>Unit 3</b>	<b>Operating Systems:</b> Real Time Operating Systems: OS Services, Process management, Timer and Event Functions, Memory Management, Device, File and I/O Subsystems Management, Interrupt routine and RTOs Environment, Basic Design using RTOs, Task Scheduling, Interrupt Latency, OS Security Issues	<b>(08)</b>
<b>Unit 4</b>	<b>Embedded Software:</b> Programming embedded systems in assembly and C – Meeting real time constraints – Multi-state systems and function sequences.	<b>(06)</b>
<b>Unit 5</b>	<b>Embedded Software Tool:</b> Embedded software development tools–Emulators and debuggers.	<b>(04)</b>
<b>Unit 6</b>	<b>Embedded System Development:</b> Design issues and techniques – Case studies – Complete design of example embedded systems.	<b>(06)</b>

**Text Books**

- Wayne Wolf, “Computers as Components: Principles of Embedded Computer System Design”, Elsevier, 2006.
- Michael J. Pont, “Embedded C”, Pearson Education, 2007.

**Reference Books**

- Steve Heath, “Embedded System Design”, Elsevier, 2005
- David Simon, “An Embedded Software Primer”, Addison Wesley, 2000
- Raj Kamal, “Embedded Systems: Architecture, Programming and Design”, TMH
- Muhammed Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay, “The 8051 Microcontroller and Embedded Systems”, Pearson Education, Second edition, 2007

**Useful Links**

- [http://nptel.ac.in/courses/108102045/Embedded Systems by Dr. Santanu Chaudhury](http://nptel.ac.in/courses/108102045/Embedded%20Systems%20by%20Dr.%20Santanu%20Chaudhury)
- <http://www.embedded.com/electrical-engineer-community/general/4402976/VIDEO--MIT-lectures-on-Computer-Science-Programming> Embedded Systems by Bernard Cole
- [http://nptel.ac.in/courses/108102045/Embedded Systems by Dr. Santanu Chaudhury](http://nptel.ac.in/courses/108102045/Embedded%20Systems%20by%20Dr.%20Santanu%20Chaudhury)

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO 1	√		√	√	√	√		√		√
CO 2			√		√		√		√	√
CO 3		√	√			√				

## Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

**Government College of Engineering, Karad**

Second Year (Sem – IV) M. C. A.

**MC 1433 : Elective-I Distributed Systems**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

- Students will be able to understand basic concepts of Distributed Systems.
- Students will be able to learn process, synchronization, security in Distributed Systems.
- Students will be able to apply knowledge of Distributed Systems in cluster formation or any other Distributed Systems.

**Course Contents****Hours**

<b>Unit 1</b>	<b>Introduction:</b> Definition, goals, types of distributed system, architecture, architectural styles, system architectures, Client-server model and examples of distributed system.	<b>(08)</b>
<b>Unit 2</b>	<b>Processes And Communication:</b> Threads, virtualization, clients, servers, remote procedure calls, distributed shared memory	<b>(08)</b>
<b>Unit 3</b>	<b>Synchronization:</b> clock synchronization, logical clock, mutual exclusion	<b>(xx)</b>
<b>Unit 4</b>	<b>Consistency And Replication:</b> Introduction, Data Centric Consistency Model, Client Centric Consistency Model, Replica Management, Consistency Protocol <b>Security:</b> Introduction, Secure Channels, Access Control, Security Management	<b>(08)</b>
<b>Unit 5</b>	<b>The Age of the Data Product:</b> What Is a Data Product? Building Data Products at Scale with Hadoop, Big Data, The Data Science Pipeline and the Hadoop Ecosystem, MapReduce detailed	<b>(08)</b>
<b>Unit 6</b>	An Operating System for Big Data: Basic Concepts Hadoop Architecture, Working with a Distributed File System, Working with Distributed Computation, Submitting a MapReduce Job to YARN	<b>(08)</b>

**Text Books**

- Distributed System - A S Tanenbaum (2nd edition) (chapter 1 and 2).
- Data Analytics with Hadoop - Kim O'Reilly Media 978-1-4919-1370-3

**Reference Books**

- Distributed Operating Systems - Dr. P. K. Sinha (PHI)
- Distributed system , concepts and design ,4<sup>th</sup> edition - Coulouirs, Dollimore, Kindberg (Addison Wesley)

**Useful Links**

- <http://video.mit.edu/watch/lecture-20-distributed-systems-1845/> Distributed Systems by Saman Amarasinghe
- <http://www.nptel.ac.in/courses/106106107/> Distributed Systems by Prof. Ananthnarayana V.S.

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO 1	√	√	√	√		√			√	
CO 2	√		√		√		√	√		√
CO 3	√	√	√	√	√	√	√	√		√

## Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

**Government College of Engineering, Karad**

**Second Year (Sem – IV) M. C. A.**

**MC 1443 : Elective-I Object Oriented Modelling And Design**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

1. Understand the principles of Object Oriented Design
2. Apply UML in Object Oriented Software Development
3. Ability to work in teams to perform the Object Oriented Techniques

**Course Contents**

		<b>Hours</b>
<b>Unit 1</b>	<b>Introduction:</b> What is Object Orientation? What is Object Oriented Development? Object Oriented Themes? Evidence for Usefulness of Object Oriented Development, <b>Modeling Concepts:</b> Modeling, Abstraction, The Three Models.	<b>(04)</b>
<b>Unit 2</b>	<b>Class Modeling:</b> Object and Class Concepts, Link and Association Concepts, Generalization and Inheritance, A Sample Class Diagram, Navigation of Class Models, Advanced Object and Class Concepts, N-ary Associations, Aggregation, Abstract Classes, Multiple Inheritance, Metadata, Constraints, Derived Data, Packages.	<b>(08)</b>
<b>Unit 3</b>	<b>State Modeling:</b> Events, States, Transitions and Conditions, State Diagrams, State Diagram Behaviour, Nested States Diagrams, Nested States, A Sample State Models, A Relation of Class and State Models.	<b>(08)</b>
<b>Unit 4</b>	<b>Interaction Modeling:</b> Use Case Models, Sequence Models, Activity Models, Use Case Relationship, Procedural Sequence Models. <b>Architectural Modeling:</b> Component Diagram, Deployment Diagram	<b>(08)</b>
<b>Unit 5</b>	<b>Analysis:</b> <b>Process Overview:</b> Development Stages, Development Life Cycle <b>System Conception:</b> Devising a System Concept, Elaborating a Concept, Preparing a Problem Statement. <b>Domain Analysis:</b> Overview of Analysis	<b>(08)</b>
<b>Unit 6</b>	<b>Design:</b> <b>System Design:</b> Overview of System Design, Estimating Performance, Making a Reuse Plan, Breaking a System into Sub-System, Design Pattern <b>Implementation:</b> <b>Implementation Modeling:</b> Overview of Implementation.	<b>(06)</b>

**Text Books**

1. Object Oriented Modeling and Design with UML by Michael Blaha, James Rumbaugh, PHI 2<sup>nd</sup> Edition
2. Object Oriented Analysis and Design with Applications - Grady Booch, Pearson Education Asia 3<sup>rd</sup> Edition

**Reference Books**

1. Object Oriented Analysis and Design with Applications by Addison Wesley, Third Edition
2. The Unified Modeling Language User Guide by Booch, Rumbaugh, Jacobson, Second Edition, Pearson
3. Object-Oriented Software Engineering : Using UML Patterns, and Java by Bernd Bruegge, Allen H. Dutoit, Third Edition, Prentice Hall

**Useful Links**

1. <http://nptel.ac.in/courses/122105022/27> NPTEL OOMD, IIT Kharagpur, Prof. Vishbajit Mohanty
2. [http://www.tutorialspoint.com/object\\_oriented\\_analysis\\_design/](http://www.tutorialspoint.com/object_oriented_analysis_design/) OOMD Tutorial Point

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO 1	√							√	√	√
CO 2	√	√			√		√		√	
CO 3	√	√		√	√	√	√	√		√

## Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	-	-	-	-
Understand	4	4	2	20
Apply	5	5	3	25
Analyse	4	4	3	10
Evaluate	2	2	2	05
Create	-	-	-	-
TOTAL	15	15	10	60

**Government College of Engineering, Karad**

**Second Year (Sem – IV) M. C. A.**

**MC 1404 : E-Governance**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
Tutorials	01 Hrs/week	CT – 2	15
Total Credits	04	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

- Understand the basic functioning of e-governance
- Apply the technical and management skills in implementing e-governance projects.
- Analyse and evaluate assessment framework of e-governance projects.

**Course Contents**

		Hours
<b>Unit 1</b>	<b>Introduction to e-Governance:</b> Definitions, Evolution of E-Governance, Objectives of E-Governance, Benefits of E-Governance, Pillars of E-Governance, Concept of Citizen Centricity, E-Governance Models, National e-Governance Plan, Role of ICT in E-Governance, Current Status in India and Global.	<b>(08)</b>
<b>Unit 2</b>	<b>Models of E-Governance:</b> Management Models: Centralised, Decentralised, Hybrid, Implementation Models: Back End Automation, Front End Services, Holistic, Business Models: Self Finance, PPP, JV, Different Payment, Facilities Management Outsourcing, Management of Intellectual Properties. Stages of e-Governance evolution, Various models, E-Government maturity model.	<b>(08)</b>
<b>Unit 3</b>	<b>Technical Trends in E-Governance:</b> Recent Technical Trends in E-Governance, E-Governance Life Cycle, Different between general and e-Governance Project Life Cycle, Concept behind and importance of each PLC stage, E-Governance Standards, Government of India Guidelines for Websites,	<b>(08)</b>
<b>Unit 4</b>	<b>Managing e-Governance:</b> Digital Divide, Overcomming the Digital Divide, Theory and practice of BPRs, Change Management, Capacity Building, Role of Political Leadership, Role of Social Media and Citizens,	<b>(06)</b>
<b>Unit 5</b>	<b>Performance Management:</b> India and Global Assessment framework and variety of e-readiness indexes and their usefulness Outcomes and Benefits management.	<b>(04)</b>
<b>Unit 6</b>	<b>Issues and Challenges in e-Governance:</b> Universally identified challenges, Challenges facing e-Governance practitioners in India, E-Governance Success Mantras, Research directions in e-governance. Case Studies: Global and Indian Case studies of Successful and Unsuccessful Projects.	<b>(06)</b>

**Tutorials**

**Text Books**

- E-Government: From vision to implementation. Subhash Bhatnagar, Sage Publications India Pvt. Ltd. 1<sup>st</sup> Edition
- E-Governance- Concepts and Case Studies, C S R Prabhu, PHI Learning Pvt. Ltd., 2<sup>nd</sup> Edition

**Reference Books**

- Unlocking E-Governance Potential Concepts Cases and Practical Insights, Subhash Bhatnagar, Sage Publications India Pvt. Ltd. 1<sup>st</sup> Edition
- Compendium of E-Governance Initiatives in India, Piyush Gupta, R. K. Bagga, University Press India, 1<sup>st</sup> Edition
- E-Governance Case Studies, Ashok Agarwal, University Press India, 1<sup>st</sup> Edition
- Information Technology and E-Governance, N. Gopalsamy, New Age International Publications, 1<sup>st</sup> edition

**Useful Links**

- [http://arc.gov.in/11threp/ARC\\_11th\\_report.htm](http://arc.gov.in/11threp/ARC_11th_report.htm)
- <http://www.insightsonindia.com/2014/11/23/e-governance-india-concept-initiatives-issues/>
- <http://meity.gov.in/content/e-governance>
- <https://egovtraining.maharashtra.gov.in/1035/Home>
- <https://it.maharashtra.gov.in>
- <http://guidelines.gov.in/>
- <https://www.mahaonline.gov.in/>
- <http://meity.gov.in/content/csc-scheme>
- <http://digitalindia.gov.in/>



**Mapping of COs and POs**

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO 1	√			√			√			
CO 2		√	√		√					
CO 3	√				√	√	√			

**Assessment Pattern (with revised Bloom's Taxonomy)**

Knowledge Level	CT 1	CT 2	TA	ESE
Remember				
Understand	02	02	02	10
Apply	05	05	03	20
Analyse	04	04	03	20
Evaluate	04	04	02	10
Create				
TOTAL	15	15	10	60

**Government College of Engineering, Karad**

**Second Year (Sem – IV) M. C. A.**

**MC 1405 : Computer Algorithm**

Teaching Scheme		Examination Scheme	
Lectures	03 Hrs/week	CT – 1	15
		CT – 2	15
Total Credits	03	TA	10
		ESE	60
		Duration of ESE	02 Hrs 30 Min

**Course Outcomes (CO)**

- Students will be able to understand the Algorithm specifications, performance analysis
- Students will be able to design the different Algorithms
- Students will be able to use the different Algorithms in programming techniques.

**Course Contents**

		Hours
<b>Unit 1</b>	<b>Introduction:</b> Algorithm specifications, performance analysis, randomize algorithm, Data structures like stack, queue, graph, tree.	<b>(06)</b>
<b>Unit 2</b>	<b>Divide and conquer:</b> General method, binary search, finding maximum and minimum, merge sort, quick sort, STRASSEN's matrix multiplication, convex hull.	<b>(06)</b>
<b>Unit 3</b>	<b>The greedy method:</b> KNAPSACK problem, tree vertex splitting, job sequencing with dead lines, optimal merge pattern, single source shortest paths.	<b>(07)</b>
<b>Unit 4</b>	<b>Dynamic programming:</b> Multistage graphs, All pairs shortest path, optimal binary search trees, string edition, 0/1 KNAPSACK, reliability design, traveling salesman problem.	<b>(07)</b>
<b>Unit 5</b>	<b>Basic traversal and search techniques:</b> Techniques for binary trees, Breadth first, depth first search, connected components and spanning trees, bi connected components and Depth First Search (DFS), Breath First Search (BFS).	<b>(07)</b>
<b>Unit 6</b>	<b>Back Tracking and Branch and bound:</b> The 8 Queen's problem, sum of subsets, Graph coloring, KNAPSACK problem. The method, 0/1 KNAPSACK problem, Traveling salesman problem, Efficiency considerations.	<b>(07)</b>

**Text Books**

- Fundamentals of computer algorithm by Horowitz and Sahni, Galgotia
- Design and analysis of algorithm by Aho and Ullman, Addison Wesley and company – 2008.

**Reference Books**

- Data Structures and Algorithms by Alfred V. Aho, Jeffrey Ullman-Pearson Education Asia-Seventh Indian reprints 2002.
- Algorithms in Nutshell by George Heineman, Gary Pollice-SPD-Oct 2008.

**Useful Links**

- <http://www.nptel.ac.in>,
- [www.ocw.mit.edu](http://www.ocw.mit.edu)

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO 1		√		√	√	√	√	√		
CO 2	√	√	√	√	√	√	√		√	
CO 3	√	√			√	√	√			√

## Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

**Government College of Engineering, Karad****Second Year (Sem – IV) M. C. A.****MC 1406 : Data Mining Lab**

Laboratory Scheme		Examination Scheme	
Practical	02 Hrs/week	CA	25
		ESE	25
Total Credits	01		

**Course Outcomes (CO)**

- Students will be able to learn python programming for data mining.
- Students will be able to Implement the appropriate data mining methods like classification, clustering or Frequent Pattern mining on large data sets.
- Students will be able to use databases with python.

**Course Contents****Hours**

	Course Contents	Hours
<b>Experiment 1</b>	Evolution of data management technologies, introduction to data warehousing concepts.	
<b>Experiment 2</b>	Installing python.	
<b>Experiment 3</b>	A simple affinity analysis example.	
<b>Experiment 4</b>	Implementing a simple ranking of rules.	
<b>Experiment 5</b>	Develop an application to extract association mining rule.	
<b>Experiment 6</b>	Develop an application for classification of data.	
<b>Experiment 7</b>	Develop an application to implement defining subject area, design of fact dimension table, data mart.	
<b>Experiment 8</b>	Develop an application to implement OLAP, roll up, drill down, slice and dice operation.	
<b>Experiment 9</b>	Develop an application for one clustering technique.	
<b>Experiment 10</b>	Develop an application for implementing Naïve Bayes classifier.	
<b>Experiment 11</b>	Develop an application for decision tree.	
<b>Experiment 12</b>	Develop an application to construct a multidimensional data	

**List of Submission**

Minimum 10 experiments to be performed and submitted.

**Reference Books**

- Learning Data Mining with Python, 2nd Edition by Robert Layton, PACKT Publishers.
- Python for Data Analysis, 2<sup>nd</sup> Edition by Wes McKinney, O’Rielly Publishers.

## Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO 1	√		√	√	√	√	√	√		√
CO 2		√	√		√		√		√	√
CO 3		√		√	√	√			√	

## Assessment Pattern (with revised Bloom's Taxonomy)

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp9	Exp10	CA
Assembling		√	√	√		√					√
Testing			√					√			
Observing	√	√	√	√	√	√	√	√	√	√	
Analyzing	√	√	√		√	√	√	√	√	√	
Interpreting	√	√	√	√		√	√				
Designing	√	√		√	√	√	√	√	√	√	
Creating		√		√	√	√	√	√	√	√	
Deducing conclusions	√		√		√	√	√	√	√	√	

**Government College of Engineering, Karad**

**Second Year (Sem – IV) M. C. A.**

**MC 1407 : Web Technology Lab**

Laboratory Scheme		Examination Scheme	
Practical	02 Hrs/week	CA	25
Tutorials	02 Hrs/week	ESE	25
Total Credits	03		

**Course Outcomes (CO)**

- Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.
- Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.
- Utilize the concepts of JavaScript and Java
- Use web application development software tools i.e. Ajax, PHP and Python etc. and identify the environments currently available on the market to design web sites.

**Course Contents**

		Hours
<b>Unit 1</b>	<b>Introduction:</b> Introduction and Web Development Strategies, History of Web and Internet, Protocols governing Web, Writing Web Projects, Connecting to Internet, Introduction to Internet services and tools, Introduction to client-server computing	<b>(06)</b>
<b>Unit 2</b>	<b>Web Page Designing:</b> HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets; Presentation and layout: Image preliminaries, HTML image basics, maps and buttons.	<b>(06)</b>
<b>Unit 3</b>	<b>Java Scripts:</b> Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script, CSS, Node JS, Angular JS	<b>(07)</b>
<b>Unit 4</b>	<b>XML</b> Introduction to XML, Anatomy of an XML, document, Creating XML Documents, Creating XML DTDs, XML Schemas, XSL.	<b>(07)</b>
<b>Unit 5</b>	<b>Apache Tomcat and Nginx</b> <b>Apache tomcat</b> architecture, requirements for installing and configuring Tomcat, Steps for installing and configuring Tomcat, Test your Tomcat installation  <b>Nginx :</b> Installing Nginx,Starting Nginx, Check if Nginx is Running, Nginx configuration file, Configuring Nginx	<b>(07)</b>
<b>Unit 6</b>	<b>Introduction to Bootstrap:</b> Use of Bootstrap, Bootstrap Packages, Environment Setup,Grid System, File system, Bootstrap-CSS overview,Tropography, Bootstrap Code, Forms,Buttons,Helper classes etc.	<b>(07)</b>

**Tutorials**

A set of Tutorial/ problems based on above syllabus is to be submitted

**Sample List of Experiments:**

<b>Experiment 1</b>	Use of Html and ITS different tags.	
<b>Experiment 2</b>	Creating a table and frame.	
<b>Experiment 3</b>	Installations of Web servers: Apache Tomcat, Nginx	
<b>Experiment 4</b>	Creating a Form.	
<b>Experiment 5</b>	Introduction to JavaScript. and AJAX	
<b>Experiment 6</b>	Using JQuery functions/Events	
<b>Experiment 7</b>	Design a webpage using CSS (Cascading stylesheet).	
<b>Experiment 8</b>	Design a webpage using Angular JS	
<b>Experiment 9</b>	Design a webpage using Node JS	

<b>Experiment 10</b>	Design responsive web application using to Bootstrap									
<b>List of Submission:</b>										
Total number of Experiments: 10										
<b>Text Books</b>										
1.	Aleksa Vukotic and James Goodwill, “Apache Tomcat 7”, Apress, 2011.									
2.	Xavier, C, “ Web Technology and Design” , New Age International									
3.	Burdman, Jessica, “Collaborative Web Development” Addison Wesley									
<b>Reference Books</b>										
1.	Ivan Bayross, ” HTML, DHTML, Java Script, Perl & CGI”, BPB Publication									
2.	Bhave, “Programming with Java”, Pearson Education									
3.	Herbert Schildt, “The Complete Reference:Java”, TMH.									
4.	Hans Bergsten, “Java Server Pages”, SPD O’Reilly									
5.	Naughton, Schildt, “The Complete Reference JAVA2”, TMH									
6.	Balagurusamy E, “Programming in JAVA”, TMH									
7.	Content Management Bible (2nd Edition) 2nd Edition by Bob Boiko, WILEY, publications									
<b>Useful Links</b>										
1.	<a href="https://www.tutorialspoint.com/bootstrap/bootstrap_quick_guide.htm">https://www.tutorialspoint.com/bootstrap/bootstrap_quick_guide.htm</a>									
2.	<a href="http://tutorials.jenkov.com/nginx/index.html">http://tutorials.jenkov.com/nginx/index.html</a>									

### Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO 1	√		√	√	√	√	√	√		√
CO 2		√	√		√		√		√	√
CO 3		√		√	√	√			√	
CO 4	√		√		√			√		√

### Assessment Pattern(with revised Bloom’s Taxonomy)

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp9	Exp10	CA
Assembling		√	√	√		√					√
Testing			√					√			
Observing	√	√	√	√	√	√	√	√	√	√	
Analyzing	√	√	√		√	√	√	√	√	√	
Interpreting	√	√	√	√		√	√				
Designing	√	√		√	√	√	√	√	√	√	
Creating		√		√	√	√	√	√	√	√	
Deducing conclusions	√		√		√	√	√	√	√	√	

**Government College of Engineering, Karad**

**Second Year (Sem – IV) M. C. A.**

**MC 1408 : Cyber Security Lab**

Teaching Scheme		Examination Scheme	
Lectures	02 Hrs/week	CA	50
Tutorials	02 Hrs/week		
Total Credits	03		

**Course Outcomes (CO)**

1. Assess the current security landscape, including the nature of the threat, the general status of common vulnerabilities, and the likely consequences of security failures;
2. Critique and assess the strengths and weaknesses of general cybersecurity models, including the CIA triad;
3. Appraise the interrelationships among elements that comprise a modern security system, including hardware, software, policies, and people;
4. Assess how all domains of security interact to achieve effective system-wide security at the enterprise level.

**Course Contents**

		Hours
<b>Unit 1</b>	<b>Introduction to Information and Network Security:</b> Overview of Networking Concepts, Information Security Concepts, Security Threats and Vulnerabilities, Cryptography / Encryption.	<b>(06)</b>
<b>Unit 2</b>	<b>Security Management:</b> Security Management Practices, Security Laws and Standards, Access Control and Intrusion Detection, Server Management and Firewalls, Security for VPN and Next Generation Technologies Security Architectures and Models, System Security, OS Security	<b>(06)</b>
<b>Unit 3</b>	<b>Network Defence tools:</b> Firewalls and Packet Filters: Firewall Basics, Packet Filter Vs Firewall, How a Firewall Protects a Network, Packet Characteristic to Filter, Stateless Vs Stateful Firewalls, Network Address Translation (NAT) and Port Forwarding, the basic of Virtual Private Networks, Linux Firewall, Windows Firewall, Snort: Introduction Detection System.	<b>(07)</b>
<b>Unit 4</b>	<b>Web Application Tools:</b> Scanning for web vulnerabilities tools: Nikto, W3af, HTTP utilities - Curl, OpenSSL and Stunnel, Application Inspection tools – Zed Attack Proxy, Sqlmap. DVWA, Webgoat, Password Cracking and Brute-Force Tools – John the Ripper, L0htcrack, Pwdump, HTC-HydraUNIT-V.	<b>(07)</b>
<b>Unit 5</b>	<b>Wireless Network and Security:</b> Components of wireless networks, Security issues in wireless	<b>(07)</b>
<b>Unit 6</b>	<b>Introduction to Cyber Crime and law and Cyber Crime Investigation:</b> Cyber Crimes, Types of Cybercrime, Traditional Problems Associated with Computer Crime, Introduction to Incident Response, Digital Forensics, Contemporary Crimes, Computers as Targets, Contaminants and Destruction of Data, Indian IT ACT 2000, Firewalls and Packet Filters, password Cracking, Keyloggers and Spyware, Virus and Worms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow, Attack on wireless Networks Firewalls and Packet Filters, password Cracking, Keyloggers and Spyware, Virus and Worms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow, Attack on wireless Networks	<b>(07)</b>

**Tutorials**

A set of Tutorial/ problems based on above syllabus is to be submitted

**Sample List of Experiments:**

<b>Experiment 1</b>	TCP scanning using NMAP	
<b>Experiment 2</b>	Port scanning using NMAP	
<b>Experiment 3</b>	TCP / UDP connectivity using Netcat	
<b>Experiment 4</b>	Network vulnerability using OpenVAS	
<b>Experiment 5</b>	Manual SQL injection using DVWA	
<b>Experiment 6</b>	Manual SQL injection using DVWA	





**Government College of Engineering, Karad****Second Year (Sem – IV) M. C. A.****MC 1409 : Project Planning and Management Lab**

Laboratory Scheme		Examination Scheme	
Practical	04 Hrs/week	CA	50
		ESE	50
Total Credits	02		

**Course Outcomes (CO)**

1. Students will demonstrate knowledge of the distinction between critical and non-critical systems.
2. Students will demonstrate the ability to manage a project including planning, scheduling and risk assessment/management.
3. Students will demonstrate proficiency in rapid software development techniques.
4. Students will be able to identify specific components of a software design that can be targeted for reuse.

**Course Contents**

	The project batches of 2-3 students should be formed, which will work on the project allocated by the department. The batch must complete it during first semester only. Term work submission should be done in the form of a joint report. The term work assessment will be done jointly by teachers appointed by Head of the Institution. The oral examination will be conducted by an internal and external examiner as appointed by the University.
	Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
	Two mid-term evaluations should be done, which includes presentations and demos of the work done.

**Mapping of COs and POs**

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO 1		√		√	√		√	√		√
CO 2	√	√	√		√	√	√	√	√	
CO 3	√	√	√	√		√		√	√	√
CO 4	√	√		√	√	√	√		√	√