SARVAJANIK UNIVERSITY
INCLUSIVE | INTEGRATED | INNOVATIVE

Faculty of Science

Shree Ramkrishna Institute of Computer Education & Applied Sciences, Surat

B.Sc. Computer Science

SEMESTER- 2

DSC-3: Object Oriented Programming Methodology

Course Code	
Course Title	**DSC-3 Object Oriented Programming Methodology**
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	---
Purpose of Course	To teach object oriented programming concepts through programming using Java as the computer Programming language.
Course Objective	• To learn inheritance, package and interfaces. • Identify exception handling methods. • Develop multithreading, object-oriented programs. • To learn Collection Framework • To Understand how to work with Strings and operations in Java
Pre-requisite	Programming basics
Course Out come	At the end of the course, student is expected to have clear concepts about the OOP concepts, Inheritance, Interfaces, Packages and Multithreading in Java.
Course Content	**Unit 1 Introduction to Object oriented programming in Java** 1.1 Object oriented paradigm, 1.2 Object oriented programming languages 1.3 Object and classes, 1.4 Data hiding 1.5 Data abstraction and encapsulation, 1.6 Benefits and application of OOP. 1.7 Classes and OOP in JAVA 1.7 Class Fundamentals 1.8 The General Form of a Class, Class Data members 1.9 Introducing class Methods 1.9.1 Inbuilt methods 1.9.2 User defined methods 1.9.3 Passing object as parameters 1.9.4 Return objects **Unit 2 Errors and Exception Handling in Java** 2.1 Concepts of Exception Handling 2.2 try…catch block. 2.3 Types of Exceptions: Uncaught exceptions, 2.4 Nested try block 2.5 Throw clause 2.6 Finally clause 2.7 Difference between: Error and Exception, Checked and Unchecked Exceptions, Throw and Throws

	Unit 3 Object Construction and Destruction in Java 3.1 Types of constructors 3.1.1 Default constructor 3.1.2 Parameterized constructor 3.1.3 Copy constructor 3.2 Destructor and garbage collection 3.3 new and finalize() methods **Unit 4 Inheritance and Object Reusability** 4.1 Basics of Inheritance and object reusability 4.2 Types of inheritance: 4.3 Single, multilevel, hierarchical and hybrid inheritance, 4.4 Access Controls 4.5 Inheritance and Constructors 4.6 Abstract Class and The object class **Unit 5 Polymorphism: Overriding and overloading** 5.1 Method overloading 5.2 Method overriding 5.3 Dynamic method dispatch 5.4 Using final to prevent overriding and inheritance **Unit 6 Interfaces (Multiple Inheritance)** 6.1 Introduction to interface 6.2 Declaration of interface, extending interface, implementing interface, accessing interface variables 6.3 Collection Framework and Collection Interface **Unit 7 Java Packages** 7.1 Introduction and declaration of Packages in Java 7.2 Creating and accessing package, adding class to a package 7.3 Java I/O package **Unit 8 Multithreaded Programming** 8.1 Introduction to thread, 8.2 Creating and Extending thread class, 8.3 stopping and blocking thread class, 8.4 Life cycle of thread, 8.5 thread exception, 8.6 implementing “Runnable” interface
Reference Book	1.The Complete Reference Java2 Herbert Schildt TMH, New Delhi 2. Mastering JAVA2 John Zukowski BPB 3. Teach Yourself Java2 platform in 21 days Lamey & Cadenhead Teach Media 4 Java in Nut shell - O’Relly Publication

	5 Java Language Reference - O'Relly Publication
Teaching Methodology	Discussion, Independent Study, Seminars and Assignment
Evaluation Method	30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 70% assessment is based on semester end written examination.

DSC- 4: Advanced Database Systems

Course Code	
Course Title	**DSC-4 Advanced Database Systems**
Credit	4
Teaching per Week	4 Hrs
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, No SQL and Data Analytics
Course Objective	To give exposure of • PL/SQL for handling data, • Transaction Management concepts and • Advanced database technologies like NoSQL, Blockchain and Bigdata
Pre-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 useer defined procedures, functions and triggers • Gain knowledge about various types of NOSQL databases • Get the overview of Blockchain technology and Bigdata
Course Content	**Unit 1 Procedural SQL** 1.1. PL/SQL Block Structure 1.1.1. Using Variables, Constants and Data Type 1.1.2. Control Statements (IF…THEN statement, Loop, FOR...Loop, While Loop) 1.2. User-Defined RECORD and TABLE data types. **Unit 2 PL/SQL Exception Handling** 2.1. What are Exceptions 2.2. User defined Exceptions and Pre-defined Exceptions 2.3. Handling Exceptions 2.4. Raising Exceptions **Unit 3 Stored Procedures** 3.1 Cursors: Implicit, Explicit 3.2 User Defined Function 3.3 Stored Procedure **Unit 4 Triggers** 4.1 Triggers and its benefits 4.2 Before and After Triggers **Unit 5 Transaction Management** 5.1 Transaction and System Concepts 5.2. Desirable Properties of Transactions 5.3 Commit, Savepoint, Rollback

	Unit 6 Introduction to NoSQL 6.1. Basic concept of NoSQL 6.2. Advantages of NoSQL 6.3 Types of NoSQL database - Column based, graph based, document based, key-value 6.4 When to use NoSQL **Unit 7 Blockchain Database Concepts** 7.1. History of Blockchain 7.2. Types of Blockchain 7.3 Blockchain Properties & Structure **Unit 8 Overview of Bigdata and Data Analytics** 8.1. Introduction to Bigdata 8.2. Big data Storage Systems - Distributed file systems, Sharing across multiple databases, Key-value storage systems, Parallel and distributed databases 8.3 Introduction to Data Warehouse 8.4 Introduction to OLAP and its operations (pivoting, slicing, rollup, drill down)
Reference books	1. Silberschatz, Korth, Sudarshan ,Database System Concepts, McGraw-Hill computer 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
Teaching Methodology	The course is composed of Lectures, assignments and a group project.
Evaluation Method	70% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 30% assessment is based on semester end written examination

DSE-2: Mathematics and Statistics for Computer Science

Course Code	DSE-2
Course Title	Mathematics and Statistics for Computer Science
Credit	4
Teaching per Week	4 Hours
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	---
Purpose of Course	Awareness about mathematics functionality and statistics
Course Objective	• Basic concepts of set and functions of mathematics • Concepts of matrices and probability theory • Classification of data and correlations
Pre-requisite	
Course Out come	Students will able to understand the importance of mathematics with different functionality and usage of mathematics in computer system concepts
Course Content	**Unit 1 : Concept of Set Theory** 1.1 Notations 1.2 Inclusion and equality of Sets 1.3 The power Set 1.4 Operations on Set 1.5 Venn Diagrams 1.6 Ordered Pair and n-tuples 1.7 Cartesian Product 1.8 Algebraic Laws of Set Theory, Set identities 1.9 Relations, Domain and Range of Relations, Properties of Relations 1.10 Intersection, Union and Difference of Relations **Unit 2 : Functions** 2.1 Definitions- Function, Domain and Co-domain, Range 2.2 Types of function-One-One function, Onto Function, One-One Onto function 2.3 Equal Functions, Some Basic Functions-Constant function, Identity Function, Modulus Function, Signum Function, Greatest Integer Function, Even-Odd functions, Linear Functions, Quadratic Functions 2.4 Classification of Functions (Introduction only)-Algebraic Functions, Transdental Functions, Rational Functions, Trigonometric Functions, Exponential Functions, Natural and General Logarithmic Functions, Power Functions, Inverse Functions **Unit 3: Mathematical Logic** 3.1 Statements and Notations 3.2 Connectives 3.2.1 Negation 3.2.2 Conjunction

	3.2.3 Disjunction & Exclusive disjunction 3.2.4 Truth Tables 3.2.5 Properties of logical connectives 3.2.6 Well-formed Formulas 3.3 Normal Forms 3.3.1 Disjunctive Normal Forms 3.3.2 Conjunctive Normal Forms 3.3.3 Principle Disjunctive and Conjunctive Normal Forms **Unit 4: Introduction to Matrices** 4.1 Introduction of Matrices and determinant 4.2 Different types of Matrices 4.3 Properties of Matrices 4.4 Operations on Matrices 4.5 Concept of Adjoint of as Matrix and Inverse of a Matrix 4.6 Rank of a Matrix **Unit : 5 Classification and Tabulation of Data** 5.1 Classification of Data 5.2 Presentation of Statistical Data 5.2.1 Textual Presentation 5.2.2 Tabular Presentation 5.2.3 Graphical Presentation 5.2 Accuracy and Precision 5.4 Values of a variable and Frequency 5.5 Grouped Frequency Distribution 5.6 Cumulative Frequency Distribution **Unit:6 Measurements of Central Tendency and dispersion** 6.1 Measurements of Central Tendency 6.1.1 Mean, Arithmetic Mean and Weighted Arithmetic Mean, their properties 6.1.2 Median, Mode and their computations 6.1.3 The empirical Relation between The Mean, Median and Mod 6.1.4 The Root Mean Square 6.2 Measure of Dispersion 6.2.1 Dispersion of Variation, The Range 6.2.2 The Mean Deviation, The Standard Deviation, The variance, their properties. **Unit 7: Elementary Probability Theory** 7.1 Definitions of Probability, Conditional Probability 7.2 Independent and Dependent Events, Mutually Exclusive Events 7.2 Probability Distributions-Discrete and Continuous 7.4 Axioms of Probability Theory **Unit 8: Elementary Correlation Theory**

	8.1 Correlation, correlation analysis, uses of correlation 8.2 Regression, Regression Analysis, Uses of Regression 8.3 Linear Correlation, Scatter Diagram method of correlation measurement. 8.4 Standard Error of Estimate
Reference Book	1. Shantinarayan: Text book of Matrices, S. Chand and Co., New Delhi 2. Krishnamurthy, Mainra and Arora: An Introduction to linear Algebra, Affiliated West Press, Pvt. Ltd., New Delhi 3. S. L. Loney: Plane Trigonometry, Part I and II, Mc Millan and Co. London. 4. R. S. Verma, K. S. Shukla: Text book of Trigonometry, Pothishala Pvt. Ltd. Allahabad.
Teaching Methodology	The course is composed of Lectures, assignments and a group project.
Evaluation Method	70% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 30% assessment is based on semester end written examination

Course Code	
Course Title	**Practical-2**
Credit	8
Teaching per Week	8 Hours
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	---
Purpose of Course	The purpose of course is to make students aware with practical implementation of concept learnt in theory subjects.
Course Objective	To provide Fundamental knowledge of practical implementation based on DSC3 and DSC4
Pre-requisite	---
Course Out come	Student should be able to demonstrate skills mentioned in DSC3, DSC4 practically.
Course Content	As per theory subject content of relative subject
Reference Book	
Teaching Methodology	Discussion, Independent Study, Seminars and Assignment
Evaluation Method	70% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 30% assessment is based on semester end written examination