

Faculty of Science

**Shree Ramkrishna Institute of Computer Education and
Applied Sciences, Surat**

B.Sc. Artificial Intelligence and

Data Science

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 Outcome	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 [6 hrs] 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 [7 hrs] 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 [4 hrs] 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 [7 hrs] 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
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
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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 Outcome	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] 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

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 Outcome	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

Fundamentals of Electronics

Course code	MDC
Course Title	Fundamentals of Electronics
Credits	4
Teaching Per Week	4 Hrs
Course Objective	This course provides an idea of electronics- its meaning and its domain in today's technology. It provides the electronic component types detail understanding of semiconductor devices. It also provides the algorithm of digital word and basics of optical fiber communication.
Course Outcome	1. Students will develop the skill to deal with active and passive components and their biasing mechanism. 2. Students will understand the working of different semiconductor devices and get the importance of their uses in daily life. 3. Students will understand the basics of sensors, storage devices and electromechanical systems.
Course Content	Unit 1. Introduction to Electronics and solid state Physics [7 hrs] 1.1 Fundamental electronic component: Active and Passive. Series and parallel connections of resistors and capacitors, 1.2 Structure of solids- Bonding in solids, Energy bands, Conductors, semiconductors and Insulators. 1.3 Semiconductors-semiconductor materials, intrinsic semiconductors, extrinsic semiconductors Unit 2. Semiconductor diodes [7 hrs] 2.1. P-N Junction diode: Forward and Reverse biasing mechanism, characteristics. 2.2. Zener diode: Working principle, breakdown mechanism and characteristics Unit 3. Optoelectronic Devices [7 hrs] 3.1. Introduction: wavelength and frequency, spectral response of Human eye. 3.2. Working mechanism of Light Emitting Diode, 3.3. Photo diodes, liquid crystal display (LCD) 3.4. Solar Cell

	Unit 4. DC power supplies [8 hrs] 4.1. Introduction: Unregulated Power supply, Regulated Power supply 4.2. Block diagram of Regulated Power supply 4.3. Rectifiers (Half wave, Full wave and bridge) 4.4. Filters (series inductor, shunt capacitor, L-type and - type) 4.5. Use of Zener diode as voltage regulator 4.6. Block diagram and explanation of SMPS and UPS Unit 5. Digital Electronics [8 hrs] 5.1 Introduction to decimal, binary, octal and hexadecimal number system and their inter conversion. 5.2 Logic gates (AND, OR, NAND, NOR, NOT, XOR) with their symbol, Boolean equation and truth table. 5.3 Universal gates. Unit 6. Introduction to Microprocessor and its Architecture [8 hrs] 6.1. Microprocessor and Microcomputer 6.2. Concept of Address Bus, Data Bus, Control Bus and System Bus. 6.3. General Bus structure – Block diagram 6.4. Basic Architecture of 8085(8 bit) microprocessor. 6.5. Signal Description (pin diagram) of 8085 microprocessor. Unit 7. Some useful devices and systems [8 hrs] 7.1 Sensors, Detectors and Transducers(Types and applications), Data storage devices, 7.2 Electromechanical and Micro electromechanical systems(MEMS), 7.3 Analog and Digital communication systems (introduction and differences). Unit 8. Fiber Optics [7 hrs] 8.1 Introduction 8.2 Structure of optical fiber, Classification of optical fibers, Optical fiber cables 8.3 Advantages and Disadvantages of Optical Fiber 8.4 Application of fiber optic communication.
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SRKI
Bachelor of Science Artificial Intelligent and Data Science
Bachelor of Science Artificial Intelligent and Data Science Honors



Reference Book	1. Basic Electronics - B.L. Theraja, S.Chand & Co.,New Delhi, Multicolour Edition-2010 2. Principles of Electronics – V.K.Mehta, S.Chand & Co. 3. Electricity and Magnetism – R. Murugesan, S.Chand & Co. 4. Physics, Vol. II- Resnick, Halliday & Krane,fifth edition, John Willey & Sons, Inc.,. 5. Digital Electronics – Jain R.P., Tata MCgraw Hill 6. Microprocessor architecture, programming & application with 8085 by R.S. Gaonkar, Penram International Publishing. (India) Pvt. Ltd.
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 semester end written examination

Name of Faculty: Science	Department: Allied (English)
Program: UG	Type: AEC – Sem- 2
Subject: Integrated Personality Development Course -2	

Credit: 02	Total Learning Hours: 30 Hours
Course Description: • The aim of this course is to deliver knowledge of Values and Morals in life • It also aims at walking the path to self-progress, peace and contentment in life.	
Student Learning Outcome: After completion of the course the student will be able to • Use a number of life skills to achieve professional success • Contemplate and imbibe valuable lessons to strengthen themselves as better human being	

Unit -1

(8 Hours)

Remaking Yourself – Begin with end in mind, Being addiction free, Better health better future, impact of company

Unit -2

(8 Hours)

From House to Home – Forgive & Forget

Facing failure – Timeless wisdom of daily life

Unit -3

(8 Hours)

My India my Pride – Present Scenario, An ideal citizen-1 & 2

Learning From Legends – Leading without leading, words of wisdom

Unit – 4

(6 Hours)

Soft Skills – Stress management, Financial planning

Selfless Service - Case study: Disaster relief

Recommended Reading:

1. English and Soft Skills, S.P.Dhanavel, Orient BlackSwan Publishing, 2010.
2. English and Soft Skills, Vol – 2, S.P.Dhanavel, Orient BlackSwan Publishing, 2019.
3. Integrated Personality Development Course -2 - Workbook – 2

Sarvajanik University

Faculty of Science

B.Sc. (Hons)

Faculty: Science	Department: All
Program: B. Sc. (Hons)	Type: Ability Enhancement Course
Subject: MIL Gujarati-2	Credits: 2
Semester: 2	

Unit 1: વર્ણનાત્મક-1

- કાવ્યપંક્તિઓ કે ગદ્યસૂક્તિનો વિચારિવસ્તાર
- નિબંધ (વર્ણનાત્મક / વિષ્ણુષાત્મક / ચિંતનાત્મક / સાંપ્રત સમસ્યા પર આધારિત)

Unit 2: વર્ણનાત્મક-2

- પ્રચાર માધ્યમો માટે નિવેદનો તૈયાર કરવા
- પત્રલેખન (અભિનંદન/શુભેચ્છા/વિનંતી/ફરિયાદ વગેરે)

Unit 3: વર્ણનાત્મક-3

- ચર્યાર્પત્ર (વતર્માનપત્રમાં પ્રજાના પ્રશ્નો/સાંપ્રત સમસ્યાઓ/વ્યક્તિગત અભિપ્રાય રજુ કરતુ ચર્યાર્પત્ર)
- ભાષાંતર : અંગ્રીજીમાંથી ગુજરાતીમાં અનુવાદ

Unit 4: વર્ણનાત્મક-4

- અહેવાલલેખન
- પુસ્તક સમીક્ષા (સૂચીમાં દર્શાવેલ પુસ્તકોમાંથી એક ઉપર)

Sarvajanik University

Faculty of Science

B.Sc. (Hons)

Faculty: Science	Department: All
Program: B.Sc. (Hons)	Type: Value Added Course (VAC)
Subject: Indian Knowledge System (Antiquity of Bharata)	Credits: 2
Semester: 2	

Unit 1: Bharatiya System of Recording Dates (07 hours)

- Indian Calendar System
- Origin of Weekday Names

Unit 2: Study of Indian Antiquity and Ramayana (08 hours)

- World Civilizations, River Saraswati and Dating of Veda
- Out of India Migrations
- Domestication of Horses
- Overview of Existing Proposals of Dating Ramayana
- Contributions, Theory and Timeline Proposed by Nilesh Oak

Unit 3: Study of Indian Antiquity: Mahabharata (08 hours)

- When did the Mahabharata War Happen?
- Brief Review of Mahabharata Research
- Summary of the Theory Proposed by P. V. Vartak
- Contributions, Theory and Timeline Proposed by Nilesh Oak

Unit 4: Aryan Migration Controversy (07 hours)

- Aryan Invasion Theory: How and Why?
- Aryan Migration Controversy: Unmasking
- Evidences Against the Aryan Invasion Theory

References:

1. Oak NN. When Did the Mahabharata War Happen?: The Mystery of Arundhati. Subbu; 2018.
2. Oak NN. 12209 BCE: Rama - Ravana Yuddha. Subbu; 2019.
3. Sastry S. Tearing Down Aryan Invasion Myth. Subbu; 2021.
4. Danino M. Aryans and the Indus civilization: Archaeological, skeletal, and molecular evidence. A companion to South Asia in the past. 2016 Jun 8:205-24.
5. Bansal JG. Aryan Invasion Theory: Why it Must be Purged from School Textbooks. From: <https://hindudvesha.org/thearyaninvasion-myth-textbooks/>