ARTIFICIAL INTELLIGENCE & DATA SCIENCE Syllabus Vikrama Simhapuri University, Nellore with effect from 2021-2022 AY



VIKRAMA SIMHAPURI UNIVERSITY::NELLORE Common Framework of CBCS for Colleges in Andhra Pradesh (A.P. State of Council of Higher Education)

SYLLABUS OF

BCA (ARTIFICIAL INTELLIGENCE & DATA SCIENCE) (UNDER CBCS FRAMEWORK WITH EFFECT FROM 2021-22)

(With Learning Outcomes, Unit-wise Syllabus, References, Co-curricular Activities &Model Q.P. For Fifteen Courses of 1, 2, 3 & 4 Semesters) (Implemented from 2021-22 Academic Year)

ARTIFICIAL INTELLIGENCE & DATA SCIENCE Syllabus Vikrama Simhapuri University, Nellore with effect from 2021-2022 AY

S.No	Course Code	Name of the Course	Hours / Week	No of Credits	Max. Marks Internal assessment	Max. Marks University Exam	Total Marks
1		English – I	4	3	25	75	100
2		Language(H/T/S/U) -I	4	3	25	75	100
3		Life Skill Course – I	2	2	-0-	50	50
4		Skill Development Course - I	2	2	-0-	50	50
5	C1	Mathematical Techniques	4	4	25	75	100
	C1-P	Mathematical Techniques Lab	2	1	-0-	50	50
6	C2	Data Analysis using Excel	4	4	25	75	100
	С2-Р	Data Analysis using Excel Lab	2	1	-0-	50	50
7	C3	C Programming	4	4	25	75	100
	С3-Р	C Programming Lab	2	1	-0-	50	50
٢		Communication Skills& Technical Report Writing Lab	2	2	25	75	100
Total			32	27	150	700	850

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S.No	Course Code	Name of the Course	Hours/ Week	No of Credits	Max. Marks Internal Assessment	Max. Marks University Exam	Total Marks
1		English – II	4	3	25	75	100
2		Language(H/T/S/U) –II	4	3	25	75	100
3		Life Skill Course – II	2	2	-0-	50	50
4		Skill Development Course - II	2	2	-0-	50	50
5		Skill Development Course - III	2	2	-0-	50	50
6	C4	Statistical Foundation for Data Science	4	4	25	75	100
	C4-P	Statistical Foundation for Data Science Lab	2	1	-0-	50	50
7	C5	Database Management Systems	4	4	25	75	100
	С5-Р	Database Management Systems Lab	2	1	-0-	50	50
8	C6	Object Oriented Programming through Java	4	4	25	75	100
	C6-P	Object Oriented Programming through Java Lab	2	1	-0-	50	50
0		Comprehensive Viva Voce	2	2	25	75	100
Total			34	29	150	750	900

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SEMESTER-I

MATHEMATICAL TECHNIQUES

Semester	CourseCode	Course Title	Hours/ Week	Hours	Credits
Ι	C1	Mathematical Techniques	4	60	4

Course Objectives

In order to be able to formulate what a computer system is supposed to do, or to prove that it does meet its specification, or to reason about its efficiency, one needs the precision of mathematical notation and techniques. For instance, to specify computational problems precisely one needs to abstract the detail and then use mathematical objects such as matrices, differentiation and integration To prove that a proposed solution does work as specified, one needs to apply the principles of mathematical logic, and to use proof techniques such as induction. And to reason about the efficiency of an algorithm, one often needs to count the size of complex mathematical objects. The Mathematics foundation for data science course aims to provide this mathematical background.

<u>Course Outcomes:</u> After successful completion of this course, the student will be able to;

1. Have an idea about basic mathematical techniques which are necessary to analyze the statically technique.

2. Able to know the concept of matrices and its operations.

3. Able to complete the adjoint and determinate of a square matrix, hence it's inverse.

4. Capable of solving the simultaneous equations using matrix method.

5. Understands the technique differentiation, integration and its applications.

SYLLABUS

UNIT-I

Matrix Algebra I: Introduction-Definition of Matrix-Various types of Matrices –Row Matrix-Column Matrix-Square Matrix-Rectangular Matrix-Scalar Matrix-Unit Matrix-Null Matrix-orthogonal Matrix-Addition of Matrices-Subtraction of Matrices-Multiplication of Matrices and their applications.

UNIT-II

Matrix Algebra II: Transpose of a Matrix-Symmetric Matrix-Skew Symmetric Matrix - Orthogonal Matrix - Singular Matrix - Non Singular Matrix - Determinant of a Matrix - Adjoint of a Square Matrix - Inverse of a Matrix up to 3 order only.

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UNIT-III

Matrix Algebra III: Rank of a Matrix - Definition - To find Rank of a Matrix for a given Matrix. Solutions of Linear equations: 1. Matrix inversion method2. Cramer's Rule up to 3 order only

UNIT-IV: Numerical Integration, Finite Difference and InterpolationNumerical

Integration: 1. Trapezoidal rule 2. Simpson's 1/3 rule 3. Simpson's 3/8 rule

Finite Difference and Interpolation:

Finite Differences - Forward Differences - Backward differences. Newton's forward interpolation formula - Newton's backward interpolation formula.

UNIT-V

Set Theory: Definition of Set- Types of Sets-Union of Sets-Intersection of Sets-Venn diagrams-Operations on Sets-Complement of Set-Distributive Laws-De"Morgan"s Laws

Note:

- 1. Concentration on numerical problems only.
- 2. Proofs of theorems and Derivations of expressions are omitted.

Text Books :

- 1. Mathematical Methods by Dr.T.K.V. Ivengar, Dr.B.Krishna Gandhi, Dr. S.Ranganatham, and Dr.M.V.S.S.N. Prasad by S.Chand publications 6th revised edition 2011.
- 2. Quantitative Techniques by C.Satyadevi by S.chand Company

Reference book :

1. Higher Engineering Mathematics by Dr.B.S.Grewal by Karna publisher"s 34th edition.

BACHELOR OF COMPUTER APPLICATIONS (BCA) ARTIFICIAL INTELLIGENCE & DATA SCIENCE Syllabus Vikrama Simhapuri University, Nellore with effect from 2021-2022

Mathematical Techniques Lab

Semester	CourseCode	Course Title	Hours/ Week	Hour s	Credit s
I	C1-P	Mathematical Techniques Lab	2	30	1

- Addition, Subtraction of Matrices. 1.
- 2. Multiplication of Matrices.
- Determinant of a Matrix and Inverse of a Matrix. 3.
- Singular and Non-Singular Matrices. 4.
- Cramer"s Rule and Matrix Inversion Method. 5.
- 6. Rank of a Matrix.
- Forward Difference, Backward Difference table. 7.
- Trapezoidal rule, Simpson"s 1/3 rule, Simpson"s 3/8 rule 8.
- Problem on Union. 9.
- Problem on Intersection. 10.

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DATA ANALYSIS USING EXCEL

Semester	Course Code	Course Title	Hours/ Week	Hours	Credit s
I	C2	Data Analysis using Excel	4	60	4

Course Objectives:

The objective of the course is to introduce the concepts of computer fundamental & their applications for the efficient use of Excel software in data analysis.

Course Learning Outcomes:

Upon successful completion of the course, a student will be able to:

- 1. Understand the evolution and functionality of a Digital Computer.
- 2. Understand hardware and software components
- 3. Have exposure to Excel software package
- 4. Understand various functions & formulae used in data analysis, preparing charts etc.
- 5. Apply data analysis tools like pivot table, goal seek, scenarios etc.

UNIT I

Introduction to Computers: Characteristics and limitations of computer, Block diagram of computer, types of computers, uses of computers, computer generations, **Types of Hardware:** Input devices and output devices, **Memories:** Primary memory, Secondary Memory, and cache memory,

UNIT II

Types of Software: System software, Application software, commercial, open source, domain and free ware software

Microsoft Excel: Fundamentals of Excel: Features of MS-Excel, Excel Program Screen, the Ribbon, Office button andQuick Access tool bar, Worksheets, rows, columns, cells.

UNIT III

Worksheet basics: Creating a new workbook, Opening a Workbook, Saving a Workbook, Workbooks, Entering labels, values, and formulas in worksheet

Editing a worksheet: Editing cell contents - cutting, copying and pasting cells – Find and Replace - Undo, Inserting rows and columns, Deleting rows and columns

Formatting Options: Adjusting row height and column width - Formatting cell values, conditional formatting

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UNIT IV

Formulas and Functions: Formulas: Enter and edit formula in Excel, operators used in formula, cell references in formula

Functions: Definition, Inserting a function in Excel, Types of functions in Excel: Mathematical, Statistical, Logical, Text, Date & Time functions

Working with Data ranges: Sorting: Sorting on single column, sorting on multiple columns, Filtering: Filtering data using AutoFilter

UNIT V

Working with Charts: Different types of charts, Creating a chart, Parts of chart, Changing chart type, changing chart options

Analyzing and Organizing Data: Data Validation, Scenarios, Sub Totals

Working with PivotTables: Creating a PivotTable, Specifying PivotTable data, Working with PivotTable Layout

TEXT BOOKS:

- 1. Fundamentals Of Computers by Reema Thareja from Oxford University Press
- 2. Microsoft Excel 2007, Custom Guide Inc, 2007

REFERNCE BOOKS

- 1. Rajaraman, Introduction to Information Technology, PHI
- 2. Peter Norton, Introduction to Computers, Sixth edition, Tata McGraw Hill (2007).
- 3. Microsoft Office 2007 Fundamentals, 1st Edition By Laura Story, Dawna Walls
- 4. Working in Microsoft Office Ron Mansfield TMH.
- 5. MS Office 2007 in a Nutshell -Sanjay Saxena Vikas Publishing House.

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DATA ANALYSIS USING EXCEL LAB

Semester	CourseCode	Course Title	Hours/Week	Hour s	Credit s
I	C2-P	Data Analysis using Excel Lab	2	30	1

- 1. Prepare your class time table using different Text formatting
- 2. Create a payslip with details of employee salary
- 3. Prepare an Excel sheet to calculate students result and grades based on their marks
- 4. Prepare an excel sheet to enter some strings and perform the following text functions
 - a. Find length of strings
 - b. Convert strings into uppercase and lowercase
 - c. Remove extra spaces in the strings
 - d. Extract substrings from the strings
- 5. Prepare an excel sheet to perform the following statistical analysis
 - a. Find mean of the values
 - b. Find mode of the values
 - c. Calculate standard deviation
 - d. Find largest and smallest values
- 6. Draw different types of charts for weather analysis of 5 successive years
- 7. Prepare an excel sheet for creating a pie chart for budget analysis
- 8. Prepare an excel sheet to illustrate the sorting
- 9. Prepare an excel sheet to illustrate the filtering
- 10. Prepare an excel sheet to illustrate the concept of sub totals
- 11. Prepare an excel sheet for restricting data entry using data validation feature
- 12. Create and demonstrate to analyze the data using a pivot table

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'C' PROGRAMMING

Semester	CourseCode	Course Title	Hours/Week	Hours	Credits	
I	C3	'C' Programming	4	60	4	

Course Objectives:

This course aims to provide exposure to problem-solving through programming. It introduces the concepts of the C Programming language.

Course Learning Outcomes:

Upon successful completion of the course, a student will be able to:

- 1. Understand the programming languages and flow charts.
- 2. Apply logical skills to analyse a given problem
- 3. Develop an algorithm for solving a given problem.
- 4. Understand "C" language constructs like Iterative statements, Array processing, Pointers, etc.
- 5. Apply "C" language constructs to the algorithms to write a "C" language program.

UNIT I

Introduction to Algorithms and Programming Languages: Algorithm – Key features of Algorithms, Flow Charts, Programming Languages – Generations of Programming Languages Introduction to C: Introduction – Structure of C Program – Writing the first C Program – Files used in C Program – Compiling and Executing C Programs - Programming Examples

UNIT II

C Fundamentals : Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Operators in C – I/O Statements (scanf, printf)

Decision Control Statements: Introduction to Decision Control Statements – Conditional Branching Statements : simple if, if..else, nested if, switch statements – Programming Examples

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UNIT III

Iterative Control Statements: Iterative Statements - Nested Loops - Break and Continue Statement - Goto Statement

Arrays: Introduction – Declaration of Arrays – Accessing elements of the Array – Storing Values in Array – one dimensional array for inter-function communication – Two dimensional Arrays – two dimensional arrays for inter-function communication

Strings: Introduction - String operations - String functions

UNIT IV

Functions: Introduction – using functions – Function declaration/ prototype – Function definition – function call – return statement – Passing parameters – Scope of variables – Storage Classes – Recursive functions.

Structure and Unions: Introduction – Nested Structures – Arrays of Structures – Structures and Functions – Unions – Arrays of Unions Variables

UNIT V

Pointers: Introduction to Pointers – declaring Pointer Variables – Passing Arguments to Functions using Pointer – Pointer and Arrays – Dynamic Memory Allocation

File Handling: Introduction to Files, File modes, File operations, Using Files in C, Reading Data from Files, Writing Data from Files, Detecting the End-of-file

TEXT BOOKS:

1. Computer Fundamentals and Programming in C by Reema Thareja from Oxford University Press

REFERNCE BOOKS

- E Balagurusamy: Computing Fundamentals & C Programming Tata McGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.
- 2. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publ, 2002.
- 3. Yashavant Kanetkar Let Us "C" BPB Publications.
- 4. Brain W Kernighan and Dennis M Ritchie The "C" Programming language Pearson publications.

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'C' PROGRAMMING LAB

Semester	CourseCode	Course Title	Hours/ Wek	Hours	Credits
I	С3-Р	'C' Programming Lab	2	30	1

- 1. Write a program to find
 - a. Area of Circle
 - b. Area of triangle
- 2. Write a Program to find
 - a. simple interest
 - b. Compound Interest
- 3. Write a program to convert temperature from Celsius to Fahrenheit
- 4. Write a program to find whether a number is even or odd
- 5. Write a program to find sum and average of 5 numbers
- 6. Write a program to check whether the given number is Armstrong or not.
- 7. Write a program to find the sum of individual digits of a positive integer.
- 8. Write a program to generate the first n terms of the Fibonacci sequence.
- 9. Write a program to find both the largest and smallest number in a list of integer values
- 10. Write a program to calculate factorial of given integer value using recursive functions
- 11. Write a program for addition of two matrices.
- 12. Write a program for multiplication of two matrices.
- 13. Write a program to perform various string operations.
- 14. Write a program to search an element in a given list of values.
- 15. Write a C program to
 - a. Write data into a File.
 - b. Read data from a File

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SEMESTER II

Semester	Cours e Code	Course Title	Hours/ Week	Hours	Credits
П	C 4	Statistical Foundation for Data Science	4	60	4

STASTICAL FOUNDATION FOR DATA SCIENCE

Course Objectives

- Statisticians help to design data collection plans, analyze data appropriately and interpret and draw conclusions from those analyses. The central objective of the undergraduate major in Statistics is to equip students with consequently requisite quantitative skills that they can employ and build on in flexible ways.
- 2. Majors are expected to learn concepts and tools for working with data and have experience in analyzing real data that goes beyond the content of a service course in statistical methods for non-majors. Majors should understand [1] the fundamentals of probability theory, [2] statistical reasoning and inferential methods, [3] statistical computing, [4] statistical modeling and its limitations, and have skill in [5] description, interpretation and exploratory analysis of data by graphical and other means; [6] graduates are also expected to learn to communicate effectively.

Course Outcomes

After successful completion of this course, the student will be able to;

- 1. Knowledge of Statistics and its scope and importance in various areas such as Medical, Engineering, Agricultural and Social Sciences etc.
- 2. Knowledge of various types of data in diagrammatic representation.
- 3. Brief analyzing in different types of data and tabulated.
- 4. Knowledge of various types of data, their organization and evaluation of summary measuressuch as measures of central tendency and dispersion etc.
- 5. Insights into preliminary exploration of different types of data.

COURSE SYLLABUS

UNIT - I

Introduction to Statistics: Introduction of Statistics-Sources of data-techniques of data collection- primary data and secondary data-methods of collecting primary data and secondary data- classification of data-frequency distribution.

Diagrammatic and graphic representation: Bar diagrams-Pie charts-histogram-frequency polygon-ogive curves.

<u>UNIT – II</u>

Measures of Central Tendency: Introduction-features of good average-Arithmetic mean, merits and demerits- Arithmetic mean individual observation, discrete series, continuous series- Median, merits and demerits-Median individual observation, discrete series, continuous series- Mode, merits and demerits-Mode

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individual observation ,discrete series ,continuous series.

UNIT - III

Measures of Dispersion I : Introduction-properties of a good measures of dispersion-methods of studying dispersion-Range, Quartile deviation, Mean deviation(MD), its merits and demerits, calculation for Individual observation, calculation on discrete and continuous Series.

UNIT-IV

Variance - Standard Deviation : Variance, its merits and demerits, calculation for Individual observation, calculation on discrete and continuous Series. Standard Deviation, its merits and demerits, calculation for Individual observation, calculation on discrete and continuous Series. Coefficient of Variation.

UNIT-V

Moments: Central and Non - Central moments, Sheppard's correction for moments for grouped data. Concept of Skewness, Karl pearson''s coefficient of skewness, Bowley''s Coefficient of skewness, kurtosis and their measures.

Note:

1. Concentration on numerical problems only.

2. Proofs of theorems and Derivations of expressions are omitted.

Text Books:

1. Statistical methods - S.P. Gupta.

2. Fundamentals of Mathematical statistics - SC Gupta and V.K. Kapoor

Reference Books:

Quantitative Techniques1 -Sulthan Chand Publication

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STATISTICAL FOUNDATION FOR DATA SCIENCE LAB

Semester	Cours e Code	's Course Title Hours/Week		Hour s	Credit s
П	C4-P	Statistical Foundation for Data Science Lab	2	30	1

- 1. Frequency distribution table
- 2. Bar diagrams.
- 3. Pie diagram.
- 4. Histogram.
- 5. Arithmetic Mean, Median.
- 6. Mode.
- 7. Mean Deviation

8. Standard Deviation.

- 9. Karl Pearson"s Coefficient of Skewness.
- 10. Bowley"s Coefficient of Skewness.

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SEMESTER - II CBCS STASTICAL FOUNDATIONS FOR DATA SCIENCE (Statistical tables and Electronic Calculators are allowed)

MODEL QUESTION PAPER

TIME: 3 HOURS

MAX.MARKS:75

SECTION-A

ANSWER ANY FIVE QUESTIONS. EACH QUESTION CARRIES 5 MARKS 5X5=25

1. Define Primary data and secondary data.

2. Construct frequency polygon for the following data

Class Interval	Mid Values	No. of Employees
0-10	5	2
10-20	15	4
20-30	25	8
30-40	35	3
40-50	45	5

3. In Asymmetrical Distribution, mode=32.1, Mean=35.4, find out the value of Median.

4. Find Median, and Mode to the following data :

4, 5, 6, 4, 5, 4, 10

5. Find the range to the following data 200, 210, 208, 160, 220, 250.

6.	Compute Quartile De	viation	From th	e follov	ving dat	a	
	Marks	10	20	30	40	50	60
	No. of Students	4	7	15	8	7	2

7. If mean of a distribution is 160, Mode 157 and Standard distribution is 50

then findCoefficient of variation.

8. Explain Merits of S.D.

9. Write Sheppard corrections.

10. Find Karl-Pearsons Coefficient of Skewness to the following data mean=150,mode=185, standard deviation(σ) = 55.

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SECTION-B

ANSWER ANY FIVE QUESTIONS. EACH QUESTION CARRIES 10 MARKS 5X10=50

11. Explain various methods of collecting primary data.

12. Prepare pie chart for expenditure in book publishing for the following data

Items of expenditure	Family A	Family B
Food	12000	15000
Clothing	5000	8000
House rent	15000	12000
Education	18000	5000
Miscellaneous	10000	10000

7

13. Calculate Arithmetic Mean for the following data :

X 1 2 3 4 5 6

F 5 9 12 17 14 10 6

14. Calculate Median from the following data

Marks	0-10	10-20	20-30	30-40	40-50	50-60	
No. of students	12	18	27	20	17	6	
15 Calculate	mean devia	tion from the	following data	1	1	1	

15. Calculate mean deviation from the following data

x	5	10	15	20	25	30
f	3	4	8	12	7	2

16. Compute Coefficient of Quartile Deviation to the following data

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of Students	10	15	28	32	40	35	26	14	10	5

17. Given the statistical distribution of the table.

xi	61	64	67	70	73
fi	5	18	42	27	8

Calculate standard deviation.

18. The following are the runs scored by two batsmen A and B in 10 innings. Find out who is better run getter and who is more consistent player

A runs	90	110	5	10	125	15	35	16	134	10
B runs	65	68	52	47	63	25	25	60	55	60

 19. Compute Karl-Pearsons Coefficient of Skewness to the following data : Distance (km) 10 20 30 40 50 No.of Buses 16 20 29 49 61

20. Find Bowley"s coefficient of skewness to the following data

C.I	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	45	26	18	13	12	12	4

Instruction to Paper Setter:

Paper Setter must select TWO Short Questions and TWO Essay Questions from Each Unit

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DATABASE MANAGEMENT SYSTEM USING SQL

Semester	Cours e Code	Course Title	Hours/Week	Hour s	Credit s
Π	C 5	Database Management System	4	60	4

Course Objectives:

The objective of the course is to introduce the design and development of databases for data science with analytical features in relational databases.

Course Learning Outcomes:

Upon successful completion of the course, a student will be able to:

- 1. Gain knowledge of Database, DBMS and SQL.
- 2. Learn SQL as best analysis tool for extract data in different ways
- 3. Create a small database using SQL.
- 4. Able to construct SQL queries to Store, Retrieve data in database
- 5. Model database using ER Diagrams and design database schemas based on the model.

UNIT I

Introduction to Database Management System: Introduction to data, information, database, database management systems, file-based system, Drawbacks of file-Based System, Classification of Database Management Systems, advantages and disadvantages of database approach, services of database systems, Components of Database Management System

UNIT II

The Relational Database Model: Various Data Models, Relational Database model, Keys used in Relational model, Relational Data Integrity, Relationships within the Relational Database, Codd''s relational database rules.

Entity-Relationship Model: Introduction, The components of an Entity-Relationship model, entities, attributes, relationships, Classification of Entity Sets, Attribute Classification, Relationship Degree, Relationship Classification

UNIT III

Structured Query Language: Introduction, SQL literals, Data types in SQL, SQL operators, Commands in SQL, Data Definition Language (DDL) commands, Creating tables, Table Modification, Table Truncation, Creating Tables with constraints, Dropping tables, Data Manipulation Language (DML) commands: Inserting data into tables, updating data in tables and deleting data in tables. Transaction Control commands in SQL

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UNIT IV

Queries, Aggregate Functions, Subqueries and correlated queries, Relational Set Operators, Joining Database Tables, SQL Functions: Numeric functions, Date & Time functions, Text functions and Conversion functions, Views, Types of views, creating views, dropping views, Data Control Language (DCL) commands

UNIT V

PL/SQL: Introduction, Structure of PL/SQL program, PL/SQL Data Types, operators used in PL/SQL, variables, declaring variables in PL/SQL, Creating and running a PL/SQL Program, Control Structures, Conditional control statements, Iterative Control statements, Cursors, types of cursors, Steps to create a Cursor, using cursors in PL/SQL program

TEXT BOOKS:

- 1. Peter Rob, Carlos Coronel, Database Systems Design, Implementation and Management, Seventh Edition, Thomson (2007)
- 2. SQL, PL/SQL the Programming Language of Oracle, Ivan Bayross, BPB publications

REFERNCE BOOKS

- 1. Elimasri / Navathe, Fundamentals of Database Systems, Fifth Edition, Pearson Addison Wesley (2007).
- 2. Database System Concepts by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill
- 3. Database Management Systems by Raghu Ramakrishnan, McGrawhill
- 4. SQL: The Ultimate Beginners Guide by Steve Tale.
- 5. C.J.Date, A.Kannan, S.Swamynathan, An Introduction to Database Systems, Eight Edition, Pearson Education (2006).
- 6. Atul Kahate, Introduction to Database Management Systems, Pearson Education (2006).

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Database Management System Lab

Semester	CourseCode	Course Title	Hours/ Week	Hours	Credits
П	С5-Р	Database Management System Lab	2	30	1

- 1. Draw ER diagram for inventory control system
- 2. Draw ER diagram for hospital administration
- 3. Illustrate the creation of a table with constraints
- 4. Creation of college database and establish relationships between tables
- 5. Employee database

An enterprise wishes to maintain a database to automate its operations. Enterprise divided into certain departments and each department consists of employees. The following two tables describes the automation schemas

Dept (deptno, dname, loc)

Emp (empno, ename, job, mgr, hiredate, sal, comm, deptno)

Generate the following queries using data of above tables.

- i. List out all employees details
- ii. Display empno, ename, job and sal columns of all employees
- iii. Display employee details who are working as "CLERK"
- iv. Find out number of employees working in each department
- v. Find out job wise total salaries and number of employees.
- vi. Calculate HRA as 30% and DA as 65% of salary
- 6. Create a view to get details of a table
- 7. Demonstrate the use of GRANT and REVOKE commands to provide authorization
- 8. Write a PL/SQL program to find factorial of a number
- 9. Write a PL/SQL program to find sum of digits of an integer
- 10. Write a PL/SQL program to demonstrate a for loop
- 11. Write a PL/SQL program to demonstrate cursors
- 12. Write a PL/SQL program to demonstrate Aggregate functions

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DATABASE MANAGEMENT SYSTEM LAB MODEL QUESTION PAPER

Time: 3 Hours

Max. Marks: 75

SECTION-A

Answer any **FIVE** of the following Questions:

- 1. Describe a) Data b) information c) database
- 2. Explain the Services of database management system
- 3. Briefly write about keys used in DBMS
- 4. Explain the relationship degree with an example
- 5. Define literal. Write about various literals used in SQL
- 6. Explain how do you insert data into tables
- Explain aggregate functions with an example 7.
- 8. Write about the use of COMMIT and ROLLBACK commands
- 9. Briefly explain the block structure of PL/SQL suitable example
- 10. Write about declaring variables in PL/SQL program

SECTION - B

Answer any FIVE of the following Questions

(5] 10 = 50 Marks)

- 11. Explain advantages of database management system
- 12. Write about various components of database management system
- 13. Define data model. Elaborate various data models
- 14. Write a short note on ER model
- 15. Explain about data definition commands
- 16. Write about data types used in Structured Query Language
- 17. Explain about relational set operators with examples
- 18. Illustrate the use of views in the database
- 19. Write about iterative control structures in PL/SQL
- 20. Explain how cursors are managed and their types

Instruction to Paper Setter:

Paper Setter must select TWO Short Questions and TWO Essay Questions from Each Unit

- (5 x 5= 25 Marks)

ARTIFICIAL INTELLIGENCE & DATA SCIENCE Syllabus Vikrama Simhapuri University, Nellore with effect from 2021-2022

Semester	Course Code	Course Title	Hours/ Week	Hour s	Credit s
П	C6	Object Oriented Programming through Java	4	60	4

OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Course Objectives:

As the business environment becomes more sophisticated, the software development is becoming increasingly complex. Object Oriented Programming (OOP) has become the predominant technique for writing software in the past decade. Many other important software development techniques are based upon the fundamental ideas captured by object-oriented programming.

Course Learning Outcomes:

Upon successful completion of the course, a student will be able to:

- 1. Understand the concept and underlying principles of Object-Oriented Programming
- 2. Understand how object-oriented concepts are incorporated into the Java programminglanguage
- 3. Develop problem-solving and programming skills using OOP concept
- 4. Understand the benefits of a well-structured program
- 5. Develop the ability to solve real-world problems through software development in high-levelprogramming language like Java
- 6. Develop efficient Java applets and applications using OOP concept

UNIT - I

FUNDAMENTALS OF OOP: Introduction, Object Oriented paradigm, Basic Concepts of OOP **OVERVIEW OF JAVA LANGUAGE**: Introduction, Java features, Java program structure, Java tokens, Implementing a Java Program, Java Virtual Machine (JVM), Command line arguments.

CONSTANTS, VARIABLES & DATA TYPES: Introduction, Constants, Data Types, Variables, Declaration of Variables, Giving Value to Variables, Scope of variables, Type casting, operators

UNIT - II

INPUT AND OUTPUT IN JAVA: Reading Input with Java.util.Scanner Class, Displaying Output with System.out.println()

CONTROL STATEMENTS IN JAVA: Conditional control statements (simple if, if..else, switch), Iterative control statements (while, do..while, for), break Statement, continue Statement, return Statement

ARTIFICIAL INTELLIGENCE & DATA SCIENCE Syllabus Vikrama Simhapuri University, Nellore with effect from 2021-2022

CLASSES, OBJECTS & METHODS: Introduction, Defining a class, Adding methods, Creating objects, Accessing class members, Constructors, Method overloading, Static members

UNIT - III

ARRAYS, STRINGS AND VECTORS: Arrays, One-dimensional arrays, Creating an array, Two –dimensional arrays, Strings, Vectors, Wrapper classes

INHERITANCE: Introduction, Types of inheritance, Overriding methods, Final variables and methods, Final classes, Abstract methods and classes

UNIT - IV

INTERFACES: Defining interfaces, Extending interfaces, Implementing interfaces, Accessing interfacevariables, Multiple Inheritance using interfaces

EXCEPTIONS: Types of errors: Compile-time errors, Run-time errors, Exceptions, Exception handling, Multiple Catch Statements

UNIT - V

MULTITHREADED PROGRAMMING: Introduction, Lifecycle of a Thread, Creating Threads, Extending the Threads, Stopping and Blocking a Thread

APPLET PROGRAMMING: Definition, Local and remote applets, Applet Life cycle: Initializationstate, Running state, Idle or stopped state, Dead state, Display state, Building Applet code

PACKAGES: Introduction, Java API Packages, Creating Packages, Accessing a Package

TEXT BOOKS:

1. E.Balaguruswamy, Programming with JAVA, A primer 3e, TATA McGraw-Hill Company

REFERENCE BOOKS:

- 1. Programming in Java by Sachin Malhotra, OXFORD University Press
- Core Java: An Integrated Approach, Authored by Dr. R. Nageswara Rao &Kogent LearningSolutions Inc.
- 3. John R. Hubbard, Programming with Java, Second Edition, Schaum"s outline Series, TATA McGraw-Hill Company.
- 4. Deitel & Deitel. Java TM: How to Program, PHI (2007)
- 5. Java Programming: From Problem Analysis to Program Design- D.S Mallik
- Object Oriented Programming Through Java by P. Radha Krishna, Universities Press (2008)

ARTIFICIAL INTELLIGENCE & DATA SCIENCE Syllabus Vikrama Simhapuri University, Nellore with effect from 2021-2022

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Semester	Course Code	Course Title	Hours/Week	Hour s	Credit s
п	С6-Р	Object Oriented Programming through Java Lab	2	30	1

- 1. Java program to demonstrate the use of Harmonic Series.
- 2. Java program to display a number is even or odd
- 3. Java Program to find whether a number is prime or not
- 4. Java program to find a sub string in the given string.
- 5. Java program to arrange the given strings in Alphabetic Order.
- 6. Java Program to search an element using arrays
- 7. Java program to implement Addition and multiplication of two Matrices.
- 8. Java program to demonstrate the use of Constructor.
- 9. Java program to demonstrate the use of overriding Method.
- 10. Java program for single Inheritance.
- 11. Java program for implementing Interface.
- 12. Java program on Multiple Inheritance.
- 13. Java program for to implement Thread
- 14. Java program to demonstrate Exception handling.
- 15. Java program to demonstrate Applet program.

BACHELOR OF COMPUTER APPLICATIONS WITH DATA SCIENCE / ARTIFICIAL INTELLIGENCE & DATA SCIENCE Syllabus Vikrama Simhapuri University, Nellore with effect from 2021-2022

OBJECT ORIENTED PROGRAMMING THROUGH JAVA MODEL QUESTION PAPER

Time: 3 Hours

Max. Marks: 75

(5 x 5= 25 Marks)

SECTION-A

Answer any <u>FIVE</u> of the following Questions:

- 1. Explain about command line arguments.
- 2. Discuss about JVM.
- 3. Explain break and continue statements
- 4. Define a class. How to define a class in Java.
- 5. What is an array? Discuss creating a one dimensional array in Java.
- 6. Briefly explain wrapper class
- 7. Discuss how to implement the Runnable Interface.
- 8. Write short notes on compile time errors
- 9. Write short notes on Thread life cycle
- 10. Differentiate local and remote applets.

SECTION - B

Answer any **FIVE** of the following Questions

(5 x 10 = 50 Marks)

11. Explain basic concepts of OOP.

12. Write about the structure of Java Program with an example.

- 13. Write in detail about looping structures in Java
- 14. Explain about constructors in Java.
- 15. Explain about Inheritance with an example.
- 16. Write about how vectors used in Java program
- 17. Write about Interfaces used in Java
- 18. How to handle exceptions in Java with an example.
- 19. Explain how to create user defined package.
- 20. Explain Applet life cycle in detail.

Instruction to Paper Setter:

Paper Setter must select <u>TWO</u> Short Questions and <u>TWO</u> Essay Questions from Each Unit

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