Government College of Engineering, Karad

(An Autonomous Institute of Government of Maharashtra)

Programme: Information Technology

Curriculum for
Third year of B. Tech

Government College of Engineering, Karad
Third Year B. Tech.
IT501: Advanced Database Management Systems

Teaching Scheme		Examination Scheme	
Lectures	3Hrs/week	**CT1**	15
Tutorial	--	**CT2**	15
Total Credits	3	**TA**	10
		ESE	60
		Duration of ESE: 2 Hrs 30 Min	

Course Objectives:

1. Understand extended entity relation features use in database design.
2. Acquire the knowledge of the different types of database management systems such as object oriented, object relational, parallel and distributed database.
3. Learn emerging databases technology such as XML.

Course Contents

		Hours
Unit I	**Extended ER :** Specialization & Generalization, Extended E-R, Subclass super class Constraints and characteristics of specialization & Generalization, Relationship types of degree Higher than two, Aggregation, Union and Categories, EER to Relation Models Mapping	5
Unit II	**Object Oriented Databases:** Overview of object oriented concepts, object identity, object structure and type constructors, encapsulation of operations, methods and persistence, type hierarchies and inheritance, type extends and queries, complex objects, database schema Design for OODBMS, OQL basic, OODBMS architecture and storage issues.	6
Unit III	**Object Relational Database:** Nested relations and collections, inheritances, reference types, functions and procedures, storage and access methods, query processing and optimization, an overview of SQL-3, comparison of RDBMS, OODMBS, ORDBMS.	7
Unit IV	**Parallel Database:** Architectures for parallel databases, parallel query evaluation, parallelizing individual operations, sorting, joins (**Self Study:** Design of Parallel Systems).	7

Unit V	**Distributed Database:** Distributed database concepts, data fragmentation, replication and allocation techniques for distributed database design, query processing in distributed databases. Concurrency control and recovery in distributed database.	9
Unit VI	**XML and Internet Databases:** Introduction, Structure of XML Data, XML Document Schema, DTD, Querying and Transformation: XQuery, XPath, XML validation, Web server, API to XML, Storage of XML Data, (**Self Study**: XML Applications: web services, Web based system, Implementation of XML validations)	6

Course Outcome (CO):

1 Construct EER diagram for real life application.
2 Differentiate different types of databases.
3 Design database schemas using object oriented and object relational database.
4 Use internet database technology such as XML for web application.

Text Books:

1 Elmasri & Navathe, "Fundamentals of Database System", Addison Wesely Publication. , 5th edition.
2 Henry F. Korth, Abraham Silberschatz, Sudarshan, "Database System Concept", McGraw-Hill Inc., 4thedition.

References:

1 Ram Krishnan, Gehrke, "Database Management System", McGraw Hill Inc., 3rd edition.
2 Ozsu, Patrick Valduriez, "Principles of Distributed Database Systems", Prentice Hall, 1999,2nd edition.
3 Stefano Ceri, Hillseppe , pelagatti "Distributed Databases, Principles and Systems" Tata Mc Graw Hill, 2nd edition.
4 Mark L. Gillenson, Paulraj Ponniah "Fundamentals of Database Systems" WILEY 2nd edition.

Useful Links:

1 http://nptel.ac.in/courses/106106130/ Prof. D. Janakiram, IIT Madras
2 https://www.cse.iitb.ac.in/~sudarsha/db-book/slide-dir/   prof.   Sudarshan   IIT Bombay
3 http://nptel.ac.in/courses/106106127/ Prof. Shankar Balachandran, IIT Madras
4   http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-830-

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5		20
Understand		5	3	20
Apply	5	5	3	10
Analyze			3	
Evaluate			1	05
Create	5			05
Total	15	15	10	60

Course Articulation Matrix:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	3	3	-	-	-	1	-	-	-	3	1
CO2	-	3	2	-	2	2	-	-	1	-	-	-	3	1
CO3	-	3	2	2	3	-	-	-	1	-	-	-	3	1
CO4	-	2	2	1	2	-	-	-	1	-	2		3	1

 1: Slight(Low)   2: Moderate(Medium)   3:Substantial (High)

Government College of Engineering, Karad
Third Year B. Tech.
IT502: Computer Networks

Teaching Scheme		**Examination Scheme**	
Lectures	3Hrs/week	**CT1**	15
Tutorial	--	**CT2**	15
Total Credits	**3**	**TA**	10
		ESE	60
		Duration of ESE: 2 Hrs 30 Min	

Course Objectives:

1. Learn basic concepts, purpose of network.
2. Understand various Networking Protocols & applications.
3. Understand the fundamentals of Network Architecture.
4. Understand networking technologies of wireless sensor networks.

Course Contents

		Hours
Unit I	**Computer Networks and the Internet Applications:** Introduction to the Internet, The Network Edge, The Network Core, Delay, Loss, and Throughput in Packet-Switched Networks, Protocol Layers and Their Service Models, Networks Under Attack, History of Computer Networking and the Internet. **Principles of Network Applications,** The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, DNS—The Internet's Directory Service, Peer-to-Peer Applications, Socket Programming: Creating Network Applications	8
Unit II	**The Transport Layer**: Introduction and Transport-Layer Services, Multiplexing and Demultiplexing, Connectionless Transport: UDP, Principles of Reliable Data Transfer, Connection-Oriented Transport: TCP, Principles of Congestion Control, TCP Congestion Control.	6
Unit III	**The Network Layer:** Introduction, Virtual Circuit and Datagram Networks, What's Inside a Router, The Internet Protocol (IP): Forwarding and Addressing in the Internet, Routing Algorithms, Routing in the Internet, Broadcast and Multicast Routing.	6

Unit IV	**The Link Layer: Links, Access Networks, and LANs:**	
	Introduction to the Link Layer, Error-Detection and -Correction Techniques, Multiple Access Links and Protocols, Switched Local Area Networks, Link Virtualization: A Network as a Link Layer, Data Center Networking.	6
Unit V	**Wireless LAN: Ad-Hoc Networks and Sensor Networks:**	
	Introduction to wireless Network Infrastructure, Comparison of Wireless Networks in ISM Band, Fundamentals of WLAN – technical issues, Network Architecture, IEEE 802.11- physical layer, Mac Layer Mechanism, CSMA/CA, IEEE 802.16 –differences between IEEE 802.11 and 802.16.	8
Unit VI	**MANET:**	
	Introduction to MANETs, Sensor Networks, Operating Environment Constraints, and Protocols supported by Wireless Networks, Applications of Sensor Networks, Sensor Node Architecture (hardware components) Routing in MANET: AODV, DSR. Sensor Network Architectures (**Self-study:** Concept of sink and source, Topologies, Design Principles).	8

Course Outcome (CO):

1	Explain working principle of client/server applications concern to application layer protocols
2	Use network protocols & technologies for various network applications
3	Use thorough knowledge of various Wireless technologies
4	Setup, install and configure networks

Text Books:

1	Kurose, Ross "Computer Networking a Top Down Approach Featuring the Internet", Pearson; ISBN-10: 0132856204,ISBN-13:978-0132856201, March 5, 2012 ,6th edition
2	Kazem Sohraby, Daniel Minoli, TaiebZnati, "Wireless Sensor Network", Wiley, ISBN: 978-0-471-74300-2. ,2nd edition
3	C. Siva Ram Murthy and B. S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols" Prentice Hall, 2004.,2nd edition

References:

1	Andrew S. Tanenbaum, "Computer Networks", PHI, ISBN: 978-0132-126953, 5th edition.
2	Behrouz A. Forouzan, "Data communication and Networking", TMGH, 4th edition.

| | 3 | William Stallings, "Data and Computer Communications", PHI, 8th edition. |
| | 4 | W. Richard Stevens, TCP/IP Illustrated, Vol. 1: The Protocols, Pearson, 2012, 2nd edition. |

Useful Links:

	1	http://nptel.ac.in/courses/106105081/ IIT Kharagpur
	2	http://nptel.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Computer%20 networks /New_index1.html
	3	http://nptel.ac.in/courses/106106091/ IIT Madras

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	3	20
Understand		5	3	20
Apply	5	5	3	10
Analyze				
Evaluate	5		1	10
Create				
Total	15	15	10	60

Course Articulation Matrix:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	2	-	2	2	2	-	1	3	-	-	-	3	1
CO2	-	2	2	-	2	-	-	-	2	-	-	-	3	1
CO3	-	2	2	-	2	1	-	-	1	-	-	-	3	1
CO4	-	2	3	2	2	2	-	-	-	-	-	2	3	1

1: Slight(Low)   2: Moderate (Medium)   3:Substantial(High)

Government College of Engineering, Karad
Third Year B. Tech.
IT503: Software Engineering

Teaching Scheme

Lectures	3Hrs/week
Tutorial	1Hr/week
Total Credits	4

Examination Scheme

CT1	15
CT2	15
TA	10
ESE	60

Duration of ESE: 2 Hrs 30 Min

Course Objectives:

1 Summarize different software process models.

2 Understand planning and managing software projects.

3 Prepare software requirement specification during analysis.

4 Understand design fundamentals and Testing Techniques.

Course Contents

Hours

Unit I **Introduction:**
Software engineering, Product: Evolving role of software, Software Characteristics, Components, Applications, Software crisis and Myths, Software Engineering Process, Software development phases and Software Process Models, Prototyping and RAD Model, Water fall, Incremental Model, Spiral Model,4 GT Model, CASE tools**. (Self-Study:** Agile process model and Rational Unified Process) — 7

Unit II **Planning and Managing Software projects:**
People, Product, Process and Project, Measures, Metrics and Indicators, Metrics for software quality, Scope, Software Project Estimation, make by decision, Software risks - Identification, Projection, Assessment, Monitoring Project Scheduling and tracking tasks/Work break down structures, Time line charts, Project plan**. (Self-Study:** Empirical estimation model**)** — 7

Unit III **Requirement Analysis:**
Communication Techniques, FAST, Quality deployment, Analysis Principals: Modeling, partitioning, Prototyping, Specification, SRS and SRS review analysis models: Data modeling, Functional modeling, Information flow, Data flow Diagrams, Extension to real time systems, Behavioral — 7

models, Mechanism of structural analysis, E-R diagrams, controlled modeling, Data dictionary

Unit IV **Design Fundamentals:**
Software Design and software design process, principals and concepts, Abstractions, Refinement and modularity, Software architecture, Control hierarchy, Partitioning, Data structure, Information hiding, Effective modular design, Cohesion, coupling, Design Model, Design documents   7

Unit V **Design Methods:**
Architectural design and design process, transform and transaction flow, design steps, interface design, procedural design, graphical and tabular design notations   5

Unit VI **Software Testing Techniques and Strategies:**
Software testing fundamentals, Test case design, White box testing, Black box testing, Control structure testing, Strategic approach to testing, Strategic issues, Unit testing, Integration testing, Validation testing, System testing   7

Course Outcome (CO):
1 Describe different software process models.
2 Explain planning and managing software projects.
3 Create software requirement specification during analysis.
4 Explain design fundamentals and various Software Testing Techniques

Text Books:
1 Roger S. Pressman "Software Engineering- A Practitioner's Approach" TMH, 5th edition.

References:
1 Rajib Mall, "Fundamentals of Software Engineering" PHI, 4th edition

2 Ian Sommerville, "Software Engineering" Pearson Publication, 9th edition

3 Pankaj Jalote ,"Software Engineering : A Precise Approach" Wiley India, 3rd edition

4 Kogent "Software Engineering" Wiley India, 2nd edition

Useful Links:

1 http://nptel.ac.in/courses/106105087 IIT Kharagpur

List of Submission: **Duration**

1   Total 8-10 number of tutorials should be conducted based on above   12Hrs.*
      contents. Tutorial should be based on the software development phases.
      Student should prepare planning and scheduling document, Data flow

diagram, Software Requirement Specification Document, Software
Design Document based on case study.
  *Indicate total 12 tutorial hours to be conducted.

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	5	20
Understand	10	10	5	30
Apply				
Analyze				10
Evaluate				
Create				
Total	15	15	10	60

Course Articulation Matrix:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	2	2	-	-	-	-	-	1	1	2	2	1	3
CO2	-	2	2	-	-	-	-	-	1	1	2	2	1	3
CO3	-	2	2	-	1	-	-	-	1	1	2	2	1	3
CO4	-	2	2	-	-	-	-	-	1	1	2	2	1	3

  1: Slight (Low)   2: Moderate (Medium)   3: Substantial (High)

Government College of Engineering, Karad
Third Year B. Tech.
IT504: Operating Systems

Teaching Scheme		Examination Scheme	
Lectures	3Hrs/week	**CT1**	15
Tutorial	1Hr/week	**CT2**	15
Total Credits	4	**TA**	10
		ESE	60
		Duration of ESE: 2Hrs 30 Min	

Course Objectives:
1. Understand Operating systems, types.
2. Understand process and threads management techniques.
3. Learn memory management techniques.
4. Understand input output devices & their management.

Course Contents

		Hours
Unit I	**Introduction:** Operating System (OS) definition, OS Evolution, OS Components and Services. Process Concept, Process Scheduling, Operations on Processes, Cooperating Processes, Interprocess Communication, Threads Overview, Multithreading Models, Threading Issues, Java Threads.	7
Unit II	**Process Management**: CPU scheduling concepts, Scheduling Criteria and Algorithms. Process Synchronization: The Critical-Section Problem, Synchronization Hardware, Semaphores, Monitors. Deadlocks: Definition & Characterization, Deadlocks Prevention, Avoidance, Detection and Recovery from Deadlock.	7
Unit III	**Memory Management**: Background, Swapping, Contiguous Memory Allocation Schemes, Paging, Segmentation. Virtual Memory Management: Background, Demand Paging scheme, Process Creation, Page Replacement Policies, Allocation of Frames, Thrashing.	7
Unit IV	**File-System Interface**; Directory Structure, File-System Mounting, File Sharing & Protection. File- System Structure, File-System Implementation. Directory Implementation, Allocation Methods, Free-Space Management. File Recovery.	6

Unit V   **I/O Systems**: Overview, I/O Hardware, Application I/O Interface, and Kernel I/O Subsystem. Transforming I/O to Hardware Operations. Disk Scheduling, Disk Management, Swap-Space Management, RAID Structure.   7

Unit VI   **The Linux System**; History, Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File Systems, (**Self Study:** Input and Output, Interprocess Communication, Network Structure & Security in Linux)

6

Course Outcome (CO):

1. Describe the knowledge of basic issues with fundamental of operating systems mechanism.
2. Explain process management, memory management which covers a broad range of engineering aspects.
3. Explain concurrency and synchronization mechanisms and introduce concept of files and directories
4. Describe basic issues in programs interacting directly with operating systems.

Text Books:

1. Silberschatz, P.B.Galvin, G. Gagne: "Operating System Concepts" John Wiley & Sons Publication, 6th edition.

References:

1. A.S Tanenbaum "Modern Operating Systems", Pearson Education, 3rd edition.

2. William Stallings "Operating Systems" Prentice-Hall, 7th edition.

3. D M Dhamdhere "Operating Systems" Tata McGraw-Hill, 2nd edition.

4. M Milankovic "Operating Systems" McGraw-Hill.", 2nd edition.

Useful Links:

1. http://nptel.ac.in/courses/106108101/ IIT Madras
2. http://nptel.ac.in/courses/106106144/ IIT Madras

List of Submission: **Duration**

1. Total 8-10 number of tutorials should be conducted based on above   12Hrs.*
   contents. Tutorial should be based on process management, Scheduling
   algorithms, Memory Management algorithms, Interprocess communication,
   Shell Scripting and case study on modern operating systems.

   *Indicate total 12 tutorial hours to be conducted.

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	3	20
Understand	5	5	3	20
Apply	-	-	3	10
Analyze	-	5	-	-
Evaluate	5	-	1	10
Create	-	-	-	-
Total	15	15	10	60

Course Articulation Matrix:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	1	-	-	-	-	-	-	1	1	-	-	1	1
CO2	-	2	2	1	1	-	-	-	1	1	-	-	1	1
CO3	-	2	2	1	1	-	-	-	1	1	-	-	1	1
CO4	-	1	3	-	3	-	-	-	1	1	-	-	1	1

1: Slight (Low)   2: Moderate (Medium)   3: Substantial (High)

Government College of Engineering, Karad
Third Year B. Tech.
IT505: Microprocessor and Microcontroller

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/week	**CT1**	15
Tutorial	1 Hr/week	**CT2**	15
Total Credits	4	**TA**	10
		ESE	60
		Duration of ESE: 2Hrs 30 Min	

Course Objectives:

1 Understand architecture of Microprocessor and microcontroller.
2 Learn basics of assembly language and interfacing of 8086 & 8051.
3 Provide basic knowledge of Embedded Systems.
4 Provide basic knowledge of ARM architecture.

Course Contents

Hours

Unit I **Architecture of Microprocessors:**

General definitions of mini computers, microprocessors, micro controllers and digital signal processors. Overview of 8085 microprocessor. Overview of 8086 microprocessor. Signals and pins of 8086 microprocessor

6

Unit II **Assembly language of 8086:**

Description of Instructions. Assembly directives. Assembly software programs with algorithms, interfacing with 8086, interfacing with RAMs, ROMs along with the explanation of timing diagrams. Interfacing with peripheral ICs like 8255, 8254, 8279, 8259, 8259 etc. Interfacing with key boards, LEDs, LCDs, ADCs, and DACs etc. **Coprocessor 8087** Architecture of 8087, interfacing with 8086. Data types, instructions and programming

7

Unit III **Architecture of Micro controllers:**

Overview of the architecture of 8051 microcontroller. Overview of the architecture of 8096 16-bit microcontroller.

6

Unit IV **Assembly language of 8051 and Interfacing with 8051:**

Description of Instructions. Assembly directives. Assembly software programs with Algorithms. Interfacing with keyboards, LEDs, 7 segment LEDs, LCDs, Interfacing with ADCs. Interfacing with DACs.

6

Unit V	**Introduction to Embedded Systems:**	
	Overview of Embedded System Architecture, Application areas, Categories of embedded systems, specialties of embedded systems. Recent trends in embedded systems. Brief introduction to embedded microcontroller cores CISC, RISC, ARM, DSP and SoC.	6

Unit VI	**ARM 7 architecture:**	
	Architectural inheritance, Detailed study of Programmer's model, ARM Development tools, Instruction set: Data processing, Data transfer, Control flow. Addressing modes. Writing simple assembly language programs. Pipelining, Brief introduction to exceptions and interrupts handling	7

Course Outcome (CO):

1. Explain and demonstrate architecture of microprocessor.
2. Describe and evaluate different applications of microcontroller.
3. Evaluate a variety of existing and developing techniques for assembly language programming.
4. Explain and demonstrate architecture of ARM and embedded systems.

Text Books:

1. Douglas V. Hall, "Microprocessors & Interfacing" , Hall McGraw Hill, , 2005 edition
2. M. A. Mazidi, J. G. Mazidi, R. D., "The 8051 microcontroller & Embedded systems", Pearson, 1st edition

References:

1. Ramesh Gaonkar, "Microprocessor Architecture, Programming, and Applications with the 8085 ", 5th edition.
2. Frank Vahid, Tony Givargis, "Embedded system design A Unified hardware/software Introduction", Wiley Publications, July 2013 edition
3. Steve Furber, "ARM System on chip Architecture", Pearson, 2nd edition.

Useful Links:

1. http://nptel.ac.in/courses/106108100   IISC Bangalore

List of Submission: **Duration**

1. Total 4-5 number of tutorials should be conducted based on above contents.   12Hrs.*
Tutorial should be based on case study comprises assembly language instructions, 8051 microcontroller and interfacing, , Embedded system and ARM processor.

*Indicate total 12 tutorial hours to be conducted.

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	3	20
Understand		5	3	20
Apply	5	5	3	10
Analyze				
Evaluate	5		1	10
Create				
Total	15	15	10	60

Course Articulation Matrix:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	2	-	-	1	2	-	-	2	-	-	-	2	1
CO2	-	2	2	1	2	1	-	1	2	-	-	-	2	1
CO3	-	2	2	2	2	2	-	1	2	-	-	-	2	1
CO4	-	1	3	2	3	3	-	1	2	-	-	-	2	1

1: Slight(Low)   2: Moderate(Medium)   3:Substantial(High)

Government College of Engineering, Karad
Third Year B. Tech.
IT506: Computer Networks Lab

Laboratory Scheme   **Examination Scheme**
Practical   2 Hrs/week   **CA**   **75**
Total Credits   1   **ESE**   **50**

Course Objectives:

    1 Design and implement small size network and to understand various networking commands.

    2 Provide the knowledge of various networking tools and their related concepts.

    3 Understand various application layer protocols for its implementation in client/server environment.

<div align="center">Course Contents</div>

Experiment 1   Study of Networking components (Hardware/software) i.e. cables, connectors, topologies, switches/ hubs, crimping tool, IP addressing scheme, Subnetting, College Network Design

Experiment 2   Preparation of patch cord & testing for Straight & Crossover cable connection

Experiment 3   Capture and analyse TCP and UDP packet using Wireshark

Experiment 4   Introduction to server administration (Server administration commands and their applications) and configuration of:

    a. Telnet   b. FTP   c. DHCP   d. DNS

Experiment 5   Design & implement a program to identify MAC address, class of a given IP address, subnet mask & first & last IP address of that block using C++/Java

Experiment 6   Implementation of Dijkstra's Shortest Path routing algorithm using C++/Java

Experiment 7   Implementation of Distance vector routing algorithm using C++/Java

Experiment 8   UNIX Sockets: WAP program in C/C++ /Java sockets API

    a. TCP Sockets   b. UDP sockets

Experiment 9   Study, Installation & configuration of Network Simulator 2 or 3 / OMNET / QualNet

Experiment 10 Study of MANET and configure static routing protocol in MANET environment using NS2/OMNET/QualNet.

List of Submission:
Total number of Experiments: 10

Course Outcome(CO):
1 Demonstrate and use of various networking tools and technologies.
2 Analyse required setup & implement small size network & test.
3 Configure/Implement various client/server environments to use application layer protocols.

ESE Evaluation Procedure:	ESE should be based on the list included in the above-mentioned contents. Practical performance should be evaluated by the internal and external examiners.

Mapping of CO and PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	2	-	3	2	-	-	-	-	-	-	1	1
CO2	2	2	-	1	2	-	-	-	-	-	-	1	1
CO3	2	1	-	-	2	-	-	-	-	-	-	1	1
CO4	-	1	-	-	-	-	-	-	-	-	-	1	1

1: Slight(Low)   2: Moderate(Medium)   3:Substantial(High)

Assessment Pattern

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	Avg
Task I	15	15	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	05	05	
CA											

Government College of Engineering, Karad
Third Year B. Tech.
IT507: Open Source Software Lab

Teaching Scheme		**Examination Scheme**	
Lecture	2 Hrs/week	TA/CA	75
		ESE	50

Laboratory Scheme
Practical   2 Hrs/week
Total Credits   3

Course Objectives:

1. Introduce FOSS environment and use of open source technology.

2. Learn Shell Programming

3. Provide basic Knowledge about Linux, MySQL, PHP, PERL, PYTHON
4. Understand and apply Web development processes using FOSS.

Course Contents

		Hours
UNIT I	**Introduction to FOSS:** Need of Open Sources- Advantages of Open Sources- Applications of Open Sources- commercial aspects of Open source movement OST (Open Source Technologies) Overview: Evaluation and development of OST, Factors leading to its growth, Open Source Initiative (OSI), Free Software Foundation and the GNU project, Pros and Cons of OST.	3
UNIT II	**FOSS Ecosystem:** Installing different distributions of GNU/Linux, FreeBSD/Open Solaris	2
UNIT III	**Linux Shell Scripting**: Introduction: Kernel Shell, Process, Redirection of Standard output/input: Redirection, Pipes and filters, Shell Programming, Vi Editor	4
UNIT IV	**PHP:** Operators and flow control, String and Arrays, Reading data in web pages, browser handling power, session, cookies, working with database, Database Connections with MYSQL, Managing Database Connections, Performing Queries, Closing Connection.	6
UNIT V	**PERL:** Perl data & variable types, Subroutines, File operations, Regular expressions, String manipulation, List & sorting, smart matching, DB access.	4
UNIT VI	**PYTHON** Introduction, Overview, Decision Making, List, tuple, directories, python programming.	6

Laboratory Contents:

Experiment 1	To install and demonstrate Various Linux Distributions.
Experiment 2	Implementation of Shell programming.

Experiment 3   Implementation of General Utilities, Directory & File Utilities.
Experiment 4   Create and Validate the form using PHP validators and display error messages.
Experiment 5   Implement PHP Program for arithmetic operation using PHP function.

Experiment 6   Implement an application using Perl MySQL Connectivity.
Experiment 7   Write a program to implement perl regular expressions**.**
Experiment 8   Implement a Program using Data Types, basic operators, decision making and looping statements using python.
Experiment 9   Implement a program to demonstrate strings, lists, dictionaries, tuples, files and functions using python.
Experiment 10   Implement a program to implement OO concepts using python.
List of Submission:
1   Total number of Experiments: 10

Course Outcome(CO):
1   Install and use of various FOSS
2   Design and develop applications using FOSS.
3   Perform Shell Programming using Linux.
4   Implement basic constructs of PHP, PERL, PYTHON .

ESE   ESE should be based on the list included in the above-mentioned contents.
Evaluation   Practical performance should be evaluated by the internal and external examiners.
Procedure:
Text Books:
1   M.N. Rao, "Fundamentals of Open Source Software ", PHI Publication, 2015, 1st edition.

Reference Book:
1   Richard L. Peterson, "The complete reference Linux", Tata McGraw Hill Publication., 6th edition.
2   Dr Martin Jones," Python for Complete Beginners", Create Space Independent Publishing Platform, 2015, ISBN 1514376989, 1st edition
3   Steven Holzner,"PHP: The Complete Reference," McGraw-Hill Osborne, ISBN-13: 978-0071508544, 2008. 1st edition.
4   Randal L. Schwartz, brian d foy ,Tom Phoenix ," Learning Perl: Making Easy Things Easy and Hard Things Possible", O'Reilly Media,7th edition

Mapping of CO and PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	2	3	2	3	-	-	1	2	2	-	2	3	1
CO2	-	2	3	2	3	-	-	1	2	2	-	2	3	1
CO3	-	2	3	2	3	-	-	1	2	2	-	2	3	1
CO4	-	2	3	2	3	-	-	1	2	2	-	2	3	1

1: Slight(Low)   2:Moderate(Medium)   3:Substantial(High)

Assessment Pattern

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	Avg
Task I	15	15	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	05	05	
CA											

Government College of Engineering Karad.
Third Year B. Tech
HS003 –   General proficiency III

Teaching Scheme

Lectures   02 Hrs./week

Practical   02 Hrs./week

Total Credits   03

Examination Scheme

CA   50

Course Objectives

1 To understand the different components of selection process i.e. written test, GD & PI.

2 To equip the students with the ability to clear NACTECH, AMCAT & ELITMUS.

3 To develop a thorough understanding of these components through strong conceptual understanding, logical approach with various short cuts & practical techniques for manage speed and accuracy to clear the written test & participation in GD & PI

Course Contents

		Hours
Unit I	**Soft skills**	**10**

The module Corporate Recruitment Training has four different topics that are**:**

- JAM
- Basics of Group Discussion
- Effective Resume' Writing
- Basics of Interview Skills

Unit II	**Basic concept 4**	**8**

The module basic concept 4 has the following topic**:**

- Ratios & proportions
- Partnerships
- Problems on ages
- SI & CI
- Averages

- Clocks & Calendars

Unit III   **Logical Reasoning**   **8**

The module reasoning has the following topic**:**

- Venn diagrams
- Cubes
- Logical deductions
- Letter series
- Number series
- Odd man out

Unit IV   **Basic concepts 5**   **6**

The module basic concepts 5 has the following topic**:**

- Number system
- Mensurations
- Probability
- Permutations & combinations

Unit V   **Reasoning**   **10**

- Reasoning 3
- Reasoning 4
- Data interpretation
- Data sufficiency

Unit VI   **Verbal Aptitude Skills**   **10**

The module verbal aptitude has the following topics**:**

- Introduction to verbal aptitude & verbal pattern
- Synonyms & antonyms
- Spotting errors & Sentence correction

- Reading comprehension & sentence rearrangement

Note   **Delivery Methodology to be followed fully depends on the Skill sets as detailed below.**

Language Skills

- A new methodology of acquiring language which integrates LSRW through emotional connect & experiences in one's life.
- The integrated approach coupled with lot of interaction, group work & effective facilitation leads to overall improvement of one's communication skills

Soft Skills

- Pre & post assessment for each topic
- Comprehensive pre & post assessment capsule wise.
- Explanation of the concept
- Self-assessment inventory
- Activities for experiential learning
- Case studies for better understanding of the concept
- PPTs and videos

Aptitude Skills

- Pre & post assessment
- Explaining the concept
- Multiple approaches to the given problem
- PPTs

Verbal Aptitude Skills

- Pre & post assessment for each topic
- Comprehensive pre & post assessment capsule wise.
- Explanation of the concept
- Work sheet for each topic

References:

1. Understanding organizational Behavior by Uday Parek

2. Training instruments on HRD & OD by Uday Parek & Dr.Surabhi purohit
3. Language Instinct by Steven Pinker
4. Freedom from Imperial shakels by Dr.K.N. Anandan
5. Quantitative Aptitude by R.S. Agarwal
6. Quicker Maths by Tyra & khundan
7. Quantitative Aptitude by Abhijeet Guh

Course Outcomes
After completing this course students will be able:

- To understand different components of campus recruitment drive.
- To effectively present oneself &ideas in JAM ,GD& interview
- To draft a resume effectively and practice the questions asked from resume'
- To learn & practice different components of verbal topics
- To learn different methods in vocabulary building & contextually use them.
- To learn various bridges in analogies
- To learn different techniques & to spot the errors pertaining to various grammatical rules & structures.
- To explaining concepts and sharing different logics for faster computations in different topics of Aptitude and Reasoning.
- The students will be able to identify and use formula as a strategy for solving problems.
- Faster computations
- Identifying most commonly made mistakes and thereby improving upon their accuracy.

Government College of Engineering, Karad
Third Year B. Tech.
OE641- Open Elective- Web Technology

Teaching Scheme   **Examination Scheme**

Lecture   2 Hrs/week   **TA/CA**   50

Practical   2 Hrs/week   **ESE**   50

Total Credits   3

Course Objectives:
1. Understand the concepts of open source.
2. Understand the basics of web technology.
3. Understand concepts of XML, JavaScript, CSS and PHP.
4. Design a full-fledged website.

Course Contents

Unit I	**Introduction:** Concept of WWW, Internet and WWW, HTTP Protocol: Request and Response, Web browser and Web servers, Features of Web 2.0 Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Website, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation	4
Unit II	**HTML:** Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, forms, XHTML, Meta tags, Character entities, frames and frame sets, Browser architecture and Web site structure. Overview and features of HTML5	4
Unit III	**Style sheets:** Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2, Overview and features of CSS3	4
Unit IV	**Java Script** : Client side scripting with JavaScript, variables, functions, conditions, loops and repetition, Pop up boxes, Introduction to basics of DOM and web browser environments, DHTML: Combining HTML, CSS and JavaScript, Events and buttons	4
Unit V	**XML:** Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Using XML with application. Transforming XML using XSL and XSLT.	4
Unit VI	**PHP and MySQL :** Introduction and basic syntax of PHP, decision and looping with examples, PHP and HTML, Arrays, Functions, Browser control and detection, string, Form processing, Files, Advance Features: Cookies and Sessions, Basic commands with PHP examples, My SQL commands, Connection to MySQL Database , **(Self Study:** Object Oriented Programming with PHP).	5

Laboratory Contents

Experiment 1   Write a program to Implement HTML5 concepts

Experiment 2   Write a program using DHTML

Experiment 3   Implement A proper CSS for a HTML

Experiment 4   Write a Schema and DTD for a XML program

Experiment 5   Write a JavaScript program with events and buttons

Experiment 6   Write a XML program for basic operations

Experiment 7   Create PHP program for website

Experiment 8   Use PHP and MySQL to create a database application

Experiment 9   Write PHP program to create online application

Experiment 10   Write a PHP program, for sessions and cookies

Text Books:

1   Ralph Moseley, M T Savaliya, "Web Technology" Wiley Publication, 2016, 1st edition.

Reference Book:

1   Brian P. Hogan, "HTML5 and CSS3, Level Up with Today's Web Technologies" Pragmatic Bookshelf, 2nd edition.
2   Ryan Benedetti, Ronan Cranley, "Head First jQuery", O'Reilly Media, ISBN: 978-1-4493-9321-2, September 2011 edition
3   Eric Freeman, Elisabeth Robson "Head First HTML5 Programming" O'Reilly Media, ISBN:978-1-4493-9054-9, 2011 edition.
4   John Pollock" JavaScript, A Beginner's Guide" McGraw-Hill, 3rd edition
5   Mark Pilgrim, "HTML5: Up and Running: Dive into the Future of Web Development ", 1st edition

Useful Link:

1   http://tekspace.eu/devwebapp/

List of Submission:

1   Total number of Experiments: 10

Course Outcome(CO):

1   Implement concepts of HTML5 and design web applications
2   Design web page using XML.
3   Implement dynamic web page using PHP

ESE   ESE should be based on the list included in the above-mentioned contents.

Evaluation   Practical performance should be evaluated by the internal and external
Procedure: examiners.

Mapping of CO and PO

CO	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO2
CO1	-	-	3	1	2	-	-	-	2	-	-	-	3	1
CO2	-	-	3	1	2	-	-	-	2	-	-	-	3	1
CO3	-	-	3	1	2	-	-	-	2	-	-	-	3	1

1: Slight(Low)   2:Moderate(Medium)   3:Substantial(High)

Assessment Pattern

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	Avg
Task I	15	15	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	05	05	
CA											

Government College of Engineering, Karad
Third Year B. Tech.
IT602: Data Warehousing and Mining

Teaching Scheme		Examination Scheme	
Lectures	4Hrs/week	CT1	15
Tutorial	--	CT2	15
Total Credits	4	TA	10
		ESE	60
		Duration of ESE: 2Hrs 30 Min	

Course Objectives:
1. Understand the value of data mining in solving real-world problems.
2. Learn foundational concepts underlying data mining.
3. Understand algorithms commonly used in data mining tools.
4. Apply data mining tools to real-world problems.

Course Contents

		Hours
Unit I	**Introduction of Data Warehousing:** Need for Data Warehouses, The Building Blocks: Defining Features, Data Warehouses and Data Marts, Overview of the Components, Metadata in the Data Warehouse; ETL overview	8
Unit II	**Dimensional Modeling and OLAP:** Dimensional Modeling Basics; The Star Schema -Dimension Table, Fact Table, Factless Fact Table, Data Granularity, Star Schema Keys, Advantages, Examples Snoflake schema. **OLAP in The Data Warehouse:** Demand For OLAP; Major Features and Functions -Dimensional Analysis, Hypercubes, Drill Down and Roll Up, Slice and Dice or Rotation; OLAP models – MOLAP, ROLAP, HOLAP	10
Unit III	**Introduction of Data Mining:** Data Mining, Kinds of Data and Patterns to be Mined, Technologies used, Applications, Major Issues in Data Mining. Know Your Data: Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Measuring Data Similarity and Dissimilarity	8
Unit IV	**Mining Frequent Patterns, Associations, and Correlations:** Basic Concepts: Market Basket Analysis, Frequent Itemsets, Closed Itemsets, and Association Rules ; Frequent Itemset Mining Methods: Apriori Algorithm, Generating Association Rules from Frequent Itemsets;	8

Pattern Evaluation Methods: lift and χ^2

Unit V	**Classification:**	
	Basic Concepts, Decision Tree: DT Induction, Attribute Selection Measures; Bayes Classification Methods: Bayes' Theorem, Naive Bayesian Classification; Rule-Based Classification: Using IF-THEN Rules for Classification, Rule Extraction from a Decision Tree; (Self Study: Metrics for Evaluating Classifier Performance)	8

Unit VI	**Cluster Analysis:**	
	Requirements, Overview of Basic Clustering Methods; Partitioning Methods: k-Means, k-Medoids; Hierarchical Methods: BIRCH; Density-Based Methods: DBSCAN; (Self Study: Measuring Clustering Quality)	8

Course Outcome (CO):

1. Describe techniques used in data warehouse and mining
2. Construct dimensional model with data cube and perform OLAP operations
3. Identify Patterns, Associations, and Correlations in text data
4. Evaluate data mining algorithms with respect to their accuracy

Text Books:

1. Paulraj Ponniah , "Data Warehousing Fundamentals: A Comprehensive Guide for IT Professionals", John Wiley & Sons, ISBN: 0-471-41254-6, 2001,2nd edition
2. Jiawei Han and Micheline Kamber, "Data Mining: Concepts and Techniques", Morgan Kaufmann, ISBN 978-0123814791, July 2011, 3rd edition

References:

1. Margaret H Dunham, "Data Mining: Introductory And Advanced Topics", Pearson Education, ISBN: 978-0130888921, Aug 2002,1st edition
2. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Pearson India. ISBN 978-8131714720, 2005.
3. Ian H. Witten and Eibe Frank, "Data Mining: Practical Machine Learning Tools and Techniques", Morgan Kaufmann, ISBN 978-0123748560, January 2011 3rd edition
4. T. Hastie, R. Tibshirani and J. H. Friedman, "The Elements of Statistical Learning, Data Mining, Inference, and Prediction", Springer, ISBN 978-0387848570, 2009, 2nd edition
5. C. M. Bishop, "Pattern Recognition and Machine Learning", Springer, ISBN 978-0387310732, 2006, 1st edition

Useful Links:

1. https://www.kdnuggets.com
2. https://www.coursera.org/specializations/data-mining
3. http://nptel.ac.in/courses/106106093/35 IIT Madras

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	05		02	10
Understand	05	05	02	20
Apply	05		02	10
Analyse		05	02	10
Evaluate		05	02	10
Create				
Total	15	15	10	60

Course Articulation Matrix:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	-	-	-	-	-	-	2	-	-	-	2
CO2	2	2	3	1	-	-	-	-	-	-	-	-	2	3
CO3	3	2	2	-	2	-	-	-	-	-	-	-	2	2
CO4	-	2	2	-	-	-	-	-	-	-	-	-	3	2

1: Slight(Low)   2: Moderate(Medium)   3:Substantial(High)

Government College of Engineering, Karad
Third Year B. Tech.
IT603: Computer Algorithms

Teaching Scheme		Examination Scheme	
Lectures	4 Hrs/week	**CT1**	15
Tutorial	1Hr/Week	**CT2**	15
Total Credits	5	**TA**	10
		ESE	60
		Duration of ESE: 2Hrs 30 Min	

Course Objectives:

1 Learn the asymptotic performance of algorithms.
2 Understand the time and space complexity of simple algorithms and recursively defined algorithms.
3 Study effectiveness of the algorithm.
4 Study major algorithms and data structures.

Course Contents

		Hours
Unit I	**Introduction:** Introduction of Algorithm, Algorithm Specification-Pseudo Code Conventions, Recursive Algorithms, Performance Analysis- Space and Time Complexity, Amortized Complexity, Asymptotic Notation	8
Unit II	**Divide and Conquer :** General Method, Binary Search, Finding Maximum and Minimum, Merge Sort, Quick Sort, Selection Sort	8
Unit III	**Greedy Method:** General Method, Container Loading, Knapsack problem, Tree Vertex Splitting, Job sequencing with deadlines, Minimum Cost Spanning tree (Prim's and Kruskal's algorithms), Optimal Storage on Tapes, Optimal Merge Pattern, Single Source Shortest Paths	9
Unit IV	**Dynamic Programming:** General Method, Multistage Graphs, All pair shortest paths, single-source shortest path, Optimal Binary Search Trees, Travelling Salesman problem	9
Unit V	**Backtracking:** General Method, Eight queens problem, Sum of Subsets, Graph coloring	8

problem, Hamiltonian problem **(Self Study :** Travelling Salesman Problem)

Unit VI   **Complexity Theory:**
P Class - P time, P time verification, NP-hard class, NP-complete class,   8
Circuit Satisfiability problem, Clique Decision Problem.

Course Outcome (CO):

1   Understand the need and techniques of algorithm analysis.
2   Solve complexity of algorithms.
3   Understand the definiteness & effectiveness of the algorithm.
4   Solve problems using different algorithm techniques and select approximate solutions.

Text Books:

1   Horowitz Ellis, Sahani Sartaz, R. Sanguthevar "Fundamentals of Computer Algorithms", Universities Press, 2nd edition

References:

1   A.Aho, J.Hopcroft and J.Ullman "The Design and Analysis of algorithms", 3rd edition.
2   D.E.Knuth "The Art of Computer Programming", Vol. I & Vol.2 .2nd edition
3   Goodman: "Introduction to Design and Analysis of Algorithms", TMH,2nd edition,
4   Thomas Cormen, Charles Leiserson, Ronald Rivest and Cliford Stein, "Introduction to Algorithms",PHI, , 3rd edition

Useful Links:

1   http://nptel.ac.in/courses/106101060/ IIT Bombay
2   http://nptel.ac.in/courses/106104019/ IIT Kanpur
3   http://nptel.ac.in/courses/106102064/1, IIT Delhi

List of Submission: **Duration**

1   Total 8-10 number of tutorials should be conducted based on above   12Hrs.* syllabus. Tutorial should be based on the complexity, Divide and conquer, greedy methods, dynamic programming, backtracking, P and NP class.

     *Indicate total 12 tutorial hours to be conducted.

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	3	20
Understand		5	3	20
Apply	5	5	3	10
Analyze				
Evaluate	5		1	10
Create				
Total	15	15	10	60

Course Articulation Matrix:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	-	-	-	-	-	1	1	-	1	1
CO2	3	2	2	-	-	-	-	-	-	1	1	-	1	1
CO3	1	2	2	2	3	-	3	-	-	1	1	-	1	1
CO4	1	2	3	3	3	3	3	-	-	1	1	-	1	1

1: Slight(Low)   2:Moderate(Medium)   3:Substantial(High)

Government College of Engineering, Karad
Third Year B. Tech.
IT604: Object Oriented Software and Web Engineering

Teaching Scheme		Examination Scheme	
Lectures	4 Hrs/week	**CT1**	15
Tutorial	1 Hr/week	**CT2**	15
Total Credits	5	**TA**	10
		ESE	60
		Duration of ESE: 2Hrs 30 Min	

Course Objectives:

1 Understand Object Modeling Technique.

2 Learn design concepts of structural modeling using UML.

3 Learn design concepts of Behavioural modeling using UML.

4 Understand web engineering fundamentals and webapp design.

Course Contents

		Hours
Unit I	**Introduction of Object Oriented Modeling:** Introduction to Object-Oriented, Object-Oriented Development, Object-Oriented Themes, Evidence for Usefulness of Object-Oriented Development. Modeling, The Object Modeling Technique, object modeling, Objects and Classes, Links and Associations, Advanced Link and Association Concepts, Generalization and Inheritance, Grouping Constructs	8
Unit II	**Introduction to UML and Structural Modeling:** An Overview of the UML, A Conceptual Model of the UML: Building Blocks of the UML Rules of the UML, Common Mechanisms in the UMLs, constraints, Introduction to UML2.0, Object Diagram Terms and Concepts, Class Diagram Classes, Attributes, Operations, Abstract Classes Relationships: Dependency, Association, Aggregation, Composition, Generalization, Realization Association Classes, Association Qualifiers, Interfaces, Templates	8
Unit III	**Behavioral Modeling:** Use case Diagram: Names, Use Cases and Actors, Use Cases and Flow of Events, Use Cases and Scenarios, Use Cases and Collaborations, Organizing Use Cases, Common Properties, Contents, Common Uses Sequence Diagram, Collaboration Diagram, State chart Diagram, Behavioral State Machines, States, Composite States, Submachine States, Transitions, Activity Diagram: Common Properties, Contents, Action States and Activity States, Branching, Forking and	10

Joining, Swimlanes, Object Flow,

Unit IV **Architectural Modeling:**
Component Diagram: Terms and Concepts, Names, Components and Classes, Components and Interfaces, Kinds of Components Deployment: Terms and Concepts, Names, Nodes and Components, Connections, Package Diagram: Terms and Concepts, Names, Owned Elements, Visibility, Importing and Exporting,

6

Unit V **Introduction to Web Engineering:**
Attributes of web based systems and application, web engineering processes, best practices, web Apps project, formulating web based systems, planning for web engineering projects, web engineering team, management issues for web engineering, matrics for web engineering and webApps, worst practices. Analysis for webApps, requirement analysis for webApps, analysis model for webApps, content model, interaction model, functional model, configuration model, relationship-navigation analysis.

10

Unit VI **Design for web apps:**
Design issues, Web E design pyramid, interface design, Aesthetic design, content design, architecture design, navigation design, component level design, hyper media design patterns, object oriented hypermedia design methods, design metrics for web Apps
(Self-study: testing for web Apps**)**

8

Course Outcome (CO):
1   Describe Object Modeling Technique

2   Design structural model using UML

3   Design behavioural model using UML

4   Design webapps using various design models.

Text Books:
1   James Rumbaugh , Michael Blaha , William Premerlani, Frederick Eddy, William Lorensen ,"Object- Oriented Modeling and Design", Pearson Education, 1st edition (Unit I)

2   Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modeling Language User Guide", Pearson Education., 2nd edition (Unit II,III, IV)

3   Roger S. Pressman "Software Engineering- A Practitioner's Approach" TMH, 6th edition. (Unit V, VI)

References:

1 Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Addision Wesley,3rd edition

2 Meilir Page-Jones, "Fundamentals of Object Oriented Design in UML", Pearson Education, 2000, 1st edition.

3 Atul Kahate, "Object Oriented Analysis & Design", Tata McGraw-Hill,1st edition

4 Gerti Kappel, Birgit, Siegfried Reich, Werner Retschitzegger, "Web Engineering: The Discipline of Systematic Development of Web Applications", John Wiley, May2006, 1st edition.

Useful Links:

1 http://nptel.ac.in/courses/106101061/   IIT Kharagpur

List of Submission: **Duration**

1 Total 8-10 number of tutorials should be conducted based on above content.   12Hrs.*
Tutorial should be based on case study. Case study consists of static and
dynamic diagrams. Student should design the case study to prepare structural
model, behavioral model and architectural model.

*Indicate total 12 tutorial hours to be conducted.

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	2	2	2	10
Understand	5	5	2	20
Apply	3	3	3	15
Analyze				
Evaluate				
Create	5	5	3	15
Total	15	15	10	60

Course Articulation Matrix:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	1	-	-	-	-	-	-	-	-	-	-	-	2
CO2	-	2	3	3	2	-	-	-	1	1	3	1	3	3
CO3	-	2	3	3	2	-	-	-	1	1	3	1	3	3
CO4	-	2	3	3	2	-	-	-	1	1	3	1	3	3

1: Slight(Low)   2 :Moderate(Medium)   3:Substantial(High)

Government College of Engineering, Karad
Third Year B. Tech.
IT605: Information Security

Teaching Scheme		Examination Scheme	
Lectures	4Hrs/week	**CT1**	15
Tutorial	---	**CT2**	15
Total Credits	4	**TA**	10
		ESE	60

Duration of ESE: 2Hrs 30 Min

Course Objectives:

1. Understand the basics of cryptography and some key encryption techniques.
2. Learn security policies such as authentication, integrity and confidentiality.
3. Understand major security threats and counter measures
4. Learn the legal issues in digital securities

Course Contents

		Hours
Unit I	**Overview and Classical Encryption Techniques:** Computer Security Concepts, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security. Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines. Block Cipher Principles, The Data Encryption Standard (DES), A DES Example, The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles.	10
Unit II	**Asymmetric Cryptography:** Principles of Public-Key Cryptosystems, The RSA Algorithm, Diffie-Hellman Key Exchange, ElGamal Cryptosystem.	8
Unit III	**Cryptographic Data Integrity Algorithms : Cryptographic Hash Functions:** Applications of Cryptographic Hash Functions, Two Simple Hash Functions, Requirements and Security, Secure Hash Algorithm (SHA), SHA-3. **Message Authentication Codes:** Message Authentication Requirements, Message Authentication Functions, Message Authentication Codes, and Security of MACs, MACs Based on Hash Functions: MAC, MACs, Based on Block Ciphers: DAA and CMAC. **Digital Signatures:** Digital Signatures, ElGamal Digital Signature Scheme, Schnorr Digital Signature Scheme, Digital Signature Standard (DSS).	12

Unit IV	**Key Management and Distribution:**	
	Symmetric Key Distribution Using Symmetric Encryption, Symmetric Key Distribution Using Asymmetric Encryption, Distribution of Public Keys, X.509 Certificates, Public Key Infrastructure.	8

Unit V	**Network and Internet Security:**	
	Transport-Level Security -Web Security Issues, Secure Sockets Layer (SSL), Transport Layer Security (TLS), HTTPS Electronic Mail Security -Pretty Good Privacy (PGP), S/MIME.IP Security overview	8

Unit VI	**Issues in digital securities:**	
	Legal, Privacy and Ethical issues in digital security program and data protection by patents, copyrights and trademarks, information and the law, computer crime, privacy, ethical issues in digital security and codes of professional ethics.	4

Course Outcome (CO):

1. Identify security threats and attacks in day today life
2. Describe fundamentals of information security
3. Explain basic principles and techniques when designing a secure system.
4. Implement different cryptographic algorithms.

Text Books:

1. Williams Stallings, "Cryptography and Network security principles and practices". Pearson Education (LPE), 5th edition
2. Nina Godbole, "Cyber Security", Wiley Publications, 1st edition

References:

1. B.A. Forouzan, "Cryptography & Network Security", McGrawHill, 5th edition

2. Atul Kahate, "Cryptography and network security", TMGH, 2nd edition

3. Menezes, A. J., P. C. Van Oorschot, and S. A. Vanston, "Handbook of Applied Cryptography", 5th edition

Useful Links:

1. http://nptel.ac.in/courses/106105031/ IIT Kharagpur
2. http://cse29-iiith.vlabs.ac.in/ Virtual Lab

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	3	20
Understand	5	5	3	20
Apply			3	10
Analyze				
Evaluate	5	5	1	10
Create				
Total	15	15	10	60

Course Articulation Matrix:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	1	3	-	1	3	-	1	-	-	2	-	2	2
CO2	1	3	2	1	3	-	-	1	-	-	2	-	2	2
CO3	2	2	2	2	2	1	-	1	-	-	2	-	2	2
CO4	2	-	1	2	3	2	-	1	-	-	2	-	2	2

1: Slight(Low)   2: Moderate(Medium)   3:Substantial(High)

Government College of Engineering, Karad
Third Year B. Tech.
IT606: Data Warehousing and Mining Lab

Laboratory Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**CA**	75
Total Credits	1		

Course Objectives:

1 Understand the value of data mining in solving real-world problems.

2 Learn foundational concepts underlying data mining.

3 Understand algorithms commonly used in data mining tools.

4 Apply data mining tools to real-world problems.

Course Contents

Experiment 1 Develop an application to design of fact dimension table, data mart using Oracle.

Experiment 2 Develop an application to implement OLAP, roll up, drilldown, slice and dice operation using Oracle.

Experiment 3 Develop an application to construct a multidimensional data using Oracle.

Experiment 4 Learn to install open source data mining software such as Weka. Experiments with Preparing the data, Loading the data, Building a decision tree, Examining the output

Experiment 5 Exploring the Weka Explorer for Loading and filtering files, Training and testing learning schemes

Experiment 6 Experiments with Bayesian classifiers on Weka

Experiment 7 Experiments with Decision Trees on Weka

Experiment 8 Experiments with Clustering algorithms Simple K Means on Weka

Experiment 9 Experiments with Association-rule learners on Weka

Experiment 10 Visualize single attributes (1-d) and pairs of attributes (2-d), rotate 3-d visualizations using Weka

List of Submission

1 Total number of Experiments: 10

Course Outcome(CO):

1 Describe techniques used in data warehouse and mining
2 Construct dimensional model with data cube and perform OLAP operations
3 Identify Patterns, Associations, and Correlations in text data
4 Evaluate data mining algorithms with respect to their accuracy

Mapping of CO and PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	2	-	2	-	-	-	-	-	-	-	2	2
CO2	1	-	2	-	-	-	-	-	-	-	-	-	2	2
CO3	2	-	3	-	-	-	-	-	-	-	-	-	-	3
CO4	3	-	2	-	2	-	-	-	-	-	-	-	-	2

1: Slight(Low)   2: Moderate(Medium)   3:Substantial(High)

Assessment Pattern

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	Avg
Task I	15	15	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	05	05	
CA											

Government College of Engineering, Karad
Third Year B. Tech.
IT607: Information Security Lab

Laboratory Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**CA**	**50**
Total Credits	**1**	**ESE**	**50**

Course Objectives:

 1 Analyse the cryptographic algorithm.

 2 Knowledge of Cryptographic tools and protocol technique.

 3 Knowledge of Network and Internet protocol technique.

Course Contents

Experiment 1 Implement Symmetric Cipher Model using any programming language

Experiment 2 Implement of Playfair Cipher using any programming language

Experiment 3 Implement Poly-alphabetic Vigenere Cipher using any programming language

Experiment 4 Implement Transposition Technique using any programming language

Experiment 5 Implement Stream Cipher & Block Cipher using any programming language

Experiment 6 Implement DES.

Experiment 7 Implement and write advantages of Poly-alphabetic Cipher.

Experiment 8 Perform a case study on roll of Private & Public Key.

Experiment 9 Demonstrate various methods of Authentication Message & Digital Signature

Experiment 10 Perform a case study on Public Key Management in PGP

List of Submission:

 1 Total number of Experiments: 10

Course Outcome(CO):

 1 Describe and analyze the cryptographic algorithm
 2 Implement symmetric and asymmetric encryption algorithm
 3 Implement block and stream cipher algorithm
 4 Implement Network and Internet protocol technique

ESE Evaluation Procedure: ESE should be based on the list included in the above-mentioned contents. Practical performance should be evaluated by the internal and external examiners.

Mapping of CO and PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	-	2	2	-	1	-	-	-	-	-	1	1
CO2	2	2	-	2	2	-	1	-	-	-	-	-	1	1
CO3	2	1	-	2	2	-	1	-	-	-	-	-	1	1
CO4	-	1	-	2	2	-	1	-	-	-	-	-	1	1

1: Slight(Low)   2:Moderate (Medium)   3:Substantial(High)

Assessment Pattern

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	Avg
Task I	15	15	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	05	05	
CA											

Government College of Engineering, Karad
Third Year B. Tech
IT608: Minor Project-II

Laboratory Scheme   **Examination Scheme**
Practical   2 Hrs/week   **CA**   75
Total Credits 2   **ESE**   50

Course Objectives:
 The main aim of this course is to demonstrate the important attributes like critical thinking, creativity, collaborative efforts and communication skills in students. The aim is also to make students aware with the process involved in making product from idea. Not more than **two** students may carry out the minor project together. One supervisor from the department shall be assigned maximum five project batches of the minor project.

The steps involved for completion of minor project includes, but not limited to:

1. Conceptualization of innovative idea through literature and market survey; sight visits; interaction with community or industry, socio-economic survey etc.
2. Defining the real-world problem, analysing, designing the solution and implementation using suitable programming language or tools.
3. Deployment and demonstration of project.
4. Presentation of project

(For purchase of consumables required for completion of project, every project batch shall receive funding from institute with maximum limit decided by BOM)

Project Report Format:
Project report should be of 15 to 20 pages (typed on A4 size sheets). For standardization of the project reports the following format should be strictly followed.
 1. Page Size: Trimmed A4
 2. Top Margin: 1.00 Inch
 3. Bottom Margin: 1.32 Inches
 4. Left Margin: 1.5 Inches
 5. Right Margin: 1.0 Inch
 6. Para Text: Times New Roman 12 Point Font
 7. Line Spacing: 1.5 Lines
 8. Page Numbers: Right Aligned at Footer. Font 12 Point. Times New Roman
 9. Headings: Times New Roman, 14 Point Bold Face
 10. Certificate: All students should attach standard format of Certificate as described by the department. Certificate should be awarded to batch and not to individual student. Certificate should have signatures of Guide, Head of Department and Principal/ Director.

11. Index of Report:
   a. Title Sheet
   b. Certificate
   c. Acknowledgement
   d. Table of Contents
   e. List of Figures
   f. List of Tables
12. References: References should have the following format
   For Books: "Title of Book", Authors, Publisher, Edition
   For Papers: "Title of Paper", Authors, Journal/Conference Details, Year

List of Submission:
   1. Working model of the software project
   2. Project Report
   3. Presentation and demonstration of project in exhibition
Course Outcomes:
   1. Ability to understand community needs
   2. Ability to convert idea in to product
   3. Ability to work in group
   4. Ability to communicate effectively with customers

Course Articulation Matrix:

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	2	3	3	2	3	2	2	3	2	2	2	3	3	3
CO2	2	3	3	2	3	2	1	2	3	2	2	3	3	3
CO3	2	3	3	2	3	2	2	2	2	3	2	3	3	3
CO4	2	3	3	2	3	2	1	2	2	3	3	3	3	3

1: Slight(Low)   2: Moderate(Medium)   3:Substantial(High)

Assessment pattern
The continuous assessment shall be done by the supervisor based on attributes like critical thinking, creativity, collaborative efforts and communication skills in students. The end semester assessment shall be done by external referee one week before the term end. The department shall arrange exhibition (all department will arrange the exhibition on same day) of the minor projects done by students and the referee will judge the project work in accordance with the outcomes of

the course by interacting with students and marks will be awarded to individual student. This exhibition will remain open for all students, parents, and other citizens visiting the exhibition.

Teaching Load

One supervisor from the department shall be assigned five project batches of the minor project. The weekly load for the supervisor is 2Hr/week.