

**Faculty of Science**

Shree Ramkrishna Institute of Computer Education & Applied Sciences, Surat

**B.Sc. Computer Science**

**SEMESTER- 2**

**Object Oriented Programming Methodology**

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| **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 |

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

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| **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**

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| **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 |

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| **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 |

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| **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**

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| **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. |

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| **Course**  **Content** | **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 |

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|  | 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 |

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| **Practical** | - |
| **Text and**  **Reference**  **Literature** | 1.Emerging Technologies in Computing -Theory, Practice, and Advances 2.[Pramod Kumar,](https://www.routledge.com/search?author=Pramod%20Kumar) [Anuradha Tomar](https://www.routledge.com/search?author=Anuradha%20Tomar)[, R. Sharmila](https://www.routledge.com/search?author=R.%20Sharmila)  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**  **Methodolog**  **y** | 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**

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| **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 |

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| **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/ |

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| **Teaching**  **Methodolog**  **y** | 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 |