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
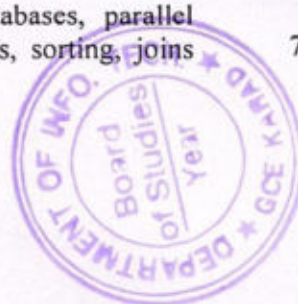
| Unit V | **Distributed Database:** Distributed database concepts, data fragmentation, replication and allocation techniques for distributed database design, query processing in distributed databases. Concurrency control and recovery in distributed database. | 9 |

| 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., 4th edition.

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

Lectures	3Hrs/week
Tutorial	--
Total Credits	3

Examination Scheme

CT1	15
CT2	15
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

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

Examination Scheme

CT1	15
CT2	15
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

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

Examination Scheme

CT1	15
CT2	15
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. Tutorial should be based on case study comprises assembly language instructions, 8051 microcontroller and interfacing, , Embedded system and ARM processor.   12Hrs.*

*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.

Course Contents

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 Procedure:	Practical performance should be evaluated by the internal and external 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
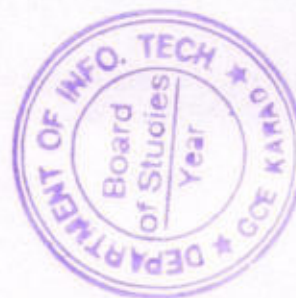4 Evaluate data mining algorithms with respect to their accuracy

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, Circuit Satisfiability problem, Clique Decision Problem.	8

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

Lectures	4 Hrs/week
Tutorial	1 Hr/week
Total Credits	5

Examination Scheme

CT1	15
CT2	15
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	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	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	PO1 0	PO1 1	PO1 2	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.

Government College of Engineering, Karad
Final Year B. Tech.
IT701: Software Testing and Quality Assurance

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 Demonstrate knowledge about fundamentals of software testing.
2 Learn test cases from SRS document and use case.
3 Aware about levels of testing.
4 Understand software metrics and measurement.

Course Contents

		Hours
Unit I	**Introduction:** Software Failures, Testing Process, Terminologies: Program and Software, Verification and Validation, Fault, Error, Bug and Failure, Test, Test Case and Test Suite, Deliverables and Milestones, Alpha, Beta and Acceptance Testing, Static and Dynamic Testing, Testing and Debugging, Limitations of Testing, V Shaped software life cycle model.	3
Unit II	**Software Verification:** Verification Methods, SRS document verification, SDD document verification, Source code reviews, User documentation verification, Software project audit Creating test cases from SRS and Use cases: Use Case Diagram and Use Cases, Generation of test cases from use cases, Guidelines for generating validity checks,	8
Unit III	**Levels of Testing:** The Need for Levels of Testing, Unit Test: Functions, Procedures, Classes, and Methods as Units, The Need for Preparation, Designing the Unit Tests, The Class as a Testable Unit, Running the Unit Tests and Recording Results, Integration Test: Integration Strategies for Procedures and Functions, Integration Strategies for Classes, Designing Integration Tests, System Test: Stress Testing, Security Testing, Recovery Testing.	7
Unit IV	**Regression Testing:**	8

Regression Test cases selection, Reducing the number of test cases, Code coverage prioritization techniques

Testing Web applications: web testing, functional testing, UI testing, usability testing, configurations and compatibility testing, performance testing.

Unit V	**Measurement in software engineering:**	
	Scope of software metrics, Classifying software measures, Applying the framework, Software measurement validation, Measuring internal product attributes: size, aspects of software size, length, reuse, functionality	8

Unit VI	**Measuring internal product attributes:**	
	Structure, Types of structural measures, Control-flow structure, Modularity and information flow attributes, Measuring external product attributes: Modeling software quality, McCall's quality factors, ISO 9126 quality characteristics, (**Self study**: ISO 9000:2000, Measuring aspects of quality)	6

Course Outcome (CO):

1 Explain basic concepts of software testing.
2 Create test cases from SRS document and use case.
3 Effectively apply the levels of testing.
4 Describe software metrics and measurement.

Text Books:

1 Yogesh Singh, "Software testing", Cambridge University Press, 1st edition, 2013 (Unit I,II,IV)
2 Ilene Burnstein,"Practical Software Testing", Springer professional computing, 1st edition, ISBN 0-387-95131-8 (Unit III)
3 N. E. Fenton, S. L. Pfleeger, "Software Metrics-A Rigorous and Practical Approach", PWS publisher, 2nd edition, ISBN: 0-534-95425-1 (Unit V,VI)

References:

1 Aditya P. Mathur, "Foundations of Software Testing", Pearson Education, 2nd edition, 2008.
2 Renu Rajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, 1st edition, 2004.
3 Srinivasan Desikan and Gopalaswamy Ramesh, " Software Testing – Principles and Practices", Pearson education, 2006
4 M. G. Limaye, "Software Testing Principles, Techniques and tools", McGraw Hills, 1st edition, 2009.
5 Rahul Shende, "Testing in 30+ Open Source Tools", SPD publication, 2nd edition, 2012.

Useful Links:

1 http://nptel.ac.in/courses/106105150 Software Testing, Dr. Rajib Mal, Department of CSE, IIT Kharagpur.
2 http://nptel.ac.in/courses/106101061/18 Software Testing, Prof. R. K. Joshi, Department of CSE, IIT Bombay.
3 http://www.softwaretestingmentor.com/istqb-videos/ Software Testing, Manish Varma.

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	3	20
Understand	5	5	3	20
Apply	5	5	3	10
Analyze			1	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	-	1	1	-	1	-	-	1	2	1	-	1	3	1
CO2	-	2	1	1	-	-	-	1	2	1	-	1	2	1
CO3	-	1	3	-	1	-	-	1	2	1	-	1	2	1
CO4	-	1	1	-	-	-	-	1	2	1	3	1	2	1

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

Government College of Engineering, Karad
Final Year B. Tech.
IT702: Internet of Things

Teaching Scheme

Lectures   3Hrs/week

Tutorial   --

Total Credits   3

Examination Scheme

CT1	15
CT2	15
TA	10
ESE	60

Duration of ESE: 2Hrs 30 Min

Course Objectives:

1. Understand the terminology, technology and its applications.
2. Introduce the concept of M2M (machine to machine) with necessary protocols.
3. Introduce various domain specific IoT applications.
4. Learn the Python scripting language which is used in many IoT devices.
5. Familiar with the Raspberry PI platform that is widely used in IoT applications.
6. Introduce the implementation of web based services on IoT devices.

Course Contents

  Hours

Unit I   **Introduction:**
The Third ICT Wave, Rise of the Machines, The IoT Kaleidoscope, Defining Internet of Things, IoT: A Web 3.0 View, Ubiquitous IoT Applications, A Panoramic View of IoT Applications, Important Vertical IoT Applications, Telematics and Intelligent Transport Systems, Smart Grid and Electric Vehicles, Smarter Planet and Smart Buildings, Four Pillars of IoT, The Horizontal, Verticals, and Four Pillars, M2M: The Internet of Devices, RFID: The Internet of Objects, WSN: The Internet of Transducers, SCADA: The Internet of Controllers.   8

Unit II   **DNA of IoT and Middleware:**
DCM: Device, Connect, and Manage, Device: Things That Talk, Connect: Via Pervasive Networks, Wired Networks, Wireless Networks, Satellite IoT, Manage: To Create New Business Value. Middleware and IoT: An Overview of Middleware, Communication Middleware for IoT, MTC/M2M Middleware, SCADA, Middleware, RFID Middleware, WSN Middleware, LBS and Surveillance Middleware.   6

Unit III	**Protocols and Architecture Standardization:** Protocol Standardization for IoT: Web of Things versus Internet of Things, IoT Protocol Standardization Efforts, Unified Data Standards: A Challenging Task. **Architecture Standardization for WoT:** Platform Middleware for WoT, Unified Multitier WoT Architecture, WoT Portals and Business Intelligence, Challenges of IoT Information Security (**Self-study:** The Internet of Things and Cloud Computing, Mobile Cloud Computing, The Cloud of Things Architecture).	8
Unit IV	**Sensors and Control Systems:** Classification of Control Processes, Open and Closed Loop Control Systems, Understanding Photoelectric Sensors, Detection Methods, Proximity Sensors, Understanding Inductive, Proximity Sensors, Understanding Capacitive Proximity Sensors , Understanding Limit Switches, Inductive and Capacitive Sensors in Manufacturing, Understanding Microwave-Sensing Applications, Understanding Laser Sensors .	6
Unit V	**IoT Physical Devices and Endpoints:** Python packages, JSON, XML, HTTPLib, URLLib, SMTPLib Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming, Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.	6
Unit VI	**Domain Specific IoTs:** Home Automation, Surveillance system, Environment Monitoring, Smart Energy, Retail Management, Logistics, Smart Agriculture, Industrial IoT, Health and Lifestyle monitoring.	6

Course Outcome (CO):

1. Explain and demonstrate various components of Internet of Things (IoT).
2. Describe and evaluate different applications of the IoT
3. Investigate and propose various requirements of IoT for real world applications
4. Evaluate a variety of existing and developing architecture technologies for IoT

Text Books:

1. Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press, 1ˢᵗ edition, 2012 (Unit I, II, III).
2. Sabrie Soloman, "Sensors Handbook", McGraw Hill, 2ⁿᵈ edition (Unit IV).
3. Matt Richardson, Shawn Wallace, "Getting Started with Raspberry Pi", O'Reilly

SPD, 1st edition, 2014, ISBN: 9789350239759 (Unit V).

4   Arshdeep Bahga, Vijay Madisetti, "Internet of Things, A Hands on Approach", University Press, 1st edition. 2015 (Unit VI).

References:

1   Hakima Chaouchi, " The Internet of Things: Connecting Objects to the Web" ,Wiley Publications, ISBN: 978-1-84821-140-7, 2010.

2   Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6 The Evolving World of M2M Communications", Wiley Publications, ISBN: 978-1-118-47347-4, July2013.

3   Adrian Mcewen, Hakin Cassimally, "Designing The Internet of Things", Wiley 2015.

4   Olivier Hersent, David Boswarthick, Omar Elloumi, "The Internet of Things: Key Applications and Protocols", Wiley, 2015.

Useful Links:

1   https://www.coursera.org/specializations/internet-of-things

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
Final Year B. Tech.
IT703: Information Retrieval

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. Learn basic concept of information retrieval process.
2. Understand the indexing and searching techniques of information retrieval.
3. Provide basic knowledge of retrieval evaluation and text operations.
4. Understand the use of IR in distributed and multimedia IR, Web Search.

Course Contents

Hours

Unit I **Introduction:**
Basic Concepts of IR, Data Retrieval & Information Retrieval, IR system block diagram. Automatic Text Analysis: Luhn's ideas, Conflation Algorithm, Indexing and Index Term Weighing, Probabilistic Indexing, Automatic Classification: Measures of Association, Classification Methods, Cluster Hypothesis, (**Self study:** Clustering Algorithms, Single Link Algorithm).   7

Unit II **Indexing, Modeling and Searching Techniques:**
Indexing & searching: Inverted file, Suffix trees & suffix arrays, Signature Files, Scatter storage or hash addressing, Clustered files. Modeling: Basic concepts, Boolean Model, Vector Model, probabilistic Model Searching strategies: Boolean Search, Serial search, cluster based retrieval. Query languages: Types of queries, Patterns matching, structural queries.   7

Unit III   **Text and Multimedia Languages:** Introduction, Metadata, Text, Mark-up Languages, Multimedia, Trends and Research Issues.   6

Unit IV   **Retrieval and Text Operations:**
Retrieval Evaluation: Precision and recall, alternative measures.
Text Operations: Introduction, Document Pre-processing, Document   7

Clustering, Text Compression, Comparing Text Compression Techniques.

Unit V   **Distributed and Multimedia IR:**
Distributed IR: Introduction, Collection Partitioning, Source Selection, Query Processing, web issues.
Multimedia IR: Introduction, Data Modeling, Query languages, Generic multimedia indexing approach, One dimensional time series, (**Self study:** Two dimensional color images, Automatic feature extraction).   7

Unit VI   **Searching the Web:**
Searching the Web: Challenges, Characterizing the Web, Search Engines, Browsing, Mata-searchers, Finding needle in the Haystack, Searching using Hyperlinks.   6

Course Outcome (CO):
1. Explain the concept of Information retrieval.
2. Describe indexing and searching techniques of retrieval.
3. Evaluate performance and text operations of any information retrieval.
4. Explain the multimedia and distributed information retrieval.

Text Books:
1. C.J. Rijsbergen, "Information Retrieval", Butterworth-Heinemann publisher, 2nd edition, 1979 ISBN-13: 978-0408709293 (Unit I, II)
2. Yates, Neto, "Modern Information Retrieval", Pearson Education, 1st edition, 2010, ISBN 81-297-0274-6. (Unit II, III, IV, V, VI)

References:
1. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schutze, "Introduction to Information Retrieval", Cambridge University Press, 1st edition, 2008, ISBN 978-0-521-86571-5
2. Mark leven, "Introduction to search engines and web navigation", John Wiley and sons Inc., 1st edition 2005, ISBN 9780-170-52684-2.
3. V. S. Subrahamanian, Satish K. Tripathi "Multimedia information System", Kulwer Academic Publisher. 1st edition 2010
4. Chabane Djeraba,"Multimedia mining A highway to intelligent multimedia documents", Kulwer Academic Publisher, 2003 edition, ISBN 1-4020-7247-3.
5. Ricci, F, Rokach, L. Shapira, B.Kantor, "Recommender Systems Handbook", 1st edition, 2011.
6. Stefan Buttcher, Charles L. A. Clarke, Gordon V. Cormack, "Information Retrieval Implementing and Evaluating Search Engines", MIT Press, 1st edition, 2010.
7. Heiner Stuckenschmidt, Frank van Harmelen, "Information Sharing on the Semantic Web", Springer International Edition, ISBN 3-540-20594-2.

Useful Links:

1. http://people.ischool.berkeley.edu/~hearst/irbook/print/chap10.pdf
2. http://openlib.org/home/krichel/courses/lis618/readings/rijsbergen79_infor_retriev.pdf

List of Submission: **Duration**

1. Total 8-10 number of tutorials should be conducted based on above contents. Tutorial should be based on Indexing, Modeling and Searching Techniques, Text and Multimedia Languages, Retrieval and Text Operations, Distributed and Multimedia IR, Searching the Web.   12Hrs.*

*Indicate total 12 tutorial hours to be conducted.

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5		20
Understand	5	5	3	20
Apply	5	5	3	10
Analyze			3	
Evaluate			1	05
Create				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	-	1	-	-	-	-	2	-	1	1	2	-	1	1
CO2	-	2	1	1	-	2	2	-	1	1	2	-	1	1
CO3	-	2	1	1	-	3	-	-	1	1	2	-	1	1
CO4	-	1	-	-	1	3	2	-	1	1	2	-	1	1

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

Government College of Engineering, Karad
Final Year B. Tech.
IT705: Software Testing and Quality Assurance Lab

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

Course Objectives:
1 Understand basic concepts of software testing.

2 Demonstrate test cases for manual as well as automated testing.

3 Acquire the knowledge of different software testing tools.

Course Contents

Experiment 1   Write programs in C Language to demonstrate the working of the following constructs with different range of values and test cases:
i) do...while ii) while....do iii) if...else iv) switch v) for

Experiment 2   A program written in C language for matrix multiplication fails "Introspect the causes for its failure and write down the possible reasons for its failure".

Experiment 3   Prepare SRS document, use case specification document and create test case matrix for use cases for any application.

Experiment 4   Demonstrate automated functionality testing tool (e.g. Winrunner/ Rational robot/UFT)

Experiment 5   Demonstrate web application testing tool (e.g. Selenium)

Experiment 6   Demonstrate Unit testing tool(e.g. JUnit/NUnit)

Experiment 7   Demonstrate bug tracking tool (e.g. Bugzilla)

Experiment 8   Demonstrate test management tool (e.g. Test Director/ Testuff)

Experiment 9   Demonstrate web based open source testing tool (e.g. Test Link)

Experiment 10   Demonstrate automated testing tool for desktop, web based and mobile applications. (e.g. TestComplete).

Experiment 11   Study of software quality model and estimation model.

List of Submission:
1.   Total number of Experiments : 10

Course Outcome(CO):

1 Explain fundamental concepts of software testing
2 Prepare test cases for manual as well as automated testing
3 Use different software testing tools.

Mapping of CO and PO

CO	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	1	1	-	3	-	-	1	2	1	-	1	2	1
CO2	-	1	1	-	3	-	-	1	2	1	-	1	2	1
CO3	-	1	1	-	3	-	-	1	2	1	-	1	2	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	Exp 11	Avg
Task I	15	15	15	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	05	05	05	
CA												

Government College of Engineering, Karad
Final Year B. Tech.
IT706: Internet of Things Lab

Laboratory Scheme
Practical   2Hrs/week
Total Credits   1

Examination Scheme
CA   50

Course Objectives:

1   Understand how sensors systems work.

2   Learn how to analyse and visualize sensor data.

3   Understand how to work as a team and create end-to-end IoT applications.

Course Contents

Experiment 1	Study of IoT (Microcontroller) Kits.
Experiment 2	Study of different types of sensors, actuators, transducers.
Experiment 3	Experiment based on IR sensor. Write an application to detect obstacle and notify user using LED.
Experiment 4	Experiment based on FIRE sensor. Write an application to detect Fire and notify users using LED.
Experiment 5	Experiment based on Ultrasonic sensor. Write an application to find out distance between obstacles.
Experiment 6	Experiment based on DHT11 (Temperature and humidity) sensor. Write an application to find out the temperature and humidity.
Experiment 7	Experiment based on interfacing to control the operation of stepper motor remotely using IoT kit.
Experiment 8	Create a simple web interface using IoT kit to control the connected LEDs remotely through the interface.
Experiment 9	Experiment based on IoT kit to control the operation of elevator operations.
Experiment 10	Study and implement clustering and configuring devices using MPI library.
Experiment 11	Implement a mini project in any one of the application from the following domains:

(Home Automation: Smart Lighting, Smart Appliances, Intrusion Detection, Smoke/Gas Detectors, Cities: Smart Parking, Smart Lighting, Smart Roads, Structural Health Monitoring, Surveillance, Emergency Response, Environment: Weather Monitoring, Air Pollution Monitoring, Noise Pollution Monitoring, Forest Fire Detection, River Floods Detection, Energy: Smart Grids, Renewable Energy Systems, Prognostics, Retail: Inventory Management, Smart Payments, Smart Vending Machines, Logistics - Route Generation & Scheduling, Fleet Tracking, Shipment Monitoring, Remote Vehicle Diagnostics, Agriculture: Smart Irrigation, Green House Control, Industry: Machine Diagnosis & Prognosis, Indoor Air Quality, Monitoring, Health and Lifestyle: Health and Fitness Monitoring.)

List of Submission:

1 Total number of Experiments : 11

Course Outcome(CO):

1 Aware of the role and importance of the Internet of Things in the enterprise, economy and society.
2 Create software for devices equipped with sensors interacting with environment.
3 Design the architecture and technologies needed to implement IoT devices.
4 Knows and understand the mechanisms used in the design of IoT device.

Mapping of CO and PO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	1	-	-	1	3	-	-	1	1	-	1	2	1
CO2	-	1	2	-	3	1	-	1	2	1	-	1	2	2
CO3	-	-	2	-	2		-	-	1	-	-	1	1	1
CO4	-	1	-	-	1	2	-	-	1	1	-	1	2	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
Final Year B. Tech.
IT707: Advanced Software Technology Lab I

Teaching Scheme		Examination Scheme	
Lecture	2Hrs/week	TA/CA	50
Laboratory Scheme		ESE	50
Practical	4Hrs/week		
Total Credits	4		

Course Objectives:

1 Introduce about emerging web technologies.

2 Motivate the students to develop web applications using Servlet and JSP.

3 Learn object-relational mapping and object persistence.

4 Create web applications using Spring , Hibernate and struts.

Course Contents

UNIT I   Java Servlet:
Introduction: History of Web Applications, HTTP Servlet Basics, Servlet Life Cycle, Retrieving Information: ,Sending HTML Information: ,Handling Cookies, Session Tracking   4

UNIT II   Java Server Pages (JSP):
Overview of JSP technology, Installation of JSP pages, Basic Syntax
Creating Template Text, Invoking Java Code from JSP, Using JSP Expressions, Writing Scriptlets, Using Scriptlets to make Parts of the JSP page Conditional.(**Self Study:** Using Declarations, Using Predefined Variables)   4

UNIT III   Struts Framework:
Introduction to Struts, MVC design pattern, AOP : DI & IC, Struts Configuration, Action and subclasses, Action classes & UI, Validator Framework ,Built-in Interceptors, Custom Interceptors, Struts Tag Libraries ,OGNL, Using data tags   5

UNIT IV   Hibernate Framework:
Object Relational Mapping, Introduction to Hibernate, Hibernate Mapping, Creating Persistent Classes, Hibernate Query Language,(**Self study:** Mapping Collections, Hibernate Caching)   4

UNIT V   Spring Framework:
Introduction to Spring Framework , Aspect-oriented programing (AOP),Spring Bean Wiring, Applying an Advice to a bean, Spring and Databases, Transaction Management   5

UNIT VI   **AngularJS:**

AngularJS: Introduction, Architecture, Advantages, AngularJS Hello World: Your First Program AngularJS Controller: , AngularJS Views , AngularJS Expressions, Numbers,Strings,Objects,Array,$eval, Angular JS Filter: Lowercase, Uppercase, json, Number, Currency, Custom. Learn AngularJS Directive: ng-app, ng-init, ng-model, ng-repeat, ng-transclude. (**Self study:** AngularJS Module, AngularJS Validation, Angular Table)   4

Laboratory Contents:

Experiment 1	Installation, Configuration of Tomcat Server and Deployment of servlet based application
Experiment 2	Develop Servlet application to demonstrate Request, Response and Session
Experiment 3	Implement database connectivity using Java Servlet.
Experiment 4	Implement wen Application with JSP.
Experiment 5	Develop JSP application using database
Experiment 6	Implement session using JSP
Experiment 7	Installing & Configuring Struts
Experiment 8	Create a registration form using struts UI tags and store these information into the database
Experiment9	Creating the login and logout application using struts.
Experiment 10	Installation of Hibernate /Setup on Eclipse IDE.
Experiment 11	Create a web application with hibernate
Experiment 12	Write an application using Hibernate using Mapping Collections
Experiment 13	Installation of Spring - Environment.
Experiment 14	Create an application of spring framework using eclipse IDE.
Experiment 15	Write an application to handle form data in spring MVC.
Experiment 16	Develop a login application using AngularJs.
Experiment 17	Implement file upload application using AngularJs.
Experiment 18	Implement Todo app using AngularJs.

List of Submission:

1. Total number of Experiments : 16

Course Outcome(CO):

1. Develop web application using Java Servlet and JSP.
2. Implement hibernate applications.
3. Design a web application using Spring Framework.
4. Create web applications based on the Model-View-Controller Architecture.

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.

Text Books:

1. Jason Hunter , "Java Servlet Programming", O'Reilly, 2nd edition, 2010 (Unit I).

2. Marty Hall, Larry Brown , "Core-Servlet and Java Server Pages" Volume -1,
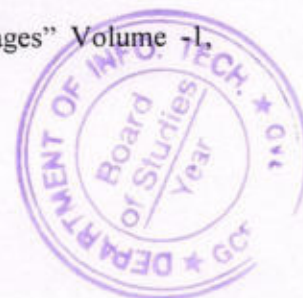
Pearson Education, 2nd edition, 2003(Unit I, II).

3 Sharanam Shah, Vaishali Shah, "Struts 2 for Beginners, Arizona Business Alliance, 3rd edition, 2014 (Unit III).

4 Craig Walls, "Spring in Action", Manning", Dreamtech Press, 4th edition, 2015 (Unit V)

5 Santosh Kumar , "Spring and Hibernate", McGraw Hill Education, 2nd edition , 2017(Unit IV, V)

6 Diego Netto and Valeri Karpov ,"Professional AngularJS", Wrox, 1st edition, 2015 (Unit VI).

Reference Book:

1 "Java Server Programming Java EE7 (J2EE1.7) Black Book", Kogent Learning Solutions Inc, Dreamtech Press, 2014.

2 Bryan Basham, Kathy Sierra, Bert Bates, "Head First Servlets and JSP", O'REILLY, 2nd edition, 2009.

3 Amuthan G , "Spring MVC: Beginner's Guide", Packt Publishing, 2014.

4 Brad Green, Shyam Seshadri , "AngularJS – Up and Running" , O'Reilly, 2nd edition, 2014.

Mapping of CO and PO

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	-	-	3	2	3	-	-	-	1	1	-	1	3	1
CO2	-	2	3	2	3	-	-	-	1	1	-	1	3	1
CO3	-	1	3	2	3	-	-	-	1	1	-	1	3	1
CO4	-	1	3	1	2	-	-	-	1	1	-	1	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 - -----	Exp 18	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
Final Year B. Tech.
IT708: Seminar

Laboratory Scheme   **Examination Scheme**
Practical   1Hr/week   CA   50
Total Credits 1

Pre-requisite:
Course Objectives:

1. Awareness about contemporary technology.
2. Improve presentation and communication skills.
3. Enhance the knowledge of writing technical report.

Course Contents

Students should deliver seminar individually. It should consist of a talk of 20 minutes on a topic preferably from the area in which a student intends to work for his project in final year B.Tech or any upcoming technology not covered in syllabus.

Selection of Seminar Topic

1. Select a seminar topic relevant to Information Technology, Computer Science and Engineering. For selection topics refer Scopus Index Journal papers and innovative ideas.
2. Get the topic approved by the seminar guide well in advance.

Preparation

1. Research the topic well. Find relevant information related to topic.
2. The presentation slides should include list of key points, figures, charts and tables. There should not be running paragraphs.
3. The slides should be readable – Font size used should be at least 20.
4. The figures, tables etc. should be relevant to content and should not be for only namesake.
5. Figures should be very clear. Develop the habit of drawing your own figures using suitable software tools for better clarity.
6. For the presentation, adopt simple themes; avoid unnecessary animation and sound effects.
7. The presentation should be approved by the seminar guide for corrections if any.
8. A report of the seminar should contain the following.
    a. Title of the seminar.
    b. Abstract of the topic.
    c. Name and other details of student and the guide.
    d. List of references strictly in IEEE format.

Presentation

1. Keep a hand-out of presentation. This will help organise the talk better.
2. There should be proper self-introduction at the beginning.
3. Introduce the topic and highlight its significance.
4. Have good voice projection; deliver in modest pace; modulation of voice is desirable.
5. Keep eye contact with the audience.
6. Face the audience - Don't talk to the screen.
7. Familiarise with presentation aids.
8. Avoid repeated use of certain words/gestures.
9. Give a proper conclusion.

Assessment Guideline:

• Student has to meet weekly to the guide and whereas internal guide has to keep track on the progress of the seminar and also has to maintain attendance report. This progress report can be used for awarding CA marks.

• There will be two presentations first will be based on industrial training / mini project and another on topic to be selected for seminar in consultation with guide.

• The seminar to be delivered by students should be assessed by a panel of at least two senior faculties within the department.

• The assessment for the seminar should include but not limited to following points.

    1) Novelty of the topic
    2) Technical depth
    3) Organization of the topic
    4) Presentation skills
    5) Communication skills
    6) Question-Answer session

• Student will have to submit the seminar report.

Teaching Load:

One supervisor from the department shall be assigned five students for seminar. Weekly load for the supervisor is 1 Hr/week.

Course Outcome :

    1 Ability to aware contemporary technology
    2 Ability to improve presentation and communication skills.
    3 Ability to enhance the knowledge of writing technical report.

Course Articulation Matrix:

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

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

Government College of Engineering, Karad
Final Year B. Tech.
IT709:Project Phase-I

| Laboratory Scheme		Examination Scheme	
Practical	2Hrs/week	CA	50
Total Credits	4	ESE	50

Course Objectives:

1 Define and analyse the problem.

2 Design, develop and implement a group project.

3 Improve presentation and communication skills.

4 Enhance the knowledge of writing a project report and technical paper.

Course Contents

The Student will undertake one project over the academic year, which will involve the analysis, design of a system or sub system in the area of Information Technology and Computer Science and Engineering.

I Guidelines:

- Select a topic relevant to the Information Technology, Computer Science and Engineering. For selection of topic refer Scopus Index Journals, innovative ideas and societal use application.
- The student will undertake same project over the academic year, which will involve the analysis, design of a system or sub system in the area identified earlier in the field of Information Technology, Computer Science and Engineering.
- The project will be undertaken preferably by a group of 3-4 students who will jointly work and implement the project. The group will select a project with approval from a committee formed by the department of senior faculty to check the feasibility and approve the topic.
- The project work can be undertaken in own organisation/company/any reputed R&D Lab.
- Student must consult project guide in selection of topic.
- Projects should have preferably industrial exposure, societal use application and research oriented.
- Student should report weekly to the project guide and log book of activities should be maintained for continuous assessment of the project work. The log book should be used for awarding CA marks.
- There would be continuous assessment by both internal and external guide for industry project.
- In case of industry projects, visit by internal guide will be preferred and completion
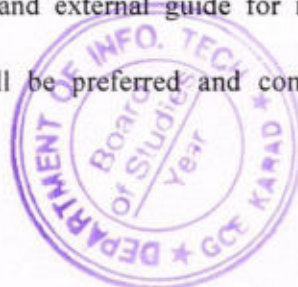
certificate from industry is necessary.

II. Project Phase –I Report Format:

Report should be of 30 to 40 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 the group and not to individual student. Certificate should have signatures of guide, Head of Department and Principal/Director.
11. Report Structure
    - Contents
    - List of Abbreviations
    - List of Figures
    - List of Graphs
    - List of Tables
  - Introduction and aims/motivation and objectives
  - Literature Survey
  - Problem Statement
  - Project Requirements
  - System Analysis, Proposed Architecture/ high level design of the project
  - Verification and Validation
  - Project Plan
  - Conclusion
    - References
    - Appendices
  - Base Paper(s)
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(IEEE format)
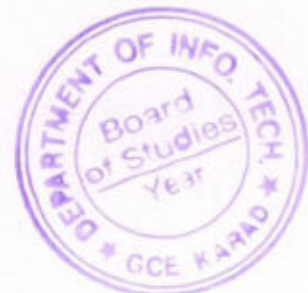
III. Assessment Guideline:

- 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 and so on would be considered.
- The Head of the department/Project coordinator shall constitute a review committee for project work for project group; project guide would be one member of that committee by default. There shall be at least two reviews in semester-VII and semester-VIII by the review committee.
- **Review 1:** Finalization of scope: the objectives and scope of the project should be finalized in second week of their academic semester. Should finalize list of required hardware, software or other equipment for executing the project, test environment/tools.
- **Review 2:** Finalization of SRS: High level design, UML diagram using Rational Rose / Dia tools etc. in the sixth week of their academic semester.
- Each student/group is required to give presentation as part of review for 15 to 20 minutes followed by a detailed discussion.
- The students or project group shall make presentation on the progress made by them before the committee. The record of the remarks/suggestions of the review committee should be properly maintained and should be made available at the time of examination.
- End semester examination should be conducted by the panel of internal examiner and external examiners from reputed institute or industry.
- The final certification and acceptance of work ensures the satisfactory performance on the above aspects.

List of Submission:
Students will have to submit the project synopsis report.

Teaching Load :
One supervisor from the department shall be assigned four groups of project and weekly load for supervisor is 2Hrs/week.

Course Outcome :
1. Ability to convert idea in to product
2. Ability to work in team
3. Ability to communicate effectively
4. Ability to write project report and research paper.

Course Articulation Matrix:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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)

Government College of Engineering, Karad
Final Year B. Tech.
IT710: Industrial Training/ Mini Project

Laboratory Scheme   **Examination Scheme**

Practical   -   CA   50

Total Credits   2

Course Objectives:

    1   Exposure to industry environment.

    2   Define and analyse the industrial problem.

    3   Design, develop and implement in group project.

    4   Improve presentation and communication skills.

    5   Enhance the knowledge of writing a project report and technical paper.

Course Contents

PART I : Industrial Training / Internship

The students must undergo an industrial training of minimum two-three weeks in an industry preferably dealing with computer and IT industry during the semester break after Sixth semester and complete within 15-21 calendar days before the start of seventh semester. It is expected that students should complete work assignment given by industry.

Industrial Training/ Internship Report Format:

Maximum fifteen students in one batch, involving three groups of maximum five students, shall work under one Faculty. However, each student should have different industrial training and its presentation. The report should be of 20 to 30 pages. For standardization of the report 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 have signatures of Guide, Head of Department and Principal/Director.

11. The entire report should be documented as

   a. "Name of Industry with address along with completed training certificate"

   b. Area in which Industrial training is completed. All Students must present their reports

individually.

Internship Guidelines

Student internships for credit at GCE Karad are carefully monitored, work experiences in which students have intentional learning goals gained through experience in a professional workplace under the general supervision of an experienced professional.

General Information

• It is the student's responsibility to seek the internship and successfully go through the hiring process of the company they choose.
• Internships may vary in duration but generally for 96 hours (minimum).
• Attendance sheets are required and it is the responsibility of the student to submit a time sheet after two weeks (signed by their supervisor) via paper copy to their Internship Coordinator directly.
• Internship hours must be completed with one company for the duration of the semester. Transferring hours from one company to another for the same applied credit during the same semester will not be allowed.

Assessment Guideline:

• The students must submit a report of the training undergone and present the contents of the report before the evaluation committee constituted by the department.
• An internal evaluation will be conducted for examining the quality and authenticity of contents of the report and award the marks at the end of the semester.

Course Outcome :

1   Ability to work in industry environment.
2   Ability to work in team.
3   Skill to communicate effectively.
4   Ability to write project report and research paper.

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	1	-	1	-	2	-	2	-	2	2	3	3	2	2
CO2	1	-	-	1	2	-	2	-	3	-	3	-	2	-
CO3	1	-	-	-	2	-	2	-	1	3	3	-	1	-
CO4	-	1	2	2	-	-	1	-	1	3	3	-	1	-

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

PART II : Mini Project

Students not seeking industrial training should opt for mini project. The student is expected to take up any industry oriented application and develop a mini-project on this topic preferably on Java, .NET, PERL, PYTHON, PHP or any contemporary technology. The implementation should involving all the phases of software development life-cycle i.e. problem formulation, design, implementation and testing phases. Below are the guidelines for structuring and formatting of the project report.

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 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
Assessment Guideline
• In case of in-house Mini Project, work will be continually evaluated by the assigned internal guide.
• Internal project work assessment will be done jointly by teacher's panel appointed by Program Head.

Course Outcome :

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

Government College of Engineering, Karad
Final Year B. Tech.
Elective I-IT714: Artificial Intelligence

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 the concepts of artificial intelligence.

2 Acquire the knowledge of the different problem solving methods in Artificial Intelligence.

3 Understand learning tools, techniques and applications.

Course Contents

		Hours
Unit I	**Introduction to Intelligent Systems:** Introduction, History, Foundations and Mathematical treatments, Problem solving with AI, AI models, Learning aspects in AI, What is an intelligent Agents, Rational agent, Environments types, types of Agents	5
Unit II	**Problem-solving :** Problem solving process, Problem analysis and representation, Problem space and search, Toy problems, real world problems, Problem reduction methods, General Search algorithms, Uninformed Search methods, Informed (Heuristic) Search { Best rst, Greedy, A* search methods, Heuristic Functions, AO*, Local Search Algorithms and optimization problems, Adversarial search methods, (**Self study:**Important concepts of Game theory)	8
Unit III	**Knowledge, Reasoning, and Planning:** Knowledge based agents, The Wumpus World, Logic, propositional logic, Representation of knowledge using rules, Predicate logic, Unication and lifting, inference in FOL, Forward Chaining, Backward Chaining, Resolution, Logic Programming. Planning problem, Planning, Algorithms for Planning as State Space Search, Planning Graphs, simple planning agent, planning languages, blocks world problem, goal stack planning, mean end analysis, progression planners, regression planners, partial order planning, planning graphs, hierarchical planning, job shop scheduling problem, Ontological Engineering.	7

Unit IV **Uncertain Knowledge and Decision Theory :**
Uncertainty and methods, Basic Probability Notion, Inference Using Full Joint Distributions, Bayesian probability and belief networks, Relational and First-Order Probability Models Hidden Markov Models, Kalman Filters, Dynamic Bayesian Networks, Decision network, Decision making and imperfect information, Combining Beliefs and Desires under Uncertainty, The Basis of Utility Theory, Decision Networks, Decision-Theoretic Expert Systems.   7

Unit V **Communicating, Perceiving, and Acting , Learning Tools, Techniques and Applications:** Machine Learning Concepts, methods and models, Supervised Learning, unsupervised and semi-supervised, Learning Decision Trees, Artificial Neural Networks, Non-parametric Models, Support Vector Machines, Ensemble Learning, empirical learning tasks, Active Learning, Learning based on limited information, Natural Language Processing, Language Models, Text Classification, Information Retrieval, Information Extraction, Natural Language for Communication, Machine Translation, Speech Recognition, Image Formation and object recognition,   7

Unit VI **AI Applications:**
Early Image-Processing Operations, Object Recognition by Appearance, Reconstructing the 3D World, Object Recognition from Structural Information, Using Vision, AI in Medicine, AI in Healthcare Industry (**Self Study:** Robotics)   6

Course Outcome (CO):
1 Apply different problem solving method for solving AI problems.

2 Design Artificial Intelligence system using different learning tools.
3 Develop AI system using concepts of Image Processing and Robotics.

Text Books:
1 Stuart Russell, Peter Norvig, "Artificial Intelligence: A Modern Approach", Prentice Hall, 3rd edition, 2009.
2 Deepak Khemani, "A First Course in Artificial Intelligence", McGraw Hill Education India, 1st edition, 2013.
3 Mike Barlow, "AI and Medicine, Data-Driven Strategies for Improving Healthcare and Saving Lives", O'Reilly, 1st edition, 2016.

References:6
1 Rich E., Knight K., "Artificial Intelligence", Tata McGraw-Hill, 3rd Edition, 2017.

2 Nilsson N. J., "Artificial Intelligence: A New Synthesis", Morgan Kaufmann Publication; International student edition (17 April 1998).
3 Patrick Henry Winston, "Artificial Intelligence", Addison Wesley, 3rd edition 1992.

Useful Links:

1. http://www.nptelvideos.in/2012/11/artificial-intelligence.html Prof. Sudeshna Sarkar and Prof. Anupam Basu, IIT, Kharagpur
2. http://www.nptelvideos.com/computer_science/artificial_intelligence_video_lectures.php Prof. P. Dasgupta IIT, Kharagpur

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	2	2	1	2	-	-	-	-	-	-	-	1	3
CO2	-	2	3	1	2	-	-	-	-	-	-	-	1	1
CO3	-	2	3	1	2	-	-	-	-	-	-	-	3	1

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

Government College of Engineering, Karad
Final Year B. Tech.
Elective I- IT 724 : Mobile Computing

Teaching Scheme

Lectures	3Hrs/week
Tutorial	--
Total Credits	3

Examination Scheme

CT1	15
CT2	15
TA	10
ESE	60

Duration of ESE: 2 Hrs 30 Min.

Course Objectives:

1. Familiar with fundamentals of mobile communication systems.
2. Choose system (TDMA/FDMA/CDMA) according to the complexity, installation cost, speed of transmission, channel properties.
3. Explain Database Issues & data dissemination.
4. Introduce various technologies and protocols involved in mobile communication.

Course Contents

		Hours
Unit I	**Wireless transmission and Medium access Control :-** Need and Application of wireless communication Frequency for radio transmission signal antennas, signal propagation Multiplexing Modulation, Spread and Cellular systems. Medium access control: Specialized MAC, SDMA, FDMA, TDMA & CDMA (**Self study:** Infrared Vs Radio transmission, Infrastructure and Ad hoc network).	7
Unit II	**Telecommunications systems :** GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, New data services. UMTS and IMT-2000: UMTS releases and standardization, UMTS system architecture.	7
Unit III	**Mobile Network Layer and Transport Layer** Mobile IP, DHCP, Mobile ad-hoc networks, Traditional TCP, Classical TCP improvements, TCP over 2.5/3G wireless networks (**Self study:** IP spoofing).	6
Unit IV	**Database Issues :** Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues.	7

Unit V   Data Dissemination:
Communications asymmetry, classification of new data delivery mechanisms, push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques (**Self Study:** Data synchronization).   7

Unit VI   Wireless application protocol :
Architecture, Wireless datagram protocol, Wireless transport layer, security Wireless transaction protocol,, Wireless session protocol, Wireless application environment , WMLScript, Mobile communications, Wireless telephony application, Push architecture, Push/pull services, Example stacks with WAP1.x 429 (**Self study:** Wireless markup language).   6

Course Outcome (CO):
1 Explain propagation effects.
2 Describe the information theoretical aspects (such as the capacity) of wireless channels and basic spread spectrum techniques in mobile wireless systems.
3 Describe current and future cellular mobile communication systems.

Text Books:
1 Jochen Schiller, "Mobile Communications", Addison Wesley, 2nd edition, 2004.
2 Stojmenovic, Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 1st edition, 2002.

References:
1 Gary J. Mulett, "Introduction to Wireless Telecommunications systems and Networks", Cengage Learning, 1st edition.
2 Ashok K Talukdar, Roopa R Yavagal, "Mobile Computing", Tata McGraw Hill, 1st edition, 2006.
3 Raj Kamal, "Mobile Computing", Oxford University Press, 2nd edition, 2011.
4 Dr. Sunil kumar, S. Manavi, Mahabaleshwar S. Kakkasageri, "Wireless and Mobile Networks, concepts and protocols", Wiley India, 1st edition, 2010.

Useful Links:
1 www.tutorialspoint.com/wireless_communication/wireless_communication_useful_reso urces.html
2 http://nptel.ac.in/courses/117102062/1 Dr. Ranjan Bose, IIT Delhi.

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	1	1	-	-	-	-	1	-	-	-	-	1	1	2
CO2	1	2	-	-	-	-	1	-	-	-	-	1	3	2
CO3	1	2	-	-	-	-	-	-	-	-	-	1	3	1

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

Government College of Engineering, Karad
Final Year B. Tech.
Elective I-IT734: Human Computer Interface

Teaching Scheme

Lectures	3Hrs/week
Tutorial	--
Total Credits	3

Examination Scheme

CT1	15
CT2	15
TA	10
ESE	60

Duration of ESE: 2 Hrs 30 Min

Course Objectives:

1 Familiar with the design technologies for individuals and persons with disabilities.
2 Aware of mobile HCI.
3 Learn the foundations of Human Computer Interface.
4 Learn the guidelines for user interface.

Course Contents

		Hours
Unit I	**Foundation of HCI :** The Human: I/O channels, Memory, Reasoning and problem solving; The computer: Devices, Memory, processing and networks, Interaction: Models, frameworks, Ergonomics, styles, elements, interactivity, Paradigms.	6
Unit II	**Design and Software Process:** Interactive Design basics, process, scenarios, navigation, screen design, Iteration and prototyping. HCI in software process, software life cycle, usability engineering, Prototyping in practice, design rationale. Design rules, principles, standards, guidelines, rules. Evaluation Techniques, Universal Design.	7
Unit III	**Models and Theories:** Cognitive models, Socio-Organizational issues and stake holder requirements, Communication and collaboration models, Hypertext, Multimedia and WWW.	7
Unit IV	**Mobile HCI:** Mobile Ecosystem: Platforms, Application frameworks, Types of Mobile Applications: Widgets, Applications, Games, Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools, (**Self study:** Context aware mobile applications).	7

Unit V	**Web Interface Design:**	
	Designing Web Interfaces, Drag and Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow. Case Studies (**Self study:** Framework: Pixlr).	7

Unit VI	**Usability of Interactive Systems:**	
	Introduction, Usability Requirements, Usability Measures, Usability Motivations, Universal Usability, Goals for the profession.	6

Course Outcome (CO):

1. Design effective dialog for HCI.
2. Design effective HCI for individuals and persons with disabilities.
3. Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.
4. Develop meaningful user interface.

Text Books:

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human Computer Interaction", Pearson Education, 3rd edition, 2004. (Uunit I, II, III).
2. Brian Fling, "Mobile Design and Development", O'Reilly Media Inc., 1st edition, 2009. (Unit IV).
3. Bill Scott, Theresa Neil, "Designing Web Interfaces",O'Reilly, 1st edition, 2009. (Unit V).
4. Ben Shneiderman, Catherine Plaisant, "Designing the User Interface", Addison Wesley, 5th edition, 2010. (Unit VI).

References:

1. Yvonne Rogers, Helen Sharp, Jenny Preece," Interaction Design: Beyond Human Computer Interaction", Wiley, 3rd edition, 2011, ISBN-10: 0470665769
2. Wilbert O. Galitz, "The essential guide to User Interface Design", Wiley Computer Publishing, 2nd edition, 2002.

Useful Links:

1. https://arl.human.cornell.edu/879Readings/Interaction%20Design%20-%20Beyond%20Human-Computer%20Interaction.pdf

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5		20
Understand		5	3	20
Apply	5	5	3	
Analyze			3	10
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	PSO
CO1	-	2	3	3	3	-	-	-	-	-	-	-	3	1
CO2	-	3	2	-	2	2	-	-	1	-	-	-	2	1
CO3	-	3	2	3	3	-	-	-	1	-	-	-	3	1
CO4	-	2	2	1	2	-	-	-	1	-	2		3	1

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