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		**Examination Scheme**	
Lectures	3Hrs/week	**CT1**	15
Tutorial	--	**CT2**	15
Total Credits	**3**	**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		**Examination Scheme**	
Lectures	3Hrs/week	**CT1**	15
Tutorial	1Hr/week	**CT2**	15
Total Credits	**4**	**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		**Examination Scheme**	
Practical	2Hrs/week	**CA**	**50**
Total Credits	**1**		

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	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	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	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)

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	PO1 0	PO1 1	PO1 2	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	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

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		**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. 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_resources.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		**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 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	PSO2
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)

Government College of Engineering, Karad
Final Year B. Tech.
IT801: Principles of Information Technology Management

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 basic concepts of management, planning and decision making.
2 Understand concept of information availability and its measurement.
3 Learn Infrastructure management activities.
4 Aware the factors in designing IT organizations and IT infrastructure.

Course Contents

		Hours
Unit I	**Nature and function of management:** Importance of management, Definition, Management functions, Role of manager, Levels of Management, Managerial skills, Management, and Administration.	6
Unit II	**Planning and Decision Making:** Nature of planning, Importance of planning, Forms of planning, Types of plan, Steps in planning, Limitation of planning, Strategic planning in Indian industry, Types of decision, Steps in rational decision making, (**Self Study:** Environment of Decision-Making, Difficulties in decision making)	7
Unit III	**Business Continuity:** Concept of information availability and its measurement, causes and consequences of downtime, concept of Recovery Time Objective (RTO), and Recovery Point Objective (RPO), single points of failure in a storage infrastructure and solutions for its mitigation, backup/recovery purposes and considerations, architecture and different backup/recovery topologies; Local	7

replication technologies and their operation, remote replication technologies and their operation, emerging technologies like deduplication, offsite backup.

Unit IV **Infrastructure Management Overview:**

Definitions, Infrastructure management activities, Evolutions of Systems since 1960s (Mainframes-to-Midrange-to-PCs-to-Client-server computing-to-New age systems) and their management, growth of internet, current business demands and IT systems issues, complexity of today's computing environment, Total cost of complexity issues, Value of Systems management for business. 7

Unit V **Preparing for Infrastructure Management:**

Factors to consider in designing IT organizations and IT infrastructure, Determining customer's Requirements, Identifying System Components to manage, Exist Processes, Data, applications, Tools and their integration, Patterns for IT systems management, Introduction to the design process for information systems, **(Self study:** Models, Information Technology Infrastructure Library (ITIL). 7

Unit VI **Service Management:**

Service Delivery Processes- Service-level management, financial management and costing, IT services continuity management, Capacity management, Availability management. Service Support Processes- Configuration Management, Service desk. (**Self study:** Incident management. Problem management, Change management, Release management.) 6

Course Outcome (CO):

1 Conceptualize the function of management.
2 Identify causes and consequences of downtime.
3 Develop Infrastructure management activities.
4 Analyse customer requirement for IT infrastructure.

Text Books:

1 P. C. Tripathi, P. N. Reddy, “Principles of Management”, McGraw Hill, 10th edition. 2007.
2 Jan Van Bon, “Foundations of IT Service Management: based on ITIL”, Van Haren Publishing, 2nd edition, 2005.

References:

1 Koontz Harold, Weihrich Heinz, "Essentials of Management", MGH, 8th edition, 2009.

2 Marc Farley, "Building Storage Networks", TMH, 2nd edition, 2001, ISBN:0072130725

3 Harris Kem, Stuart Gaiup, Guy Nemiro, "IT Organization: Building a Worldclass Infrastructure", Prentice Hall, 1st edition, 2000.

Useful Links:

1 http://nptel.ac.in/courses/122108038/1, Prof. K. B. Akhilesh , IISc Bangalore.

Assessment Pattern:

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

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

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

Government College of Engineering, Karad
Final Year B. Tech.
IT802: Cloud Computing

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. Provide knowledge about fundamentals and essentials of Cloud Computing.
2. Provide sound foundation of the Cloud Computing so that they are able to start using and adopting Cloud Computing services and tools in their real life scenarios.
3. Explore important cloud computing driven commercial systems.

Course Contents

		Hours
Unit I	**Introduction to distributed system:** Definition, goals, types of distributed systems, architecture, architectural styles, system architectures, Client Server model and examples of distributed systems. Remote procedure call, Distributed shared memory, clock synchronization, logical clocks, (**Self study:** Mutual exclusion).	7
Unit II	**Introduction to Cloud Computing:** Roots of Cloud Computing: From mainframe to Cloud, Benefits of Cloud Computing SOA, Web services, Web 2.0, Mashups, Grid computing, Utility computing, Hardware virtualization, Essentials of Cloud characteristics, Challenges, Cloud economics, Role of Networks in Cloud Computing: Cloud types and service models, Cloud computing platforms : Openstack, Opennimbus, Eucalyptus Primary Cloud Service models, Cloud Services brokerage, Primary cloud deployment models, cloud computing reference model, The greenfield and brownfield deployment options	7
Unit III	**Cloud Computing Architecture:** Cloud computing stack, Comparison with traditional computing architecture (client/server), Services provided at various levels, How Cloud Computing Works, Role of Networks in Cloud computing, protocols used, Role of Web services, Service Models (XaaS),	6

Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service(SaaS), Deployment Models: Public cloud, Private cloud, Hybrid cloud, Community cloud.

Unit IV **Virtualization:**

Introduction, Characteristics of Virutalized environments, Taxonomy of Virtualization techniques, Pros and Cons of Virtualization, Technology examples: Xen, KVM, Vmware, (**Self study:** Microsoft Hyper-V) 7

Unit V **Security in Cloud:**

Cloud Security Challenges, Infrastructure Security, Network level security, Host level security, Application level security, data privacy, data security, application security, virtual machine security, Identity Access Management, Authentication in cloud computing, Client access in cloud, Cloud contracting Model, Commercial and business considerations. 7

Unit VI **Big Data Analysis, Hadoop and Map Reduce:**

Introduction, Clustering Big Data, Classification of Big Data, Hadoop MapReduce Job Execution, Hadoop scheduling, Hadoop cluster setup, configuration of Hadoop, starting and stopping Hadoop cluster. 6

Course Outcome (CO):

1 Understand the key dimensions of the challenge of Cloud Computing

2 Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS etc.

3 Explain the core issues of cloud computing such as security, privacy, and interoperability.

4 Describe system virtualization and outline its role in enabling the cloud computing system model

Text Books:

1 P.K. Sinha "Distributed Operating Systems –Concepts and Designs" PHI, 2nd edition, 2009.

2 Rajkumar Buyya, "Cloud computing principles and paradigms", Wiley, 1st edition, 2011.

3 Gautam Shroff, "Enterprise Cloud Computing", Cambridge, 1st edition, 2010.

4 Ronald Krutz, Russell Dean Vines, "Cloud Security", Wiley, 1st edition, 2010

References:

1 Kailash Jayaswal," Cloud computing", Black Book, Dreamtech Press, 1st edition.

2 Barrie Sosinsky,“ Cloud Computing Bible” John Wiley and Sons, 1st edition, 2010.

3 Dr. Kumar Saurabh,”Cloud Computing”, Wiley Publication.

4 Richard Hill, “Guide to Cloud Computing: Principals and Practices”, Springer, ISBN-10: 1447146026.

Useful Links:

1 http://nptel.ac.in/courses/106106129 Prf. D. Ayyar, IIT Madras

2 https://www.tutorialspoint.com/cloud_computing/

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

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

Government College of Engineering, Karad
Final Year B. Tech.
IT805: Cloud Computing Lab

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

Course Objectives:

1 Introduce basics of cloud environment.

2 Familiar with different cloud services.

3 Learn to install different cloud platforms.

Course Contents

Experiment 1 Implementation of Para-Virtualization using VM Ware's Workstation

Experiment 2 Creating a Simple Application in SalesForce.com.

Experiment 3 Creating an Application in SalesForce.com using Apex Programming Language.

Experiment 4 Integrate Google App Engine in Eclipse/Netbeans. Develop an application on Google cloud

Experiment 5 Installation and Configuration of Eucalyptus.

Experiment 6 Installation and Configuration of Hadoop.

Experiment 7 Create an application (Ex: Word Count) using Hadoop Map/Reduce**.**

Experiment 8 Implementation of Cloud Sim.

Experiment 9 Case Study: PAAS(Facebook, Google App Engine)

Experiment 10 Case study: Amazon Web Services.

List of Submission:

1. Total number of Experiments : 10

Course Outcome(CO):

1 Design and Implement applications on the Cloud.

2 Installation of various cloud computing platforms

3 Explain different cloud services.

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	PSO1	PSO2
CO1		1	3	-	3	-	-	1	1	-	-	1	2	1
CO2		1	2	1	2	-	-	1	1	-	-	1	2	1
CO3		1	-	-	2	-	-	-	1	-	-	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
Final Year B. Tech.
IT807: Advanced Software Technology Lab II

Teaching Scheme		**Examination Scheme**	
Lecture	2Hrs/week	**TA/CA**	**50**
		ESE	**50**
Laboratory Scheme			
Practical	2Hrs/week		
Total Credits	**3**		

Course Objectives:

1. Understand the process of developing software for the mobile
2. Create mobile applications involving data storage in SQLite database
3. Create web based applications
4. Use different server controls to create rich user interactive web sites.

Course Contents

UNIT I	**Introduction to Android:** Fundamentals: Basic Building blocks – Activities, Services, Broadcast Receivers & Content providers, UI Components- Views & notifications, Components for communication -Intents & Intent Filters, Android API levels (versions & version names), Brief introduction to current android version, Application Structure, Emulator, Intents	4
UNIT II	**Android :Basic UI design, Styles & Themes:** Form widgets , Text Fields, Layouts, RelativeLayout , TableLayout, FrameLayout, LinearLayout, Nested layouts, (dip, dp, sip, sp) versus px styles.xml, drawable resources for shapes, gradients(selectors), Style attribute in layout file, Applying themes via code and manifest file AlertDialogs & Toast, Time and Date, Images and media, Composite. Menu: Option menu, Context menu, Sub menu, menu from xml, menu via code Adapters :ArrayAdapters, BaseAdapters, ListView and ListActivity, Custom listview, GridView using adapters.(**Self study:** Gallery using adapters, Shared Preferences, Preferences from xml).	5
UNIT III	**Android: Content Providers:** SQL, DML & DDL Queries in brief, SQLiteDatabse, SQLiteOpenHelper, Cursor, SQLite Programming, Broadcast Receivers, Services Customize Toast, Dialogs, Tabs, Animated popup panels, Thread, Asyntask JSON Parsing, Accessing Phone services (Call, SMS).,Fragments, Fragments, Fragment Life Cycle, Fragments in Activity, Google Maps V2 using Fragments, Develop Fragment based UI designs (Fragment Tabs, ListView etc), Location based Services, GPS, Geocoding, Action bar with fragments, (**Self study:** Introduction to Android Studio)	5
UNIT IV	**ASP .NET:** Overview, Working with HTML and CSS in Visual Studio, ASP.NET Web Forms Structure: Application Location Options, the ASP.NET Page	4

	Structure Options, and ASP.NET 4.5 Page Directives, ASP.NET Page Events Dealing with Postbacks, Cross-Page Posting, ASP.NET Application Folders, Compilation, Build Providers, Global asax,	
UNIT V	**ASP.NET Server Controls and Client-Side Scripts:** ASP.NET Server Controls, HTML Server Controls, Identifying ASP.NET Server Controls, Manipulating Pages and Server Controls with JavaScript ASP.NET Web Server Controls, Validation Server Controls	4
UNIT VI	**Data Management with ADO .NET:** Basic ADO.NET Features, Common ADO.NET Tasks, Basic ADO.NET Namespaces and Classes, Using the Connection Object, Using the Command Object ,Using the Data Reader Object, Using Data Adapter, Using Parameters, Understanding Data Set and Data Table.(**Self study:** Data Binding, State Management)	4

Laboratory Contents:

Experiment 1	Installation of Android SDK, emulator, creating simple project and study of android project structure.
Experiment 2	Write a program to demonstrate Buttons, Text Fields, Checkboxes, Radio Buttons, and Toggle Buttons with their events handler (Give one app to create which will cover 7, 8, 9 and 10 practicals, because of which students can understand the use of these controls in practical case)
Experiment 3	Write a program to use of Intents for SMS and Telephony.
Experiment 4	Write a program to study and demonstrate Broadcast Receiver.
Experiment 5	Write a program to demonstrate Spinners, Touch Mode, Alerts, Popups, and Toasts with their events handler
Experiment 6	Write a program to demonstrate Touch Mode, Menus with their events handler
Experiment 7	Write a program to demonstrate notification with their action.
Experiment 8	Write a program to study and use of SQLite database.
Experiment9	Implement web application using ASP.NET with web control and provide input validations using input valuators.
Experiment 10	Create a Web application that illustrates the use of themes and master pages with Site-Map. And create a web page with CSS.
Experiment 11	Implement the concept of state management in a web application. Study of ASP.NET administration and configuration tool.
Experiment 12	Using Data Base Controls make a login application with registration.
Experiment 13	Use Dataset, Data Reader, XML Reader & Data Sources (SQL, Object & XML) with Any Windows or Web Application
Experiment 14	Use Dataset, Data Reader, XML Reader & Data Sources (SQL, Object &

XML) with Any Windows or Web Application

List of Submission:

1 Total number of Experiments : 10

Course Outcome(CO):

1 Impart the concepts for development of Android apps.

2 Create a rich GUI for web based applications using a rich set of controls

3 Deploy web applications

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 Dawn Griffiths, "Head First Android Development" O'reilly, 1st edition, 2015 (Unit I,II,III).

2 Brad Wilson, David Matson, Jon Galloway, K. Scott Allen , "Professional ASP.NET MVC 5",Wrox, 2015 (|Unit IV,V, VI)

Reference Book:

1 Reto Meier, "Professional Android 4 Application Development", O'reilly, Updated edition 2012

2 Matthew MacDonald , "Beginning ASP.NET 4.5 in C# " APRESS, 1st edition, 2012.

3 John Horton, "Android Programming for Beginners",Packt publishing, 2015.

4 Mark L. Murphy, "The Busy Coder's Guide to Advanced Android Development", CommonsWare, 2nd edition, 2009.

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	1	1	3	-	3	-	-	-	-	2	-	1	1	1
CO2	2	1	3	2	3	-	-	-	1	2	-	1	3	1
CO3	-	1	3	2	2	-	-	-	-	-	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 9----	Exp 14	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.
IT808: Project Phase-II

Laboratory Scheme		**Examination Scheme**	
Practical	5Hrs/week	**CA**	100
Total Credits	**8**	**ESE**	100

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 project group will continue to work on the project selected during the semester VII and submit the completed project work to the department at the end of semester VIII.

• 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.

• In case of industry projects, visit by internal guide will be preferred and completion certificate from industry is required.

I Project Report Format:

Report should be of 40 to 60 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. The project report contains the details.

1. Problem definition

2. Requirement specification
3. System design details (UML diagrams)
4. System implementation – code documentation – dataflow diagrams/ algorithm, protocols used.
5. Test result and procedure
6. Conclusions.
7. Appendix
    a) Tools used
    b) References

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)

II. 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.
- There shall be at least two reviews in semester-VIII by the review committee constituted at department level by the programme head which includes presentations and demonstration of the work carried out

Review 3: Implementation status and testing document.

Review 4 : Final Project Demonstration, Project Report and Result analysis.

- 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:

1. Working model of the software /Hardware project.
2. Project report.
3. Presentation and demonstration of project in exhibition.

Teaching Load :

One supervisor from the department shall be assigned four groups of project and weekly load for supervisor is 5 Hrs/week.

Course Outcome (CO):

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.

Mapping of CO and PO

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

Government College of Engineering, Karad
Final Year B.Tech.
Elective II -IT813: Soft Computing

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

Course Objectives:

1. Conceptualize with soft computing concepts.
2. Learn neural networks and training algorithms
3. Familiarize the concepts of genetic algorithm and applications to soft computing using some applications.
4. Introduce the ideas of fuzzy set theory, hybrid system and apply derivative based and derivative free optimization

Course Contents

		Hours
Unit I	**Introduction to Soft Computing:** Introduction, requirement, different tools and techniques, Soft computing Constituents, Characteristics of Neuro Computing and Soft Computing, Difference between Hard Computing and Soft Computing, usefulness and applications.	6
Unit II	**Artificial Neural Networks:** Introduction, Fundamental concept, Evolution of Neural Networks, Basic Models of Artificial Neural Networks, Important Terminologies of ANNs, McCulloch-Pitts Neuron, Linear Separability, Hebb Network. Supervised Learning Network: Perceptron Networks, Adaline, Multiple Adaptive Linear Neurons, Back-Propagation Network, (**Self study:** Radial Basis Function Network).	10
Unit III	**Fuzzy Set Theory:** Introduction, Classical Sets, Fuzzy Sets, Fuzzy relations, Membership Function, Defuzzification, Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule base and Approximate Reasoning, Fuzzy Decision Making, (**Self study:** Fuzzy Logic Control System).	9

Unit IV	**Hybrid system:** Introduction to Hybrid Systems, Adaptive Neuro Fuzzy Inference System(ANFIS), Introduction to Optimization Techniques: Derivative based optimization, Derivative free optimization	8
Unit V	**Swarm intelligence:** Various animal behaviour, Particle search optimization, Artificial Bee colony search, Ant colony algorithm **Genetic Algorithms:** Introduction, Biological Background, Traditional optimization and search Techniques, GA and Search Space, Traditional Algorithm vs. Genetic Algorithms, Simple GA, General Genetic Algorithm, The Schema Theorem, Classification of Genetic Algorithm, (**Self study:** Holland Classifier System)	10
Unit VI	**Applications of Soft Computing:** GA Based Internet Search Technique; Soft Computing Based Hybrid Fuzzy Controllers	7

Course Outcome (CO):

1. Explain use of soft computing and differentiate soft computing and hard computing.
2. Describe the concepts of Genetic algorithm and applications to soft computing using some applications.
3. Explain the ideas of fuzzy set theory, hybrid system and apply derivative based and derivative free optimization.

Text Books:

1. K. Mohan, S. Ranka, K Mehrotra "Elements of Artificial Neural Networks", MIT Press, 1st edition 1996 (Unit I, IV)
2. S. N. Sivanandam, S.N.Deepa "Principles of Soft Computing", Wiley Publication, 2nd edition, 2011. (Unit II, III, V, VI)

References:

1. S.Rajasekaran, G.A.V.Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 1st edition, 2003..
2. George Klir, Bo Yuan "Fuzzy sets and Fuzzy logic" PHI, 1st edition.
3. Hagan, Demuth, Beale, "Neural Network Design" Cengage Learning India, 2nd edition, 2014.
4. Satish Kumar, "Neural Networks –A classroom approach", TMH Publication, 2nd edition, 2017.

Useful Links:

1. http://nptel.ac.in/courses/117105084/ Neural Networks and Applications, Prof. S. Sengupta, IIT Kharagpur.
2. https://www.journals.elsevier.com/applied-soft-computing/

3. https://link.springer.com/book/10.1007%2F978-3-540-77481-5

4. http://www.scrs.in/

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

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

Government College of Engineering, Karad
Final Year B.Tech.
Elective II-IT823:Bioinformatics

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

Course Objectives

1. Learn various computational methods to address problems in molecular biology.
2. Provide knowledge about the storage, retrieval, sharing and use of biological data, information, and tools.
3. Exposed to the need for Bioinformatics technologies and be familiar with the modeling techniques.
4. Learn Microarray analysis, Pattern Matching and Visualization.

Course Contents

		Hours
Unit I	**Introduction:** Need for Bioinformatics technologies, Overview of Bioinformatics technologies Structural bioinformatics, Data format and processing, Secondary resources and applications, Role of Structural bioinformatics, Biological Data Integration System.	7
Unit II	**Data warehousing and Data mining in Bioinformatics:** Bioinformatics data, Transforming Data to Knowledge, Data warehousing architecture, data quality, Biomedical data analysis, DNA data analysis, Protein data.	7
Unit III	**Machine Learning in Bioinformatics:** Introduction, Artificial Neural Network, Neural Network Architectures and Applications, Neural Network Architecture, Neural Network Learning Algorithms, Neural Network Applications in Bioinformatics, Genetic Algorithm, Fuzzy System.	9
Unit IV	**Modeling for Bioinformatics:** Hidden markov modeling for biological data analysis, Sequence identification, Sequence classification, multiple alignment generation, Comparative modelling, Protein modelling, genomic modelling, Probabilistic modelling, Bayesian networks, Boolean networks, Molecular modelling, Computer programs for molecular	9

modeling.

Unit V **Pattern Matching and Visualization:**
Gene regulation, motif recognition, motif detection, strategies for motif detection, Visualization, Fractal analysis, DNA walk models, one dimension, two dimension, higher dimension, (**Self study:** Game representation of Biological sequences, DNA, Protein, Amino acid sequences. 9

Unit VI **Microarray Analysis:**
Microarray technology for genome expression study, image analysis for data extraction, pre-processing, segmentation, gridding, spot extraction, normalization, filters, cluster analysis, gene network analysis, Compared Evaluation of Scientific Data Management Systems, (**Self study:** Cost Matrix, Evaluation model , Benchmark, Trade-offs'). 9

Course Outcome (CO):

1 Develop models for biological data
2 Apply pattern matching techniques to bioinformatics data – protein data genomic data.
3 Apply micro array technology for genomic expression study.

Text Books

1 Yi-Ping Phoebe Chen (Ed), "BioInformatics Technologies", Springer Berlin Heidelberg, 2005.
2 Arthur M Lesk, "Introduction to Bioinformatics", Oxford University Press, 2nd edition, 2005.

References

1 Bryan Bergeron, "Bio Informatics Computing", Pearson Education, 2nd edition, 2003.
2 Andreas D. Baxevanis, B. F. Francis Ouellette, "Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins" Wiley Interscience, Publication, 2nd edition.

Useful Links

1 http://nptel.ac.in/syllabus/106104018/ Prof. Somenath Biswas, Dr. Arnab Bhattacharya, Prof. Harish Karnick IIT Kanpur.
2 http://nptel.ac.in/courses/106104071/ IIT Kanpur.

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

Government College of Engineering, Karad
Final Year B.Tech.
Elective II-IT833: Enterprise Resource Planning

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

Course Objectives:

1. Understand the technical aspects of ERP and SCM systems.
2. Learn steps and activities in the ERP life cycle.
3. Identify and describe typical functionality in an ERP system.
4. Understand tools and methodology used for designing ERP for an Enterprise.

Course Contents

		Hours
Unit I	**Enterprise Resource Planning:** Introduction, Need of ERP, Structure of ERP, Advantages of ERP, Typical business process, Growth of ERP.	6
Unit II	**ERP and Related Technologies:** Business process reengineering(BPR), Management Information System (MIS), Decision Support System(DSS), Executive Support System(ESS), Data Warehousing, Data mining, Online Analytical Processing (OLTP), Supply Chain management(SCM), (**Self study:** Customer Relationship Management(CRM)).	9
Unit III	**ERP Business Modules:** Finance, Manufacturing, Human Resource, Quality Management, Material Management, Marketing, Sales Distribution and Service	8
Unit IV	**ERP Implementation Life Cycle:** ERP implementation and strategy, Implementation Life Cycle, Pre-Implementation task, requirement definition, End user training and Going live, (**Self study:** Post evaluation and maintenance).	9
Unit V	**ERP Case Studies**: Post implementation review of ERP packages in Manufacturing, Services, and Other organizations.	9

Unit VI **Information Technology in SCM:**

Introduction to SCM, Types of IT solutions like Electronic Data Interchange(EDI), Intranet/Extranet, Data Marts, E-Commerce, E-Procurement, (**Self study:** Bar coding, RFID, QR code) 9

Course Outcome (CO):

1 Conceptualize the basic structure of ERP and SCM.

2 Identify implementation strategy used for ERP.

3 Apply design principles for various business module in ERP.

4 Apply different emerging technologies for implementation of ERP.

Text Books:

1 V K Garg, N. K. Venkatakrishnan, "Enterprise Resource Planning Concepts and Practice", PHI Publication, 2nd edition, 2003.

2 Alexis Leon, "ERP Demystified", McGraw Hill, 2nd edition, 2007.

References:

1 Alexis Leon, "Enterprise Resource Planning", Tata McGraw Hill, 3rd edition, 2017.

2 Rahul Altekar,"Enterprise Wide Resource Planning: Theory and Practice", PHI, 2004.

3 R. P. Mohanty, S. G. Deshmukh, "Supply Chain Management Theories and Practices", Dreamtech Press, 1st edition, 2005.

Useful Links:

1 http://www.nptelvideos.in/2012/12/operations-and-supply-chain-management.html Prof. G. Srinivasan , IIT Madras

Assessment Pattern:

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

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

Government College of Engineering, Karad
Final Year B. Tech.
Elective-II-IT843: Science of Design

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

Course Objectives:

1 To understand the natural and artificial world.
2 To learn thinking techniques so as to make idea generation more consistent.
3 To understand design thinking philosophy of Stanford school to provide structure to problem solving.
4 To learn to design thinking applications for society through IoT domain.

Course Contents

		Hours
Unit I	**Understanding the Natural & Artificial Worlds:** Understanding the natural and artificial worlds, Artifacts, The environment as mold, The Artifact as Interface, Functional Explanation & Synthesis, Role of Simulation	6
Unit II	**Mechanism of Mind: Training the brain:** How the brain functions, Synaptogenesis, Four basic types of thinking: natural thinking, logical thinking, mathematical thinking, and lateral thinking, Introduction to de Bono's creative thinking techniques	8
Unit III	**Science of Design & Design Thinking:** Creating the Artificial, Design Thinking Methods, Logic of Design: Finding Alternatives and choosing the best alternative, Age of Experience Economy, Examples of Design	8
Unit IV	**Lateral Thinking Techniques** **Alternatives:** How to use concepts as a breeding ground for new ideas. Sometimes we do not look beyond the obvious alternatives. **Focus:** When and how to change the focus of your thinking. You will learn the discipline of defining your focus and sticking to it. **Challenge:** Breaking free from the limits of traditional thinking. With challenges, we act as though the present way of doing things is not	10

necessarily the best.

Random Entry: Using unconnected input to open up new lines of thinking.

Provocation and Movement: Generating provocative statements and using them to build new ideas.

Harvesting: Capturing your creative output.

Treatment of Ideas: How to develop ideas and shape them to fit an organization or situation

Unit V **Designing for the Internet of Things:**
Review of IoT and IoT Technologies (Devices, Protocols, Platforms), Thinking from the Things perspective, Using stories for design, Applying machine learning to create value, Emerging communication technologies and selection of right technology for the target applications — 9

Unit VI **Design Thinking Applications and Case studies:**
Overview of Digital Economy, Application of Design Thinking Techniques for Smart City Solutions, Developing Intelligent Homes, smart buildings, Needs of Experience Economy and Experience design for various situations — 9

Course Outcome (CO):

1 Explain foundation that will enable new way of thinking to approach the new challenges.
2 Describe structure for solving 'wicked' problems.
3 Evaluate new patterns and understanding thinking techniques.
4 Explain cognitive behaviour of brain.

Text Books:

1 Simon, Herbert Alexander, "The Sciences of the Artificial", MIT Press, 3rd Edition ISBN13: 9780585360102 (Unit I, Unit III)
2 Edward de Bono, "The mechanism of mind (pelican)", Penguin Books Ltd (Unit II, Unit IV)
3 Adrian McEwen, Hakim Cassimally, " Designing the Internet of Things", Wiley (Unit V)
4 Jose Berengueres**,** "The Brown Book of Design Thinking" UAE University College, Al Ain. ISBN 978-1-63041-059-9, 1st Edition. November 16, 2013.

References:

1 Johannesson, Paul, Perjons, Erik, "An Introduction to Design Science", Springer ISBN:978-3-391-10631-1
2 Aline Dresch, Daniel Pacheco Lacerda, Jose Antonio Valle Antunes Jr, "Design Science Research: A Method for Science and Technology Advancement" Springer

Useful Links:

1. https://www.interaction-design.org/literature/topics/design-science
2. https://design.ncsu.edu/student-publication/wp-content/uploads/2016/11/Simon_H_ScienceofArtificial.pdf

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

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

Government College of Engineering, Karad
Final Year B. Tech.
Elective III-IT814: Parallel Computing

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 Introduce current trends in parallel computer architectures and programming.

2 Learn the fundamental aspects of processor design, pipelining, and superscalar architecture.

Course Contents

		Hours
Unit I	**Introduction:** The State of Computing, Multiprocessors and Multicomputer, Multivector and SIMP Computers, Conditions of Parallelism, Program Partitioning and Scheduling, Program Flow Mechanisms, System Interconnect Architectures, Amdahl's law.	6
Unit II	**Parallel and scalable architectures:** Multiprocessor System Interconnects, Cache Coherence and Synchronization Mechanisms, Message-Passing Mechanisms, Vector Processing Principles, Multivector Multiprocessors, (**Self study:** SIMD Computer Organizations)	6
Unit III	**Scalable, Multithreaded, and Dataflow Architectures:** Latency-Hiding Techniques, Principles of Multithreading, Fine-Grain Multicomputer, (**Self study:** Dataflow Architectures)	7
Unit IV	**Parallel Models, Languages, and Compilers:** Parallel Programming Models, Parallel Languages and Compilers, Dependence Analysis of Data Arrays, Code Optimization and Scheduling, Loop Parallelization and Pipelining	7
Unit V	**Parallel Programming Libraries:** OpenMP, MPI, Thread basics ,Work Sharing constructs, Scheduling, Reduction, Mutual Exclusion Synchronization & Barriers, The MPI Programming Model, MPI Basics, Global Operations , Asynchronous	7

Communication, Modularity, Other MPI Features, (**Self study:** Performance Issues)

Unit VI **Parallel programming Tools:**
Introduction of CUDA/OpenCL, Chapel, Basics of GPGPU, CUDA Programming model, CUDA memory type, CUDA and/or OpenCL for GPGPU hardware, case study 7

Course Outcome (CO):

1 Describe different parallel paradigms, inter connection networks.
2 Describe basics of tools used for parallel programming.
3 Analyse a given problem for possibilities of parallel computations.

Text Books:

1 Kai Hwang, "Advanced Computer Architecture: Parallelism. Scalability. Programmability", TMH Publication, 2003.
2 Shane cook, "CUDA Programming: A Developer's Guide to Parallel Computing with GPUs", TMH Publication,1st edition, 2012.

References:

1 AnanthGrama, Anshul Gupta, George Karypis, Vipin Kumar. "Introduction to Parallel Computing", Schaum's outline Series. MGH, 2nd edition, 2003.
2 Michael J. Quinn, "Parallel Programming in C with MPI and OpenMP", McGraw-Hill, 2004.
3 Buyya Raijkumar, "High Performance Cluster Computing: Programming and Applications",Volume 2, Prentice Hall, 1999.

Useful Links:

1 http://nptel.ac.in/courses/106106094/ Dr. Kamala Krithivasan, IIT Madras
2 http://mpitutorial.com/tutorials/
3 https://computing.llnl.gov/tutorials/openMP/

Course Articulation Matrix

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

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

Assessment Pattern:

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	3	20
Understand	5	5	4	20
Apply	5	5	3	10
Analyze	-	-	-	-
Evaluate	-	-	-	10
Create	-	-	-	-
Total	15	15	10	60

Government College of Engineering, Karad
Final Year B. Tech.
Elective III-IT824:Ethical Hacking and Digital Forensics

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 importance of information security.
2 Understand various hacking techniques and attacks.
3 Understand programming languages for security professionals.
4 Understand the penetration testing phases.

Course Contents

		Hours
Unit I	**System Hacking:** Introduction, Cracking Passwords, Password Cracking Websites, Password Guessing, Password Cracking Tools, and Password Cracking Counter measures, Escalating Privileges, Executing Applications, Key loggers and Spyware.	7
Unit II	**Programming for Security Professionals:** Programming Overview, C language, HTML, Perl, Windows OS Vulnerabilities, Tools for Identifying Vulnerabilities, Linux OS Vulnerabilities, (**Self study:** Tools for Identifying Vulnerabilities).	6
Unit III	**Penetration Testing:** Introduction, Security Assessments, Types of Penetration Testing, Phases of Penetration Testing, Tools, Choosing Different Types of Pen-Test Tools, Penetration Testing Tools.	6
Unit IV	**Introduction to Digital Forensic:** Foundations of digital Forensics Foundations of digital Forensics, Language of Computer Crime Investigation, Digital Evidence of Courtroom, Cybercrime Law: United State Perspective, (**Self study:** Cybercrime Law: European State Perspective).	7
Unit V	**Violent Crime and Evidence:** Violent Crime and Digital Evidence, Digital Evidence as Alibi, Gender Offenders on the Internet, Computer Intrusions. Cyber	7

stalking: Cyber stalking, Computer Basics for Digital Investigators, Applying Forensic Science to Computers. Digital Evidence Digital Evidence on Windows Systems, Digital Evidence on UNIX Systems, Digital Evidence on Mobile Devices, (**Self study:** Introduction to Intellectual Property Rights).

Unit VI **Computer Attack and Social Engineering:**
Overview of TCP/IP, IP Addressing, Malicious software (Malware), Protecting against malware attacks, Intruder attacks on network and computers, Addressing physical security. Introduction to Social Engineering: Art of Shoulder surfing, Dumpster Diving, Piggybacking, Phishing. 7

Course Outcome (CO):

1 Explain to defend hacking attacks.
2 Describe to defend computer and network against security attacks.
3 Explain hacking techniques.
4 Understand programming for security professionals.

Text Books:

1 Ec-Council, "Ethical Hacking and Countermeasures: Attack Phases", Delmar Cengage Learning. 1st edition, 2003. (Unit: I, II)
2 Patrick Engebretson, "The Basics of Hacking and Penetration Testing – Ethical Hacking and Penetration Testing Made Easy", Syngress Media, Second Revised Edition, 2013. (Unit: III)
3 Eoghan Casey "Digital Evidence and Computer Crime Forensic Science, Computers and the Internet", Academic Press; 3rd edition 2011. (Unit:VI, V, VI)

References:

1 Bill Nelson, Amelia Phillips, Christopher Steuart , "Guide to Computer Forensics & Investigation" , Cengage Learning, 4th edition, ISBN 13 : 978-1435498839, ISBN 10 : 1435498836.
2 Jon Erickson, "Hacking: The Art of Exploitation", No Starch Press, 2nd edition, 2008.
3 Eliot P. Reznor "Hacking: Ultimate Hacking Guide for Beginners", 1st edition, 2016.
4 T Simpson , Hands-On Ethical Hacking and Network Defense, Thomson Course Technology, Delmar Cengage Learning; 2nd edition , 2010.
5 Michael T. Simpson, Kent Backman, James E. Corley, "Hands-On Ethical Hacking and Network Defense", Cengage Learning, 1st edition 2012.

Useful Links:

1 http://www.jdfsl.org/ The Journal of Digital Forensics, Security and Law
2 http://www.digitalforensicsmagazine.com/ Digital Forensic Magazine
3 http://vlab.amrita.edu/?sub=85 Virtual Lab, Amrita University

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

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

Government College of Engineering, Karad
Final Year B. Tech.
Elective III-IT834: Gaming Architecture and Design

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. Describe and understand the history of games and key game genres. Describe current state of the art in industry game design techniques.
2. Implement the game design scenarios on a range of platforms.
3. Understand the processes, mechanics, issues in game design, AR/VR.

Course Contents

		Hours
Unit I	**Introduction to Computer Games:** History of Computer Games, Types of Computer Games (video, console, arcade, hand-held, wireless, mobile), Game Genres, Game Rules, Game Balancing: obstacle/aid, penalties/rewards; board game, role-playing game; Interface Design: human-computer interaction design; Visual Design: composition, lighting and color; Graphics Design	7
Unit II	**Game Design Principles:** Character development; Story Telling; Game Balancing, Core mechanics; Principles of level design, Collision Detection, Game Logic; Game AI, Path Finding; Software Rendering, Hardware Rendering and Controller based animation, Levels of engine design	6
Unit III	**Game Development and Applications** Developing 2D and 3D interactive games using OpenGL, DirectX – Isometric and Tile Based Games; Puzzle games, Single Player games, Multi-Player games Applications: Flash, DirectX, OpenGL, WebGL, XNA with Visual Studio, Mobile Gaming for the Android and iOS (**Self study**-Adventure Game Studio, DXStudio, Unity)	7
Unit IV	**Augmented Reality and Virtual Reality:**	7

Introduction to Augmented Reality and Virtual Reality, Modern VR Experiences; History Repeats; Bird's-Eye View: Hardware, Software, Human Physiology and Perception, The Geometry of Virtual Worlds: Geometric Models, Changing Position and Orientation, Axis-Angle Representations of Rotation, Viewing Transformations, Chaining the Transformations; Tracking: Tracking 2D Orientation, Tracking 3D Orientation, Tracking Position and Orientation, 3D Scanning of Environments

Unit V **Virtual Reality Evaluation:**

Audio: The Physics of Sound, Auditory Perception, Auditory Rendering; Evaluating VR Systems and Experiences: Perceptual Training, Recommendations for Developers, Comfort and VR Sickness, Experiments on Human Subject, Frontiers: Touch and Proprioception, Smell and Taste, Robotic Interfaces, Brain-Machine Interfaces 7

Unit VI **Virtual Reality Applications:**

Wikitude, Argon, ARToolKit, Aruco, ATOMIC Authoring Tool, Goblin XNA, GRATE, DroidAR, GeoAR, EasyAR, Aurasma, Layer 6

Course Outcome (CO):

1 Explain principles and levels of design in different game development.
2 Describe various platforms and frameworks available for game development.
3 Design and develop interactive games.

Text Books:

1 Jeannie Novak, "Game Development Essentials", Delmar Cengage Learning, 3rd edition, 2011.
2 Ernest Adams, "Fundamentals of Game Design", Pearson publication, 3rd edition, 2013.
3 David H. Eberly, "3D Game Engine Design, Second Edition: A Practical Approach to Real-Time Computer Graphics" Morgan Kaufmann Publication, 2nd edition, 2006.

References:

1 Steven M. LaValle, "Virtual Reality", Cambridge University Press, 2016.
2 Jeannie Novak, "Game Development Essentials", Delmar Cengage Learning, 3rd edition, 2011.
3 Jason Gregory, "Game Engine Architecture", A K Peters, 4th edition, 2009.
4 Andrew Rollings, Dave Morris, "Game Architecture and Design", Addison Wesely Publication. , 1st edition, 2003

Useful Links:

1 http://www.vancouver.wsu.edu/fac/peabody/game-book/Coverpage.html. Crawford, The Art of Computer Game Design, 1982.

2 https://www.gamedev.net/forums/topic/639110-game-architecturedesign-pattern/

3 http://vr.cs.uiuc.edu/

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

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

Government College of Engineering, Karad
Final Year B. Tech.
Elective III Lab-IT816: Parallel Computing Lab

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

Course Objectives:

1 Understand MPI, OpenMPI and CUDA.

2 Implement programs related to MPI, OpenMPI and CUDA.

Course Contents

Experiment 1 Implement threads in java

Experiment 2 Implementation of IPC in Java

Experiment 3 Introduction and MPI Installation on single machine

Experiment 4 Implement simple Hello World program in MPI.

Experiment 5 Implement MPI_Send ( ) and MPI_Recv ( ) Function in MPI.

Experiment 6 Write a program for simple Broadcast data in MPI.

Experiment 7 Write a program for finding a Max/Sum/Min/Avg form N numbers using OpenMP.

Experiment 8 Write a Program for Matrix – Vector Multiplication using OpenMP.

Experiment 9 Write a program to get and print the Environment Information in OpenMP

Experiment 10 Study of CUDA platform.

List of Submission:

1. Total number of Experiments : 10

Course Outcome(CO):

1 Explain basics of MPI, OpenMPI and CUDA.
2 Develop applications on parallel programming platform.

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	2	2	-	3	2	-	-	-	-	-	-	-	1	1
CO2	2	2	-	1	2	-	-	-	-	-	-	-	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
Final Year B. Tech.
Elective III Lab-IT826: Ethical Hacking and Digital Forensics Lab

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

Course Objectives:

1. Develop Programming Skills in Computer Forensics and Cyber applications using multi-core features.
2. Use professionally special tools for Data Communication, WSN and Forensics.

Course Contents

Experiment 1 Implementation of following spoofing assignments using C++ multicore Programming a) IP Spoofing b) Web Spoofing.

Experiment 2 Write a computer forensic application program in Java/Python/C++ for recovering deleted files and deleted partitions.

Experiment 3 Develop a GUI and write a Java/Python/C++ program to monitor network forensics, investigating logs and investigating network traffic.

Experiment 4 Write a program in Python for investigating wireless attacks using multi-core programming.

Experiment 5 Write a program in Python for investigating web attacks. Finding originator's IP, subnet mask and default gateway where a web server is connected using optical router.

Experiment 6 Create a scenario and write a program for overcoming a website hacking problems and identifying hacker machine using Java/Python/C++. Develop a prototype website using Ruby on rails.

Experiment 7 Write a program in C++ for tracking emails and investigating email crimes.

Experiment 8 Install and use Android Mobile Forensics Open Source Tools.

Experiment 9 Install and use open source tools to identifying various types of WiFi attacks. Write a C++/ Java/Python program to identify at least one such attack.

Experiment 10 Install and use open source tool to identifying MMS attacks and create necessary scenario.

List of Submission:

1. Total number of Experiments : 10

Course Outcome(CO):

1 Perform programming for Computer Forensics Cyber Applications.
2 Perform programming for attacks and investigation.
3 Use Android Mobile Forensics Open Source Tools.

Mapping of CO and PO

CO/ PO	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	2	2	-	2	1	-	2	1	1	-	1	2	2
CO2	-	2	2	-	2	1	-	2	2	1	-	1	2	2
CO3	-	1	3	-	2	1	-	3	2	1	-	1	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
Final Year B. Tech.
Elective III Lab-IT836: Gaming Architecture and Design Lab

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

Course Objectives:

1. Study the concepts in game architecture and design.
2. Understand the processes, mechanics, issues in game design, game engine development.
3. Acquire the knowledge of modelling, techniques, handling situations, and logic.

Course Contents

Experiment 1 Installation of OpenGL, WebGL and other Graphics Libraries.

Experiment 2 Installation of different Game Engines.

Experiment 3 Program to create a 2D house like figure and rotate it about a given fixed point using OpenGL functions.

Experiment 4 Program to draw a color cube and allow the user to move the camera suitably to experiment with perspective viewing. Use OpenGL functions.

Experiment 5 Draw a Rotating 3D Cube using WebGL.

Experiment 6 Program to draw a 3D color cube and allow the user to move the camera suitably to experiment with perspective viewing by using WebGL.

Experiment 7 Study Google's Applied CS with Android for building games. https://cswithandroid.withgoogle.com/

Experiment 8 Write an application in Augmented Reality. Students are suggested to choose at least one AR/VR tools recommended for implementation.

1. Argon
2. ARToolKit
3. ArUco
4. ATOMIC Authoring Tool
5. Goblin XNA
6. GRATF
7. DroidAR
8. GeoAR
9. mixare
10. EasyAR (https://www.easyar.com/)

11. Aurasma (https://www.aurasma.com/)
12. Layar (https://www.layar.com/)

Experiment 9 Write a program to implement blender game engine.

Experiment 10 Students are suggested to choose at least one game idea, possibly:
1.Single player (Puzzle, Educational, Strategy etc.)
2. Multiplayer (Adventure, fighting, sports etc.)
Following are the Open Source Game Engine Tools recommended for implementation.
1. GDevelop
2. PlayConvas
3. Unity
4. Aleph One
5. Adventure Game Studio
6. Crystal Space
7. Delta 3D
8. Game Play 3D and many more

List of Submission:

1. Total number of Experiments : 10

Course Outcome(CO):

1 Develop a gaming application using various gaming engines.
2 Explain the processes, mechanics, issues in game design, game engine development.
3 Apply the knowledge of modelling, techniques in game development.

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	PO1 12	PSO 1	PSO 2
CO1	1	2	3	1	2	-	-	-	1	-	-	-	3	1
CO2	1	2	-	1	2	-	-	-	-	-	-	-	2	1
CO3	3	1	-	-	3	-	-	-	1	-	-	-	1	3

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											