Faculty of Science

Shree Ramkrishna Institute of Computer Education & Applied Sciences, Surat

B.Sc. Information

Technology SEMESTER- 2

Object Oriented Programming Methodology

Course Code	
Course Title	**Major : Object Oriented Programming Methodology**
Credit	3 (Theory) + 1 (Practical)
Teaching per Week	3hrs (Theory) + 2hrs (Practical)
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	---
Purpose of Course	To develop the understanding of object-oriented programming concepts through programming using java as the computer programming language.
Course Objective	● To learn inheritance, polymorphism, abstraction and encapsulation ● To understand the utility of package ● To learn exception handling
Pre-requisite	Programming basics
Course Out come	At the end of the course, student is expected to have understanding about the concepts of object-oriented programming, inheritance, polymorphism, interfaces and packages

Course Content	**Unit 1 Introduction to Object oriented programming in java [8 hrs]**
	    1.1 Object oriented programming
	    1.2 Structured vs object-oriented programming
	    1.3 Object oriented programming languages
	    1.4 Overview of object-oriented programming features – data hiding, abstraction, encapsulation, inheritance, polymorphism
	    1.5 Classes and objects
	    1.6 Class attributes/variables and methods
	    1.7 Calling class methods
	    1.8 Calling user defined class methods without parameters
	    1.9 Calling user defined class methods with primitive datatype parameters
	    1.10 Calling user defined class methods with object as parameters
	    1.11 Access modifiers and its usage for data hiding
	
	Unit 2 Object - construction, accessibility and clean-up [7 hrs]
	    2.1 Constructor and its types
	        2.1.1 Default constructor

	2.1.2 Parameterized constructor
	2.1.3 Copy constructor
	2.2 Garbage collection in java
	2.3 new() and finalize() methods
	2.4 static keyword – static variables and methods
	2.5 this keyword
	2.6 Array of objects
	
	Unit 3 Exception handling in java
	    3.1 Need of exception handling
	    3.2 Types of exceptions
	    3.3 Try… catch block
	    3.4 Finally clause
	    3.5 Throw clause
	    3.6 Throws clause
	
	Unit 4 Inheritance
	    4.1 Importance of inheritance in object-oriented programming
	    4.2 Types of inheritance
	        4.2.1 Single
	        4.2.2 Multilevel
	        4.2.3 Hierarchical
	        4.2.4 Multiple (using interface)
	        4.2.5 Hybrid
	    4.3 Use of super keyword
	    4.4 Order of calling constructors
	
	Unit 5 Polymorphism
	    5.1 Method overloading
	    5.2 Method overriding and dynamic binding
	    5.3 Using Final keyword to prevent overriding and inheritance
	
	Unit 6 Encapsulation and packages in java
	    6.1 Significance of Encapsulation
	    6.2 What is a package?
	    6.3 Importance of package
	    6.4 Creating and accessing package in java
	    6.5 Adding classes to package
	    6.6 Inbuilt packages – Java.util, Java.lang, Java.io
		
		[6 hrs]
		
		[7 hrs]

Practical	List of practical will be prepared at the beginning of each semester	
Text and Reference Literature	6. The Complete Reference Java2 Herbert Schildt TMH, New Delhi 7. Mastering JAVA2 John Zukowski BPB 8. 3. Teach Yourself Java2 platform in 21 days Lamey & Cadenhead Teach Media 9. Java in Nut shell - O'Relly Publication 10. Java Language Reference - O'Relly Publication	
Teaching Methodology	Discussion, Independent Study, Seminars and Assignment, Internal Project Development Practical Assignments 80% (Approximately weekly)	

Evaluation Method	50% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% assessment is based on end semester written examination

Database Management Systems-II

Course Code	
Course Title	**Major: Database Management Systems-II**
Credit	3 (Theory) + 1 (Practical)
Teaching per Week	3hrs (Theory) + 2hrs (Practical)
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	---
Purpose of Course	This course imparts the knowledge of Procedural SQL

Course Objective	To give exposure of ● SQL Joins and SubQueries, ● PL/SQL for handling data, ● Transaction Management concepts
Pr-requisite	Understanding of basic Database concepts, DDL, and DML
Course Out come	Students will be able to ● Efficiently use PL/SQL for handling data ● Create and invoke user defined procedures, functions and triggers

Course Content	**Unit 1 SQL Query Functions** **[6 hrs]**
	   1.1. Numeric, String and Date functions
	   1.2. Aggregate Functions
	   1.3. Sorting and Grouping the data
	
	Unit 2 Data from multiple tables **[5 hrs]**
	   2.1. Joins: Inner, Outer, Self
	   2.2 Sub-queries
	
	Unit 3 Procedural SQL and Exception Handling **[8 hrs]**
	   3.1. PL/SQL Block Structure
	       3.1.1. Using Variables, Constants and Data Type
	       3.1.2. Control Statements :IF…THEN statement, Loop,
	            FOR...Loop, While Loop
	   3.2. User-Defined RECORD and TABLE data types.
	   3.3. Exceptions
	       3.3.1. User defined Exceptions and Pre-defined Exceptions
	       3.3.2. Handling Exceptions
	       3.3.3. Raising Exceptions
	   3.4. Working with Views
	
	Unit 4 Cursors and functions **[6 hrs]**
	   4.1. Concept of Cursors and types of Cursors
	   4.2. Functions
	       4.2.1. Built-in functions
	       4.2.2. User defined functions
	
	Unit 5 Stored Procedures and Triggers **[7 hrs]**
	   5.1 Stored Procedure with parameters
	   5.2 Triggers
	       5.2.1 Triggers and its benefits
	       5.2.2 Types of Triggers: Before and After Triggers
	
	Unit 6 Transaction Management and Packages **[5 hrs]**
	   6.1 Transaction and System Concepts
	   6.2. Desirable Properties of Transactions
	   6.3 Commit, Savepoint, Rollback

Practical	List of practical will be prepared at the beginning of each semester
Text and	1. Silberschatz, Korth, Sudarshan ,Database System Concepts, McGraw-Hill computer

Reference Literature	science series 2. C J Date, An introduction to Database Systems, Addition-Wesley 3. Nilesh Shah, Database System using Oracle, PHI. 4. Ramez Elmasri & Shamkant B. Navathe, Fundamentals of Database Systems, Addison-Wesley 5. Hector Gracia-Molina, Jeffrey D. Ullman, and Jennifer Widom, Database System Implementation, Pearson. 6. Ivan Bayross, SQL, PL/SQL, BPB Publications 7. Scott Urman, Oracle9i PL/SQL programming, McGraw-Hill
Practical	List of practical will be prepared at the beginning of each semester
Teaching Methodology	Discussion, Independent Study, Seminars and Assignment, Internal Project Development Practical Assignments 80% (Approximately weekly)
Evaluation Method	50% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% assessment is based on end semester written examination

Emerging Technologies in Computing

Course Code	
Course Title	**Minor: Emerging Technologies in Computing**
Credit	4(Theory)
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	-
Purpose of Course	The aim of this course is to introduce to the students about the emerging technologies and upcoming areas of computer science and information technology. Students will become familiar with special branches of the field which are future specialization areas of their learning.
Course Objective	To Gain understanding about special branches of the IT field. To Gain knowledge AI, Data Science, Information and Cyber Security and Web Mobile technologies. To Understand application areas and future prospects of same branches.
Pr-requisite	NIL
Course Out come	At the end of the course, student is expected to have understanding about the introductory ideas of AI, Data Science, Information and Cyber Security, Web Mobile technologies, Cloud Computing and IoT. as fields of IT.

Course Content	**Unit 1 Artificial Intelligence** [8 hrs]

Unit 1 Artificial Intelligence [8 hrs]

1.1 Intelligence, Types, Human vs. Machine Intelligence
1.2 Introduction to Artificial Intelligence, Definitions
1.3 Reasoning, Learning, Problem Solving, Perception, Linguistic Intelligence
1.4 Application Areas of AI
1.5 Introduction to Machine Learning and Neural Networks
1.6 Robotics, Conversational AI - Bots, Responsible AI
1.7 Autonomous AI and Robotics

Unit 2 Data Science [7 hrs]
2.1 Data and Databases as Opportunities
2.2 Types of Data, Sources of Data and Big Data
2.3 Insights from Data
2.4 What is Data Science
2.5 Idea of Data Science Process
2.6 What is Data Analytics, Type of Analytics
2.7 Application Areas and Future Prospects

Unit 3 Web Application Development [8 hrs]
3.1 Computer Program, Computer Application and Software
3.2. Type of Computer Application and softwares
  3.2.1 Windows and Web Application Development
   3.2.2 Working of Web, 2,3 and N-Tier Application, Client Server, Distributed and Cloud Computing
3.4 Client Side Scripting Languages
3.5 Server Side Technologies
3.6 Opportunities, Application Areas and Job Profiles

Unit 4 Mobile Application Development [7 hrs]
4.1 Web and Mobile Applications, Differentiation
4.2 Mobile Application Fundamentals - Cross platform development, Responsive Web Programming, Overview Mobile Development Architecture
4.3 Mobile Application Technologies - Android, Flutter, IOS, Xamrine, React
  Native, Dart
4.4 Compatible Databases -sqlite, firebase, nosql databases Smart Device
  Computing
4.5 Application Areas and Job Profiles

Unit 5 Information Security [8 hrs]
5.1 Information in Computer Networks, Software and Devices
5.2 Data Security mindset
5.3 Data confidentiality and availability, Privacy, Authentication and Authorization
5.4 Network Security Concepts - Common threats, E-Mail security, Authentication, Firewalls, Cryptography
5.5 Common well known security approaches

5.6 Application Areas and Job Profiles

Unit 6 Cyber Security   **[7 hrs]**
      6.1 Introduction & defining the Cyber Security
      6.2 Frauds in IT, Banking, Mobile network, telecommunications
      6.3 Cyber Crime and Frauds
      6.4 Ethical and unethical hacking, Application Areas of Cyber Security
      6.5 Careers in Cyber Security

Unit 7 Cloud Computing
      7.1 Introduction to Cloud
      7.2 Defining a cloud, Characteristics and benefits
      7.3 Virtualization, Service-oriented computing
      7.4 Types of Cloud
      7.5 Computing platforms and technologies AWS, Google App Engine, Salseforce

Unit 8 Internet of Things
      8.1 Overview of IoT
      8.2 IoT Categories - Consumer IoT, Industrial IoT, Infrastructure IoT
      8.3 IoT Applications - Industrial Automation
      8.4 IoT Devices - Arduino, Raspberry Pi
      8.5 Challenges of IoT

Practical	-
Text and Reference Literature	1. Emerging Technologies in Computing -Theory, Practice, and Advances 2. Pramod Kumar, Anuradha Tomar, R. Sharmila 3. Emerging Technologies in Computing - 4. Introduction to Artificial Intelligence by Rajendra Akerkar, PHI, ISBN : 978- 81-203- 2864-8 5. Introducing Data Science - Big data, machine learning, and more, using Python tools 6. A Complete Overview On: Web-development Ayush Mauryavanshi (Author) 7. Developing inclusive Mobile Apps - Building Apps for IOS and Android by Rob Whitaker, Apress 8. Cyber security, Nina Godbole, Sunit Belapure, Wiley 9. Introduction to computer security by Matt Bishop 10. Cryptography and network security by William Stalling
Teaching Methodology	Discussion, Independent Study, Seminars and Assignment
Evaluation Method	50% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% assessment is based on end semester written examination

Web Designing - II

Course Code	
Course Title	**SEC: Web Designing – II**
Credit	1(Theory) + 1(Practical)
Teaching per Week	1 Hrs (Theory) + 2 Hrs (Practical)
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	-
Purpose of Course	The purpose of the course is to make students capable of developing web applications interface using latest designing frameworks, UI/UX tools and technologies.
Course Objective	To provide knowledge of web design concepts and most recent UI/UX tools
Pr-requisite	NIL
Course Out come	After completion of this course, the students will be capable of developing effective and interactive front end for web applications

Course Content	**Unit 1: Introduction to Design Framework** **[8 hrs]**
	
	1.1 Bootstrap Basics, Need, Advantages and Disadvantages
	1.2 Bootstrap Grid System Structure
	1.3 Bootstrap Basic Classes – Tables, Forms, Buttons, Images,
	    Helper classes, Responsive Utilities, Bootstrap Layout Components-
	    Dropdowns, Button Groups, Dropdown Button Pagination, Alerts
	1.4 Overview of Bootstrap design framework
	
	Unit 2: Fundamentals of JQuery **[8 hrs]**
	
	2.1 Introduction to JQuery, features
	2.2 JQuery Structure
	2.3 JQuery Attributes, Traversing, DOM methods, Events
	2.4 JQuery Utilities
	2.5 JQuery with CSS
	2.6 Overview of JQuery UI widgets
	
	Unit 3: Introduction to UI/UX **[8 hrs]**
	3.1 Basic Concept of UI and UX.
	3.2 Difference between UI and UX
	3.3 Need for UI/UX
	3.4 Roles and Responsibilities of UX
	3.5 Good vs Bad UX
	3.6 UI Design Fundamentals - Layouts, Typography, Colour
	3.7 Wireframing and Prototyping
	
	Unit 4: Figma Essentials **[8 hrs]**
	4.1 Set up your account, teams, projects, and files
	4.2 Basic Tools: Frames, Grid, Shape Tools and Alignment
	4.3 Working with Text, Colour and Styles
	4.4 Setting up Components
	4.5 Working with Images: Importing and Customizing Images

Practical	List of practical will be prepared at the beginning of each semester
Text and Reference Literature	1. jQuery, jQuery UI and jQuery Mobile, Adriaan de Jonge, Pearson 2. Jquery and Jquery UI, Jay Balchand, Pearson 3. Jquery in Action, Dreamtech Press 4. Jumpstart Bootstrap, Syed Fazle Rahman , SPD 5. Extending Bootstrap, Christoffer Niska, Packt Publishing 6. Learning Web Development with React and Bootstrap by Harmeet Singh 7. UI is communication By Everett N McKay 8. The UX Book , By Rex Hartson and Pardha Pyla 9. Designing and Prototyping Interfaces with Figma – Fabio Staiano Online resource: 1. https://designcode.io/figma-handbook 2. https://www.figma.com/

Teaching Methodology	Discussion, Independent Study, Seminars and Assignment, Internal Project Development Practical Assignments 80% (Approximately weekly)
Evaluation Method	50% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% assessment is based on end semester written examination