



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

SYLLABUS OF
BCA WITH BIG DATA & MACHINE LEARNING
(UNDER CBCS FRAMEWORK WITH EFFECT FROM 2020-21)

PROGRAMME: FOUR-YEAR UG PROGRAMME

*(With Learning Outcomes, Unit-wise Syllabus, References, Co-curricular Activities &
Model Q.P. For Fifteen Courses of 1, 2, 3 & 4 Semesters)*
(To be Implemented from 2020-21 Academic Year)

**BACHELOR OF COMPUTER APPLICATIONS WITH BIG DATA & MACHINE
LEARNING Syllabus
Vikrama Simhapuri University, Nellore with effect from 2020-2021**

FIRST SEMESTER

S. No	Paper Code	Subject	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) – 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 Foundation for Data Science	4	4	25	75	100
6	C1-P	Mathematical Foundation for Data Science Lab	2	1	-0-	50	50
7	C2	Data Analytics using Excel	4	4	25	75	100
8	C2-P	Data Analytics using Excel Lab	2	1	-0-	50	50
9	C3	'C' Programming for Data Science	4	4	25	75	100
10	C3-P	'C' Programming for Data Science Lab	2	1	-0-	50	50
11		Communication Skills & Technical Report Writing Lab	2	2	25	75	100
Total			32	27	150	700	850

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SECOND SEMESTER

S .No	Paper Code	Subject	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) – 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
7	C4-P	Statistical Foundation for Data Science Lab	2	1	-0-	50	50
8	C5	Data Analytics using SQL	4	4	25	75	100
9	C5-P	Data Analytics using SQL Lab	2	1	-0-	50	50
10	C6	Java Programming for Data Science	4	4	25	75	100
11	C6-P	Java Programming for Data Science Lab	2	1	-0-	50	50
12		Comprehensive Viva Voce	2	2	25	75	100
Total			34	29	150	750	900

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THIRD SEMESTER

S. No	Paper Code	Subject	Hours/Week	No of Credits	Max. Marks Internal assessment	Max. Marks University Exam	Total Marks
1		English – III	4	3	25	75	100
2		Language(H/T/S) – III	4	3	25	75	100
3		Life Skill Course – III	2	2	-0-	50	50
4		Life Skill Course – IV	2	2	-0-	50	50
5		Skill Development Course - IV	2	2	-0-	50	50
6	C7	Probability and Statistics	4	4	25	75	100
7	C7-P	Probability and Statistics Lab	2	1	-0-	50	50
8	C8	Data Structures	4	4	25	75	100
9	C8-P	Data Structures Lab	2	1	-0-	50	50
10	C9	Introduction to Big Data & Machine Learning	4	4	25	75	100
11	C9-P	Introduction to Big Data & Machine Learning Lab	2	1	-0-	50	50
12		Seminar & Group Discussion	2	2	0	50	50
Total			34	29	125	725	850

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FOURTH SEMESTER

S.No	Paper Code	Subject	Hours/Week	No of Credits	Max. Marks Internal assessment	Max. Marks University Exam	Total Marks
1	C10	Data Analytics Methods and Probability Distributions	4	4	25	75	100
2	C10-P	Data Analytics Methods and Probability Distributions Lab	2	1	-0-	50	50
3	C11	Accounting & Systems Approach for Management	4	4	25	75	100
4	C11-P	Tally Lab	2	1	-0-	50	50
5	C12	Machine Learning using Python	4	4	25	75	100
6	C12-P	Machine Learning using Python Lab	2	1	-0-	50	50
7	C13	Web Technology Fundamentals	4	4	25	75	100
8	C13-P	Web Technology Fundamentals Lab	2	1	-0-	50	50
9	C14	Computer Networks	4	4	25	75	100
10	C14-P	Computer Networks Lab	2	1	-0-	50	50
11	C15	Big Data using Hadoop	4	4	25	75	100
12	C15-P	Big Data using Hadoop Lab	2	1	-0-	50	50
Total			36	30	150	750	900

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Vikrama Simhapuri University, Nellore with effect from 2020-2021

Semester	Course Code	Course Title	Hours/Week	Hours	Credits
I	C1	Mathematical Foundation For Data Science	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.

Course Outcomes

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.

UNIT - I

Matrix Algebra I: Introduction-Definition of Matrix-Variety 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.

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 Interpolation

Numerical 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.

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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
I	C1-P	Mathematical Foundation For Data Science Lab	2	30	1

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

MATHEMATICAL 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 5 X 5 = 25M

1. If $A = \begin{bmatrix} 8 & 9 \\ 5 & -1 \end{bmatrix}$, $B = \begin{bmatrix} -2 & 3 \\ 4 & 0 \end{bmatrix}$ then find AB and BA

2. If $A = \begin{bmatrix} 1 & 2 \\ 1 & 1 \end{bmatrix}$ then find $A^2 + A + I$

3. Examine the following Matrix is Singular or Non-Singular $A = \begin{bmatrix} 3 & 8 & 1 \\ -4 & 1 & 1 \\ -4 & 1 & 1 \end{bmatrix}$.

4. Find the inverse matrix of $A = \begin{pmatrix} 2 & -3 \\ 4 & 6 \end{pmatrix}$

5. Find the rank of $A = \begin{bmatrix} 2 & 4 \\ 1 & 2 \end{bmatrix}$.

6. Explain Matrix Inversion method for solving linear equations.

7. The following table shows the temperature $f(t)$ as follows

t	1	2	3	4	5	6	7
$f(t)$	81	75	80	83	78	70	60

Use Simpson's $\frac{1}{3}$ method to estimate $\int_1^7 f(t) dt$

8. Construct backward difference table to the following data and find $\nabla^2 y_2, \nabla^4 y_2$

x	0	1	2	3	4	5	6
y	0	1	16	81	256	625	1296

9. $A = \{1, 2, 3, 4\}$, $B = \{2, 3, 5, 6\}$ find $A - B$ and $B - A$.

10. $A = \{2, 6, 8, 10\}$, $B = \{6, 8, 10, 11, 12\}$ find $A \cup B$ and $A \cap B$.

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SECTION-B

ANSWER ANY FIVE QUESTIONS.

EACH QUESTION CARRIES 10 MARKS

5X10=50

11. $A = \begin{bmatrix} 1 & 2 \\ 0 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 5 \\ 1 & 0 \end{bmatrix}$ then find (i) AB (ii) BA (iii) $A+B$ (iv) $(A+B)^T$ (v) $A-B$

12. Evaluate $A^2 - 3A + 9I$ where $A = \begin{bmatrix} 1 & -2 & 3 \\ 2 & 3 & -1 \\ -3 & 1 & 2 \end{bmatrix}$ and I is the unit Matrix.

13. Examine the following matrix is orthogonal or not

$$A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & 5 & 7 \\ 2 & 1 & -1 \end{bmatrix}$$

14. If $A = \begin{bmatrix} 2 & 0 & 1 \\ 4 & -2 & 3 \\ 0 & 4 & -1 \end{bmatrix}$ then find A^{-1}

15. Find the rank of $A = \begin{bmatrix} 3 & -1 & 2 \\ -3 & 1 & 2 \\ -6 & 2 & 4 \end{bmatrix}$.

16. Solve the equations by using Matrix Inversion method $2x - y + 3z = 9, x + y + z = 6, x - y + z = 2$

17. Find $f(1.6)$ using Newton's forward Interpolation formula from the following table

x	1	1.4	1.8	2.2
y	3.49	4.82	5.96	6.5

18. Evaluate $\int_0^6 \frac{1}{1+x} dx$ by using trapezoidal rule.

19. If $A = \{8, 3, 2, 6, 5\}$, $B = \{1, 2, 7, 9\}$, $C = \{4, 5, 9\}$ prove that $A \cup (B \cap C) = (A \cup B) \cap C$.

20. $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, $A = \{2, 4, 6, 8, 10\}$, $B = \{1, 3, 5, 7, 9\}$

prove that 1. $(A \cup B)^c = A^c \cap B^c$ 2. $(A \cap B)^c = A^c \cup B^c$

Instruction to Paper Setter:

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

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LEARNING Syllabus
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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
I	C2	Data Analytics using Excel	4	60	4

Course Objectives:

1. 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 and Quick 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

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

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, Subtotals

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

Reference 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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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
I	C2-P	Data Analytics 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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**B.C.A (Big Data & Machine Learning)
SEMESTER - I CBCS
DATA ANALYTICS USING EXCEL
MODEL QUESTION PAPER**

Time: 3 Hours

Max. Marks : 75

SECTION-A

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

(5 x 5= 25 Marks)

1. What are various characteristics of computers
2. What is Cache memory? Explain
3. Briefly write about open source software
4. Define MS-Excel. Write about rows in Excel sheet
5. Briefly explain creating a new workbook in MS-Excel
6. Explain how to enter different data into a worksheet
7. Write about cell references used in Excel
8. Explain mathematical functions used in Excel with an example
9. Write about parts of chart in Excel
10. Briefly write about the use of SubTotals in Excel

SECTION - B

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

(5 × 10 =50 Marks)

11. Explain in detail about parts of a computer system with a neat sketch.
12. Write about input devices in detail.
13. What is software? Explain different types of software
14. Write about features of MS-Excel
15. Explain various editing options of MS-Excel.
16. Write about formatting options in Excel
17. Define Sorting. Explain how to sort data in MS-Excel
18. Explain operators with examples used in Excel software.
19. Explain in detail how to create a PivotTable in Excel
20. Write in detail how Scenarios help in what-if-analysis.

Instruction to Paper Setter:

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

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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
I	C3	'C' Programming for Data Science	4	60	4

Course Objectives:

1. 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

UNIT - III

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

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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

Reference Books:

1. 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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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
I	C3-P	'C' Programming for Data Science 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

**B.C.A (Big Data & Machine Learning)
SEMESTER-I CBCS
'C' PROGRAMMING FOR DATA SCIENCE
MODEL QUESTION PAPER**

Time: 3 Hours

Max. Marks : 75

SECTION-A

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

(5 x 5= 25 Marks)

1. Define flowchart. Write symbols used in flow charts.
2. Write about compiling and executing programs in C.
3. Explain briefly constants used in C language.
4. Write about switch statement with an example
5. Illustrate break and continue statements.
6. Write about accessing elements of an array with an example
7. What is recursive function? Explain with an example program
8. Explain how to define a function in C program
9. Briefly explain passing arguments to functions using pointers with an example
10. Write various file modes used in C language

SECTION - B

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

(5 × 10 =50 Marks)

11. Explain the key features of an algorithm
12. Write in detail the structure of C program with an example
13. Define data type. Explain various data types used in C language
14. Illustrate the use of decision control statements with an example
15. Define array. Explain how will you declare and access arrays in C program
16. Explain various string functions with an example
17. Write about storage classes used in C language
18. Define Structure. Illustrate the use of structures in C program
19. What is dynamic memory allocation? Explain with examples
20. Explain different file operations in C language

Instruction to Paper Setter:

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

SECOND SEMESTER

Semester	Course Code	Course Title	Hours/Week	Hours	Credits
II	C4	Statistical Foundation for Data Science	4	60	4

Course Objectives

1. 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 measures such as measures of central tendency and dispersion etc.
5. Insights into preliminary exploration of different types of data.

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.

UNIT – II

Measures of Central Tendency: Introduction-features of good average-Arithmetic mean, merits and

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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 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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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
II	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.

**B.C.A (Big Data & Machine Learning)
SEMESTER - II CBCS
STATISTICAL 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 Deviation From the following data

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 deviation is 50 then find Coefficient 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

13. Calculate Arithmetic Mean for the following data :

X	1	2	3	4	5	6	7
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 deviation from the following data

<i>x</i>	5	10	15	20	25	30
<i>f</i>	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.

<i>x_i</i>	61	64	67	70	73
<i>f_i</i>	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-Pear sons 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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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
II	C5	Data Analytics using SQL	4	60	4

Course Objectives:

1. 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

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(DML) commands: Inserting data into tables, updating data in tables and deleting data in tables.
Transaction Control commands in SQL

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

Reference 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 Raghuram 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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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
II	C5-P	Data Analytics using SQL 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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**DATA ANALYTICS USING SQL
MODEL QUESTION PAPER**

Time: 3 Hours

Max. Marks : 75

SECTION-A

Answer any FIVE of the following Questions:

(5 x 5= 25 Marks)

1. Describe the following
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
7. Explain aggregate functions with an example
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 joins 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

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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
II	C6	Java Programming for Data Science	4	60	4

Course Objectives:

1. 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 programming language
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-level programming 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

CLASSES, OBJECTS & METHODS: Introduction, Defining a class, Adding methods, Creating

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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 interface variables, 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: Initialization state, 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
2. Core Java: An Integrated Approach, Authored by Dr. R. Nageswara Rao &Kogent Learning Solutions 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
6. Object Oriented Programming Through Java by P. Radha Krishna, Universities Press (2008)

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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
II	C6-P	Java Programming for Data Science 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.

**JAVA PROGRAMMING FOR DATA SCIENCE
MODEL QUESTION PAPER**

Time: 3 Hours

Max. Marks : 75

SECTION-A

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

(5 x 5= 25 Marks)

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 × 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 TWO Short Questions and TWO Essay Questions from Each Unit

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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
III	C7	Probability and Statistics	4	60	4

Course Objective

1. The main objective of this course is to provide students with the foundations of probabilistic and statistical analysis mostly used in varied applications in engineering and science like disease modeling, climate prediction and computer networks etc.

Course Outcomes

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

1. Able to know the concepts of the set theory and operations in sets.
2. Knowledge to conceptualize the probabilities of events including frequent and axiomatic approach. Simultaneously, they will learn the notion of conditional probability.
3. Knowledge related to concept of discrete and continuous random variables and their probability distributions including expectation and moments,
4. Knowledge related to concept of random variable, Probability mass function and probability density function.
5. Knowledge related to concept of Mathematical expectation.

UNIT- I

Set theory for Probability: 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

UNIT - II

Introduction to Probability: Basic concepts of Probability, random experiment, trial, outcome, sample space, event, mutually exclusive event, equally likely events, favorable events, classical, statistical and axiomatic definitions of probability.

UNIT- III

Probability theorems: Conditional probability, Independent events Addition and multiplication theorems of probability for 2 events (Statement and proof), Addition and multiplication theorems of probability for n events statements only, Bayes theorem Statement and its applications.

UNIT-IV

Random variable: Definition of Random variable, discrete and continuous random variables, functions of random variable, probability mass function, probability density function, distribution function and its properties, For a given probability mass function calculation of mean and variance, For a given probability density function calculation of mean and variance.

UNIT-V

Mathematical expectation : Mathematical Expectation of random variable and function of random variable, Moments and covariance using mathematical expectation, with examples. Addition and multiplication theorem on expectation. Definitions of M.G.F, P.G.F,C.F and their properties, and applications

Note:

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

Text Book:

1. Statistical Methods by S.P.Gupta.
2. Fundamentals of Mathematical statistics - S.C. Gupta & V.K.Kapoor.

Reference Books:

1. Sambavyatha - Telugu Academy.
2. Fundamentals of statistics - Goon, Gupta and Das Gupta.

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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
III	C7-P	Probability and Statistics Lab	2	30	1

1. Operation on sets.
2. Distributive Laws-De'Morgan's Laws.
3. Basic concepts of probability.
4. Conditional Probability.
5. Addition and Multiplication theorem problems.
6. Bayes theorem applications.
7. Random variable
8. Mathematical Expectation.

PROBABILITY AND STATISTICS

(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 5 X 5 = 25

- If $A = \{5, 6, 7, 8, 9\}$, $B = \{2, 4, 6, 8, 10\}$, find (i) $A \cup B$ (ii) $A \cap B$ and examine they are equal or not
- If $A = \{3, 4, 5, 6, 7\}$, $B = \{5, 6, 7, 8, 9\}$, find (i) $A - B$ (ii) $B - A$ and examine they are equal or not.
- Define sample space and random experiment.
- Define Equally likely events and Exhaustive events.
- If A and B are events such that $P(A) = \frac{3}{4}$ and $P(B) = \frac{5}{8}$ then show that $\frac{3}{8} \leq P(A \cap B) \leq \frac{5}{8}$
- State Addition theorem for “n” events in probability.
- Define Random variable.
- A random variable X has the following probability function. Find ‘K’ value :

$X = x$	-2	-1	0	1	2	3
$P(X = x)$	0.1	K	0.2	2k	0.3	K

- Define Mathematical Expectation.
- Write Addition and multiplication theorems on mathematical expectations.

SECTION-B

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

- If $\mu = \{1, 3, 5, 7, 9, 11\}$, $A = \{3, 5, 7, 11\}$, $B = \{1, 5, 7, 11\}$ then find
(i) $A \cup \mu$ (ii) $B \cup \mu$ (iii) $A \cap \mu$ (iv) $B \cap \mu$ (v) A^1 (vi) B^1
- If $A = \{1, 2, 3, 5, 8\}$, $B = \{5, 6, 7, 8\}$ $C = \{1, 3, 5, 7\}$ prove that $A \cup (B \cap C) = (A \cup B) \cap C$.
- Define the following (i) trial (ii) sample space (iii) event (iv) out come.
- Write classical, statistical and axiomatic definitions of probability.
- State and prove addition theorem for two events.
- State Bayees theorem and its applications.
- Explain properties of distribution function.
- A random variable X has the following probability function.

$X = x$	0	1	2	3	4	5	6	7
$P(X = x)$	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2 + K$

Find (i) K (ii) Mean (iii) Variance

19.

x :	2	3	6
P(x) :	Y_2	Y_4	Y_4

Find (i) E(x) (ii) V(x).

- Define M.G.F and write its applications.

Instruction to Paper Setter:

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

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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
III	C8	Data Structures	4	60	4

Course Objectives

1. To introduce the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms.

Course Learning Outcomes:

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

1. Understand how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms.
2. Learn the benefits of dynamic and static data structures implementations
3. Design and develop various programs using data structures
4. Demonstrate different methods for traversing trees
5. Develop ability to implement different Sorting and Search methods
6. Understand the concept of recursion and how it can be implemented using a stack .

UNIT – I

INTRODUCTION TO DATA STRUCTURE: Definition, Data Types, Abstract Data Types (ADT), classification of data structure - primitive & non-primitive data structures, Linear and Non-linear data structures

ARRAYS: Definition, one dimensional array, two dimensional arrays, Applications, pointers.

LINKED LIST: Definition, linked list ADT, single linked list, double linked list, circular linked list, comparison of linked list with Arrays.

UNIT – II

STACKS: Definition, Stack as an ADT & Operations on stack, Applications of stack, Representation of stack.

QUEUES: Definition, Queue as an ADT & Operations on Queue, Application of Queues, Representation of Queues, Various Queue Structures: circular Queue, DEQueue.

UNIT – III

TREES: Definition, Basic Tree Terminology. **Binary Tree** – Definition, Properties of Binary Trees, Types of Binary Trees, Representation of Binary Tree, Binary Tree Traversals.

Binary Search Tree (BST) – Definition, Operations on a Binary Search Tree, Examples of BST.

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UNIT - IV

GRAPHS: Definition, Basic Graph Terminology, Representation of Graphs, Graph Traversal – DFS and BFS. Topological sort, Shortest Path problem, Minimum Spanning Tree.

UNIT – V

SORTING: Definition, Sorting methods - Bubble Sort, Selection Sort, Quick Sort, Insertion Sort, Merge Sort.

SEARCHING: Definition, searching methods - Linear or Sequential Search, Binary Search.

Text Books:

1. “Classic Data Structures ”, by DEBASIS SAMANTHA 2nd EDITION, PHI publications , 2009
2. “Data Structures and Algorithms”, by NARASIMHA KARUMANCHI , CAREERMONK Publications , 2017

Reference Books:

1. Data structures by Lipschutz, McGraw Hill Education
2. Fundamentals of Data Structures in C by Sahni Horowitz, University Press
3. Data Structures And Algorithms by Alfred V Aho and John E Hopcroft and Jeffrey D Ullman, Pearson Education
4. “Data Structures through C”, Yashavant Kanetkar, BPB Publications

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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
III	C8-P	Data Structures Lab	2	30	1

1. Program to generate Fibonacci series using recursion
2. Program for implementation of stack using arrays.
3. Program for implementation stack using linked list.
4. Program for implementation queue using array.
5. Program for implementation queue using linked list.
6. Program for implementation of circular queue.
7. Program for bubble sorting
8. Program for quick sorting.
9. Program for insertion quick sorting.
10. Program for merge sorting.
11. Program for linear searching.
12. Program for binary searching.
13. Program for Binary search tree operations.
14. Program to implement Graph traversal using DFS
15. Program to implement Graph traversal using BFS

**DATA STRUCTURES
MODEL QUESTION PAPER**

Time: 3 Hours

Max. Marks : 75

SECTION-A

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

(5 x 5= 25 Marks)

1. Explain about Abstract Data Types.
2. Write about one dimensional arrays
3. What are the applications of stack? Explain
4. Write the differences between stack and queue
5. Write about fully and complete binary Tree
6. Write about tree terminologies
7. What is Graph? Write the representation of adjacency matrix
8. Briefly explain shortest path problem
9. What is sorting? Write an algorithm for Bubble sort
10. What is searching? Explain about sequential search.

SECTION – B

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

(5 × 10 =50 Marks)

11. Write the classification of Data structures with diagram
12. Explain about primitive data structures.
13. What are the operations performed on stacks
14. Write the algorithm for Queue insert and Queue Delete
15. What is Binary tree? Write the Tree traversal techniques in Binary tree.
16. What is Binary search tree? Give an example
17. Write about Minimum Spanning tree?
18. Explain BFS with an example
19. What is insertion sort? Explain the procedure with an Example.
20. Explain about Binary search.

Instruction to Paper Setter:

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

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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
III	C9	Introduction to Big Data & Machine Learning	4	60	4

Course Objective

1. To understand the concepts of big data and also machine learning technologies. This subject makes students to learn the current trends in data management and data analysis.

Course Outcomes

After completing this course, the student will be able to:

1. Learn tips and tricks for Big Data use cases and solutions.
2. Learn to build and maintain reliable, scalable, distributed systems with Apache Hadoop.
3. Able to apply Hadoop ecosystem components.
4. Ability to formulate machine learning techniques to respective problems

UNIT-I

BIG DATA: Introduction, Need of Big Data, Classification of data, Big Data definitions, Big data characteristics (four v's of big data), big data types, big data classification, big data handling techniques, Big data applications (Marketing, Healthcare, Banking)

SCALABILITY AND PARALLEL PROCESSING: Analytics Scalability to big data, massively Parallel processing, cloud computing.

UNIT – II

DESIGNING DATA ARCHITECTURE: Data architecture design, managing data for analysis

DATA STORAGE AND ANALYSIS: Big data storage, big data platform, big data analytics

USE CASES: Pattern for big data deployment, the fraud detection pattern, social media pattern, big data analysis in Facebook and Amazon

UNIT-III

INTRODUCTION OF MACHINE LEARNING: Overview of Machine learning, machine learning types (Supervised, unsupervised, semi supervised), issues in machine learning.

CLASSICAL DATA ANALYSIS: Mean, variance, correlation, Linear Regression

UNIT –IV

CONCEPT LEARNING: Introduction, a concept learning task, learning as search, version Space and candidate elimination algorithm. **DECISION TREE LEARNING:** - introduction, Representation, basic decision tree learning algorithm.

UNIT-V

Hadoop for Big Data: Definition, Features, comparison with RDBMS, Hadoop Ecosystem, HDFS architecture. **R for Machine Learning-** Introduction, features of R, data structure in R, performing data operations, performing data modeling in R. **Python for Machine Learning** – Introduction, features of Python, data structure in python.

Text Books:

1. Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning, Raj Kamal, Preeti Saxena 2019, Mcgraw-Hill Education
2. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge University Press.

References Books:

1. Chris Eaton, Dirk Deroos et al., “Understanding Big Data”, McGraw Hill , 2012.
2. “BIG DATA IN PRACTICE” BY Bernard Marr.published by Wiley,1st Edition,2016
3. Tom Michel, Machine Learning, McGraw Hill, 1997
4. Tom White, “HADOOP” : The definitive Guide”, O Reilly 2012.
5. Boris lublinsky, Kevin t. Smith Alexey Yakubovich, “Professional Hadoop Solutions”. Wiley, ISBN : 9788126551071, 2015.
6. ”python data analytics” by Fabio Nelli , 2015
7. “Big data analytics with R and hadoop” by vignesh prajapati, packt publishing, 2013.

**BACHELOR OF COMPUTER APPLICATIONS WITH BIG DATA & MACHINE
LEARNING Syllabus**

Vikrama Simhapuri University, Nellore with effect from 2020-2021

Semester	Course Code	Course Title	Hours/Week	Hours	Credits
III	C9-P	Introduction to Big Data & Machine Learning Lab	2	30	1

1. Steps to Installation of R Software in windows.
2. Demonstrate the Data Structures in R.
3. Steps to Installation of Python Software in windows.
4. Demonstrate the Data Structures in Python.
5. Steps to Installation of Apache Hadoop in windows.
6. Draw the Diagram for HDFS Architecture.
7. Implement Candidate Elimination Algorithm in Machine learning.
8. Implement Decision Tree classification Algorithm in Machine learning.
9. Write a program in R to find the mean value given from the list of values.
10. Write a program in R to find the variance value given from the list of values.

INTRODUCTION TO BIG DATA & MACHINE LEARNING

MODEL QUESTION PAPER

Time: 3 Hours

Max. Marks : 75

SECTION-A

Answer any FIVE of the following Questions:

(5 x 5= 25 Marks)

1. Define data. Write the classification of data.
2. Explain briefly about cloud computing
3. Briefly write about big data platform
4. Illustrate the social media pattern in big data analysis
5. Write about supervised machine learning
6. Define Correlation. Explain briefly Correlation calculation with an example
7. What is learning? Explain version space
8. Write about representation of decision tree learning
9. What is Hadoop? Give its features
10. Write about data modeling in R

SECTION – B

Answer any FIVE of the following Questions

(5 × 10 =50 Marks)

11. Write about Characteristics of Big Data
12. Explain about parallel processing.
13. Write and explain data architecture design
14. Elaborate pattern for big data deployment
15. Define Machine Learning. Write various issues in machine learning
16. Explain Linear regression analysis
17. Write and explain candidate elimination algorithm
18. Explain decision tree algorithm
19. Write and explain Hadoop ecosystem
20. Explain the features of R language in machine learning

Instruction to Paper Setter:

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

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Vikrama Simhapuri University, Nellore with effect from 2020-2021

Semester	Course Code	Course Title	Hours/Week	Hours	Credits
IV	C10	Data Analytics Methods and Probability Distributions	4	60	4

Course Objectives

1. The main objective of this course is to provide students with the foundations of probabilistic and statistical analysis mostly used in varied applications in engineering and science like disease modeling, climate prediction and computer networks etc.

Course Outcomes

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

1. Ability to distinguish between discrete and continuous distributions.
2. Knowledge related to concept of curve fitting.
3. Knowledge of important discrete and continuous distributions such as Binomial, Poisson, rectangular, normal, distributions.
4. Acumen to apply standard discrete and continuous probability distributions to different situations.
5. Knowledge related to concept of correlations.
6. Knowledge related to concept of regressions.
7. Knowledge of correlation, regression analysis, regression diagnostics.

UNIT – I

Correlation: Introduction, Meaning of Correlation, Types of correlation, probable error, Karl-pearson's coefficient of correlation for individual series only, Spearman's Rank correlation for individual series only.

UNIT –II

Regression: Introduction, definition, difference between correlation and regression, Simple linear regression, properties of regression coefficients, Regression equation x on y, Regression equation y on x, Simple Problems.

UNIT – III

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

UNIT – IV

Curve Fitting : method of least squares, fitting of a straight line only. Linear trend and find trend values by the method of straight line trend.

UNIT –V

Probability Distributions: Binomial, Poisson and Normal Distributions – Definitions, means, variances and applications of these distributions. Simple problems.

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.Iyengar. - S.Chand Publications.
2. Statistical methods - S.P Gupta.

Reference Books:

1. Fundamentals of Mathematical statistics - S.C. Gupta & V.K.Kapoor.

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LEARNING Syllabus
Vikrama Simhapuri University, Nellore with effect from 2020-2021**

Semester	Course Code	Course Title	Hours/Week	Hours	Credits
IV	C10-P	Data Analytics Methods and Probability Distributions Lab	2	30	1

1. Fitting of Binomial by Direct method
2. Fitting of Poisson distribution.
3. Fitting of a Straight Line.
4. Fitting of a Straight Line Trend.
5. Finite Differences.
6. Interpolation.
7. Rank Correlation.
8. Correlation coefficient.
9. Regression lines X on Y.
10. Regression lines Y on X.

**BACHELOR OF COMPUTER APPLICATIONS WITH BIG DATA & MACHINE
LEARNING Syllabus**

Vikrama Simhapuri University, Nellore with effect from 2020-2021

DATA ANALYTICS METHODS AND PROBABILITY DISTRIBUTIONS

(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=25M

1. Explain correlation coefficient of $\sum x^2 = 222, \sum y^2 = 364, \sum xy = 261$

2. The ranks of two subjects A and B are given below. Obtain rank correlation coefficient.

$(3,2), (4,4), (1,1), (2,3), (6,6), (5,5)$

3. Define Regression. Write Regression coefficients.

4. Write properties of regression coefficients.

5. Find the forward difference table to the following

x	35	45	55	65	75
y	200	220	243	270	289

6. Construct backward difference table to the following data and find $\nabla^2 y_2, \nabla^4 y_2$

x	0	1	2	3	4	5	6
y	0	1	16	81	256	625	1296

7. Explain Method of list squares for fitting a straight line.

8. To find Normal Equations for fitting a straight line .

x	1	2	3	4	5
y	14	27	40	55	68

9. Define Binomial distribution. Write down its mean and variance.

10. Importance of Normal distribution.

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SECTION-B

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

11. Calculate coefficient of correlation of the following data

x	10	12	13	16	17	20	25	30	34
y	20	22	26	27	29	33	37	40	42

12. Calculate rank correlation of the following data

x	72	70	46	69	56	65	65	45	35	75
y	111	110	105	112	115	115	101	118	107	120

13. Calculate regression equation of Y on X from the following data

x	40	38	35	42	30
y	30	35	40	36	29

14. In correlation study the following values are obtained :

	X	Y
Mean	65	67
Standard Deviation	2.5	3.5
Coefficient of Correlation: 0.8		

Find the two regression equations that are associated with the above values.

15. Find $f(1.6)$ using Newton's forward Interpolation formula from the following table

x	1	1.4	1.8	2.2
y	3.49	4.82	5.96	6.5

16. Find $f(3.5)$ by Newton's Backward Interpolation formula from the following data

x	0	1	2	3	4
y	3	4	7	8	10

17. Fit a Straight line to the form $y=a+bx$ for the following data :

x	0	5	10	15	20	25
y	12	15	17	22	24	30

18. Fit a straight line trend for the following series. Estimate the value for 2012 :

Year	2001	2002	2003	2004	2005	2006	2007
Production of Steel (M. Tones)	60	72	75	65	80	85	95

19. Define Poisson distribution and write its properties.

20. Write properties of Normal distribution.

Instruction to Paper Setter:

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

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LEARNING Syllabus**

Vikrama Simhapuri University, Nellore with effect from 2020-2021

Semester	Course Code	Course Title	Hours/Week	Hours	Credits
IV	C11	Accounting and Systems Approach to Management	4	60	4

Course Objectives:

1. This paper is designed to impart knowledge regarding concepts of Accounting and financial management. This course is useful for Students to get placements in different offices as well as companies in Accounts departments.

Course Outcomes:

1. Company Setup & Configurations.
2. Recording Financial Transactions.
3. Financial Reports

UNIT - I: Fundamentals of Management

Definition – Nature & scope of Management – Characteristics of Management – Functions of Management – Henry Fayol Principles of Management – Effective Manager

UNIT – II: Introduction to Accounting

Need for Accounting – Definition – Objectives, Advantages – Book keeping and Accounting – Accounting concepts and conventions – Accounting Cycle – Classification of Accounts and its rules – Double Entry Book-keeping – Journalization – Posting to Ledgers, Balancing of ledger Accounts (problems).

UNIT – III: Subsidiary Books:

Types of Subsidiary Books – purchases Book- Purchase returns Book-Sales Book – Sales returns Book – Cash Book – Simple Cash Book – Two Columnar Cash Book – Three-column Cash Book – Petty cash Book (Problems).

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UNIT – IV: Bank Reconciliation Statement:

Need for bank reconciliation - Reasons for difference between Cash Book and Pass Book Balances- Preparation of Bank Reconciliation Statement- Problems on both favorable and unfavorable balances.

UNIT – V: Trial Balance and Final Accounts:

Meaning objectives - Methods of preparation of trial balance –Totals method –Balances Method
Preparation of Final Accounts: Trading account – Profit and Loss account – Balance Sheet – with adjustments- Bad debts- Provision for bad debts (Simple Problems).

Reference Books:

1. T.S.Reddy & A. Murthy, Financial Accounting , Margham Publications
 2. Organization and Management - by R.G. Agarwal TATA Mc Grawhill Pub. Ltd.,
 3. S.P. Jain & K.L Narang, Accountancy-I, Kalyani Publishers
 4. Tulasian, Accountancy -I, Tata McGraw Hill Co.
 5. V.K.Goyal, Financial Accounting, Excel Books
- K. Arunjothi, Fundamentals of Accounting; Maruthi Publications

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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
IV	C11-P	Accounting and Systems Approach to Management Lab	2	30	1

1. Preparation of ledger and cash book
2. Practice and functioning of triple column cash book
3. Creation of journal voucher
4. Creation of payment voucher
5. Preparation of Bank reconciliation statements
6. Create company using accounts
7. Displaying trial balance
8. Displaying financial statements

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**ACCOUNTING & SYSTEMS APPROACH TO MANAGEMENT
MODEL QUESTION PAPER**

Time: 3 Hours

Max. Marks : 75

SECTION-A

Answer any FIVE of the following Questions:

(5 x 5= 25 Marks)

1. Write characteristics of management
2. Explain role of effective manager
3. Write advantages of accounts
4. Differentiate book keeping and accounting
5. From the following particulars prepare Raju's A/c Rs.

1-1-2014 Amount due from Raju	8,000
5-1-2014 Sold goods to Raju	14,000
8-1-2014 Purchased goods from Raju	5,000
14-1-2014 Cash received from Raju	6,000
24-1-2014 Cash paid to Raju	4,000
31-1-2014 Raju's A/c settled by cheque	

6. A trader maintains Petty cash book under imprest system. Record the following Transactions in his Petty Cash Book:

2014		Rs.
Sep. 1	Received for Petty payments	500
2	Postage	40
5	Stationery	25
8	Advertising	50
12	Wages paid	20
16	Carriage	15
20	Conveyance	22
30	Postage	50

7. From the following particulars prepare bank Reconciliation statement as on 30.04.2010
 - a) Bank Balance as per Pass book Rs 12000.
 - b) Cheques deposited but not collected Rs.2000
 - c) Cheques issued but not presented Rs 1500
 - d) Bank Charges appeared in Passbook Rs 200
8. What are the causes for the difference in cash book and pass book balance ?
9. From the following particulars Prepare Trial Balance.

Cash	4000	Plant	30000
Capital	25000	Bank Loan	6000
Stock	5000	Sales	10000
O/S Expenses	1000	Reserve	3000
Drawing	3000	O/S Income	4000
Purchase Returns	1000	Creditors	15000
Purchases	15000		

(PTO)

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10. Prepare trading account from the following items

Purchases	50,000
Sales	2,65,000
Opening Stock	20,000
Carriage	1,500
Bad debts	4,000
Sales Returns	1,000
Closing Stock	62,000

SECTION – B

Answer any **FIVE** of the following Questions

(5 × 10 =50 Marks)

11. Define Management. Explain the functions of management

12. Write about Henry Fayol principles of Management

13. Classify the following into Personal, Real and Nominal Accounts

- (a) Capital (b) Rent recovered (c) Accrued Interest
(d) Discount (e) Bad debts (f) Carriage (g) goodwill
(h) Premises (i) Investments (j) Work-in-Progress.

14. Journalise the following transactions.

- (a) Rao starts business with Rs.10,000 cash and a building worth Rs.50,000
(b) Purchased goods worth Rs.20,000 out of which goods worth Rs.12,000 was on credit from Shyam.
(c) Sold goods on credit worth Rs.16,000 to Ram.
(d) Received Rs.15,600 from Ram in full settlement of his account.
(e) Paid Rs.11,800 to Shyam in full settlement of Rs.12,000 due to him.
(f) Paid wages Rs.500 and salaries Rs.2,000

15. Enter the following transactions in suitable subsidiary books.

	Rs.
Jan.1 Purchased goods from Rekha	7,500
4 Sold goods to Midhum	8,000
5 Returned goods to Rekha	500
6 Sridevi bought goods from us	4,000
8 Received goods returned by Midhun	400
10 Rajesh sold goods to us	4,000
15 Sold goods to Kishore	3,000
16 Returned goods to Rajesh	600
20 Kishore returns goods	500

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16. Enter the following transactions in a three column cash book.

2018	Rs.
January 1 Started business with cash	40,000
2 Opened savings bank account with Vijaya Bank	16,000
5 Bought goods by cheque	350
6 Received cheque from Suhas	400
Allowed him discount	20
8 Sold goods for cash	80
10 Paid into bank – Cash	60
Cheque	400
14 Paid Sateesh by cheque	690
Discount received	10
17 Paid Carriage	300
20 Drew from bank for office	400
31 Paid Salaries by cheque	200

17. From the following particulars prepare Bank Reconciliation Statement.

- (a) Debit balance as per cash book is Rs. 10,000.
- (b) Cheques issued but not presented for payments Rs. 1,500.
- (c) Cheques paid into bank but not credited Rs. 1,000.
- (d) Interest credited in pass book only Rs. 100.
- (e) Cheques received, entered in cash book but omitted to send to bank Rs. 500.
- (f) Bills collected and credited in pass book only Rs. 2,000.

18. From the following transactions prepare bank reconciliation statement of Prabhas as on 30.04.2018

- a) Overdraft balance as per pass book Rs. 20,000
- b) On 24th . April Cheques worth Rs. 8000 were issued of which cheques worth Rs 5000 were presented for payment.
- c) On 29th April Cheques worth Rs. 10000 were Deposited with the bank of which cheques worth Rs 8000 were only collected.
- d) Interest on Investments Rs. 2000 was collected by bank which was appeared in Passbook
- e) Bank Charges Rs 200 and interest on overdraft Rs 150 were debited in pass book.

19. The following trial balance was prepared by a clerk appointed newly by Rao & Company. Some errors were found in the Trial Balance due to lack of experience in preparing accounts. Prepare Trial Balance by rectifying these mistakes.

S.No	Particulars	Debit Rs.	Credit Rs.
	Opening Stock	5,000	
	Capital		60,000
	Discount allowed		500
	Discount received		700
	Fixed Assets		60,000
	Sales	85,000	
	Purchases		45,000

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Purchase returns		1,000
Sales returns	2,000	
Carriage inwards		600
Carriage outwards		700
Wages, Salaries	25,000	
Bills receivable	7,000	
Debtors	9,000	
Bills Payable		7,000
Rent	3,000	
Interest Paid		2,000
Cash	800	
Creditors	6,900	
Closing Stock	33,800	
	<u>1,77,500</u>	<u>1,77,500</u>

20. The following are the figures extracted from the Books of Krishna Murthy on 31-12-2018 ; Prepare Final Accounts :

	Debit Rs.	Credit Rs.
Capital		50,000
Plant & Machinery	20,000	
Furniture	11,500	
Sundry Debtors & Creditors	15,000	20,000
Bills Receivable & Payable	10,000	5,000
Opening Stock	20,000	
Purchases & Sales	60,000	90,000
Depreciation	1,200	
Outstanding Salaries		800
Salaries	10,000	
Wages	22,000	
Insurance	1,000	
Prepaid Insurance	100	
Carriage	400	
10% Loan		<u>5,400</u>
Total	<u>1,71,200</u>	<u>1,71,200</u>

Adjustments : (a) Write off Rs. 1,000 as Bad Debts and provide 5% on debtors for bad debts.
(b) Closing Stock was valued at Rs. 40,000.
(c) Allow 10% Interest on Capital.

Instruction to Paper Setter:

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

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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
IV	C12	Machine Learning using Python	4	60	4

Course Objectives:

1. To implement machine learning problems corresponding to different applications using Python programming language. To understand the basic theory underlying machine learning. Understanding and being able to use basic programming concepts

Course Learning Outcomes:

After completing this course, the student will be able to

1. Learn Python language with programming skills for machine learning
2. Student should be able to understand the basic concepts such as decision trees and neural networks.
3. Ability to formulate machine learning techniques to respective problems.
4. Apply machine learning algorithms to solve problems of moderate complexity.
5. be able to use and program in the Python programming language

UNIT – I

INTRODUCTION: Overview of Machine learning, machine learning types, well posed learning algorithms and issues in machine learning. Classical Data Analysis: Mean, variance, Linear Regression. Concept Learning: Introduction, a concept learning task and learning as search, version space and candidate elimination algorithm

UNIT- II

Introduction to Python: Features of Python Language, installing Python, Environment Setup, python syntax, running a python script

Python basics: Data types, variables, operators, expressions, comment statements

Standard I/O Operations, python casting

UNIT – III

Control statements- Conditional branching: if, if-else, nested if, if-elif-else statements, Iterative statements: while loop, for loop, nested loops, pass statement, continue statement, break statement, and else statement used with loops, Programming using Python conditional and loops block

Functions: Introduction, function definition, creating a function, Function Calling, declaration and defining functions, variable scope and lifetime, built-in functions

UNIT – IV

Sequences: Lists, Tuples, Sets, and Dictionaries

Strings and Regular expressions: Introduction to strings, String operations, Built-in string methods and functions, comparing strings, Functions in regular expression.

UNIT-V

Object Oriented Programming: Classes and Objects, Class method and self argument, The `__Init__` Method, Class Variables and Object Variables, The `__Del__` Method, Public and Private Data Members Private Methods, Built-In Functions to Check, Get, Set and Delete Class Attributes, Garbage Collection (Destroying Objects)

Inheritance and polymorphism: Inheriting Classes in Python, Polymorphism and Method Overriding, Types of Inheritance, Composition/ Containership, Abstract Classes and Interfaces,

Text Books:

1. Tom Michel, Machine Learning, McGraw Hill, 1997.
2. Python Programming using problem solving approach, Reema Thareja, First Edition, Oxford higher Education.

Reference Books:

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge University Press.
2. Kenneth A. Lambert, Fundamentals of Python
3. James Payne, Beginning Python using Python 2.6 and Python 3
4. Charles Dierach, Introduction to Computer Science using Python

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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
IV	C12-P	Machine Learning using Python Lab	2	30	1

1. Write a program to perform different sum of 5 numbers in Python
2. Write a program to find mean of numbers
3. Write a Python script to find mode of n values
4. Write Python program to calculate variance
5. Write a python script to find linear regression
6. Write Python script to read a string and find length of string
7. Write a program to create, append, and remove lists in python.
8. Write a program to demonstrate working with tuples in python.
9. Write a program to demonstrate working with dictionaries in python.
10. Write a python program to find largest of three numbers.
11. Write a Python script that print prime numbers
12. Write a python program to find factorial of a number using Recursion.
13. Write a Python program to implement candidate elimination algorithm
14. Write a Python class to implement pow(x, n)
15. Write a Python class to reverse a string word by word.

**BACHELOR OF COMPUTER APPLICATIONS WITH BIG DATA & MACHINE
LEARNING Syllabus**

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**MACHINE LEARNING USING PYTHON
MODEL QUESTION PAPER**

Time: 3 Hours

Max. Marks : 75

SECTION-A

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

(5 x 5= 25 Marks)

1. What is Machine Learning? Write its importance
2. Explain issues in machine learning
3. Write the features of Python language.
4. Explain briefly about comment statements
5. Illustrate pass statement with an example
6. Write about declaring a function in Python
7. Define dictionary. Explain briefly about creating a dictionary in Python
8. What is a regular expression? Explain
9. Briefly explain about destroying objects in Python
10. What is Polymorphism? Explain briefly with an example

SECTION – B

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

(5 × 10 =50 Marks)

11. Write and explain candidate elimination algorithm
12. Explain Linear Regression with an example
13. Write about various data types used in Python
14. Explain different operators used in Python.
15. Write the conditional statements with an example
16. Define function. Explain the scope and lifetime of variables
17. What is a list? Explain how to create and manage lists in Python
18. Write about string operations in Python with examples
19. Explain OOP concepts in Python
20. What is Inheritance? Explain various types of Inheritance

Instruction to Paper Setter:

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

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Semester	Course Code	Course Title	Hours/Week	Hours	Credits
IV	C13	Web Technology Fundamentals	4	60	4

Course Overview

1. This course introduces World Wide Web as a fundamental information and application platform for today's information systems. This Subject is useful for making own Web page and how to host own web site on Internet. Students will examine core aspects of web technologies and web applications, and will develop usable websites.

Course objectives/learning outcomes

1. Learn about Internet and its environment in making web sites
2. Understand different components and technologies of World Wide Web as a platform.
3. Design and develop web pages using various tags
4. Distinguish between server-side and client-side web technologies.
5. Describe various web technology and application development issues and trends.
6. Conduct independent research on a subject related to the course material.

UNIT - I

Introduction to Internet: Definition of Internet – History of Internet – Advantages & disadvantages of Internet – Tools of internet - How internet works. **Introduction to WWW:** Definition of WWW – WWW tools - Web Terminology – web browser – web server

E-Mail : Definition of e-mail – advantages & disadvantages of e-mail, message components

UNIT- II

Introduction to HTML: Basic HTML – HTML document structure – HTML tags – Basefont tag – title tag – body tag – Horizontal Rule Tag - Text formatting tags – Character tags - Character entities

HTML Lists : Ordered List , Unordered List & Definition List – Using colors – Using Images

Hyperlinks: Textual links, Graphical links, types of document links, anchor tag

UNIT - III

HTML Tables – table creations tags, Nested Tables

Frames: Frame introduction - frame creation tags – Nested Frames – **Forms:** Form Controls : textbox, button, password, checkbox, radio button, select, text area - Processing of forms

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UNIT – IV

Introduction to Scripting: JavaScript Introduction - Simple Program - Obtaining User Inputs with Prompt Dialogs - variables – operators (arithmetic, relational, logical, increment and decrement).
JavaScript – Control Statements: Introduction – conditional control statements (if, if...else, switch) – Repetitive statements (for, while, do...while) - break and continue Statements

UNIT – V

JavaScript Functions: Introduction - Program Modules in JavaScript - Programmer-Defined Functions - Function Definitions - Scope Rules - JavaScript Global Functions

Advanced HTML : Cascading Style Sheets (CSS): Introduction – Using Styles: As an attribute, tag & external file – Defining Your own styles – **Properties and values** : properties related to Fonts, Backgrounds & colors, text , boxes & borders

Prescribed Books:

1. Chris Bates, Web Programming Building Internet Applications, Second Edition, Wiley.
2. Deitel & Deitel, Goldberg “Internet and world wide web – How to program”, Pearson Educations Asia

Reference Books:

1. Paul S.WangSanda S. Katila, An Introduction to Web Design Plus Programming, Thomson.
2. Robert W.Sebesta, Programming the World Wide Web, Third Edition, Pearson Education.
3. Joel Sklar, Principles of Web Design, Thomson.
4. Raj Kamal, Internet and Web Technologies, Tata McGraw Hill.
5. Gopalan & Akilandeswari, Web Technology: A Developer’s Perspective, PHI.

**BACHELOR OF COMPUTER APPLICATIONS WITH BIG DATA & MACHINE
LEARNING Syllabus**

Vikrama Simhapuri University, Nellore with effect from 2020-2021

Semester	Course Code	Course Title	Hours/Week	Hours	Credits
IV	C13-P	Web Technology Fundamentals Lab	2	30	1

1. Create a simple HTML page which demonstrates all types of lists.
2. Create a letter head of your college using following styles
 - i. image as background
 - ii. use header tags to format college name and address
3. Create a web page, which contains hyperlinks like fruits, flowers, animals. When you click on hyperlinks, it must take you to related web page; these web pages must contain with related images.
4. Create a hyperlink to move around within a single page rather than to load another page.
5. Create a leave letter using different text formatting tags.
6. Create a table format given bellow using row span and colspan.

RNO	NAME	MARKS				
		M1	M2	M3	M4	M5

Insert 5 records.

7. Create a table with different formats as given bellow.
 - i. Give different background and font colors to table header, footer and body.
 - ii. Use table caption tag.
8. Divide a web page vertically and horizontally with scroll bars, name them as shown below decorate it with some items.

F1	F2
	F3

9. Create a student Bio-Data, using forms.
10. Create a web page using following style sheets
 - i. Inline style sheets.
 - ii. Embedded style sheets.
 - iii. External style sheets
11. Create a web page by using html & CSS

**WEB TECHNOLOGY FUNDAMENTALS
MODEL QUESTION PAPER**

Time: 3 Hours

Max. Marks : 75

SECTION-A

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

(5 x 5= 25 Marks)

1. What is a web server? Explain
2. Write short notes on the working of Internet.
3. Write about HTML document structure.
4. Explain ordered lists in HTML
5. Write a short notes on table tag in HTML
6. Write differences between table and frame
7. Write about variables in Java script
8. Explain switch statement in Java Script
9. Define function in Java script with an example
10. Define CSS. Explain with an example

SECTION – B

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

(5 × 10 =50 Marks)

11. Define Internet. Write the tools of Internet
12. Write advantages and disadvantages of e-mail.
13. Explain Text Formatting tags in HTML
14. What is a Hyperlink? Discuss different types of hyperlinks in HTML
15. Write a short notes on Form controls
16. Explain how do you create frames using HTML
17. Briefly explain various operators used in Java Script
18. Write about repetitive control statements in Java Script
19. What are the various scope rules? Explain
20. Write about properties used in cascading style sheets

Instruction to Paper Setter:

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

**BACHELOR OF COMPUTER APPLICATIONS WITH BIG DATA & MACHINE
LEARNING Syllabus**

Vikrama Simhapuri University, Nellore with effect from 2020-2021

Semester	Course Code	Course Title	Hours/Week	Hours	Credits
IV	C14	Computer Networks	4	60	4

Course Objectives:

1. To provide an introduction to the fundamental concepts on data communication and the design of computer networks.
2. To get familiarized with the basic protocols of computer networks.

Course Outcomes:

After this course, the student will be able to

1. Identify the different components in a Communication System and their respective roles.
2. Describe the technical issues related to the local Area Networks
3. Identify the common technologies available in establishing LAN infrastructure.

UNIT- I:

Introduction to Network:- Definition, Applications, line configuration, Network topologies, Transmission mode, Types of Networks (LAN, WAN, MAN), Protocols, Network models: The OSI model, TCP/IP Protocol Suite.

Physical Layer: Signals –Analog signals, Digital signals, Transmission media - Guided & Un-Guided.

UNIT- II:

Network LAN Technologies: Ethernet, Fast Ethernet, Gigabit Ethernet, and Wireless LAN's.

Data Link Layer: Error Detection and correction - Types of Errors, Error Detection, Error correction. Data link Protocols – Stop-and-wait ARQ, Go-back-n ARQ, Automatic Repeat Request (ARQ).

UNIT- III:

Network Devices: Modem, Hub, Switch, Router, Repeaters, bridges, Gateway.

Network Layer: Internetwork Protocol (IP), Addressing (Classes, Dotted-decimal notation, Sample Internet), Subnet mask, Network layer Protocols – ARP, IPv4, and IPv6.

**BACHELOR OF COMPUTER APPLICATIONS WITH BIG DATA & MACHINE
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UNIT- IV:

Transport Layer: TCP protocol, UDP protocol, Process-to-Process delivery, Congestion: Congestion control, congestion avoidance, congestion discarding, Quality of Service (QOS).

UNIT- V:

Application Layer: Domain Name System (DNS) - domain name space, distribution of name space, DNS in the Internet, SMTP, SNMP, FTP, POP3, HTTP, WWW.

Text Books:

1. Data Communication and Computer Networks by Behrouz A. Forozoun, Published by Thomas casson, MC GRAW HILL 2nd edition.

References Books:

1. Andrew S. Tanenbaum, "Computer Networks", Fourth Edition, 2003
2. An introduction to computer network by PETER L DORODAL.
3. Communication networks by JEAN WAIRAND –WCB/MCGRAW HILL -1998, 2nd Edition.
4. Computer Networks by Bhushan Trivedi, Oxford University Press
5. Nader F. Mir, "Computer and Communication Networks", Pearson Education, 2007

**BACHELOR OF COMPUTER APPLICATIONS WITH BIG DATA & MACHINE
LEARNING Syllabus**

Vikrama Simhapuri University, Nellore with effect from 2020-2021

Semester	Course Code	Course Title	Hours/Week	Hours	Credits
IV	C14	Computer Networks Lab	2	30	1

1. Write a program for print the IP Address of a WWW.YAHOO.COM
2. Write a program for to print the IP Address of the local machine and hostname.
3. Write HTML program to implement get() and post() methods
4. Write a program for to identify the well known ports on a Remote system.
5. Write a program for to print the parts of URL.
6. Write a program for to send & receive data from datagram packet.
7. Write a program for a chat application.
8. Write a program for the simple file transfer between two systems by opening socket connection to out server on one system and sending a file from one system to another.
9. Write a program for the HTTP server.

COMPUTER NETWORKS - MODEL QUESTION PAPER

Time: 3 Hours

Max. Marks : 75

SECTION-A

Answer any FIVE of the following Questions:

(5 x 5= 25 Marks)

1. Write various transmission modes in network
2. Write difference between Analog and Digital signals
3. Write about wireless network
4. Briefly explain Data link protocols
5. Write about modem and router
6. Explain about Internet Protocol
7. What is QOS? Explain
8. Briefly explain TCP protocol
9. Write and explain domain name space
10. What is WWW? Explain

SECTION - B

Answer any FIVE of the following Questions

(5 × 10 =50 Marks)

11. What is network? Explain various types of networks
12. Explain about OSI model
13. Explain about Ethernet technologies
14. Write about error detection and correction
15. Explain various network devices involved in a computer network
16. What is Protocol? Illustrate different network layer protocols.
17. Explain uses of Transport layer in the computer network
18. What is congestion? Explain
19. Write about Domain Name System
20. Explain about the working of Application Layer

Instruction to Paper Setter:

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

**BACHELOR OF COMPUTER APPLICATIONS WITH BIG DATA & MACHINE
LEARNING Syllabus**

Vikrama Simhapuri University, Nellore with effect from 2020-2021

Semester	Course Code	Course Title	Hours/Week	Hours	Credits
IV	C15	Big Data using Hadoop	4	60	4

Course Objective

1. This course provides practical foundation level training that enables immediate and effective participation in big data projects.
2. The course provides grounding in basic and advanced methods to big data technology and tools, including map Reduce and Hadoop and its ecosystem.

Course Learning Outcomes:

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

1. Learn tips and tricks for Big Data use cases and solutions.
2. Learn to build and maintain reliable, scalable, distributed systems with Apache Hadoop.
3. Able to apply Hadoop ecosystem components.

UNIT - I

DATA: Definition, characteristics of data, classification of digital data.

BIG DATA: Definition, Evolution of big data and its importance, four V's in big data, Drivers for Big data, Big data analytics, Big data applications, designing data architecture

UNIT – II

Introduction to HADOOP: Definition, meeting the big data challenge, Apache Hadoop & Hadoop Ecosystem, Hadoop core components, Hadoop Distributions, developing enterprise application with Hadoop, Storage and analysis in Hadoop, comparison with RDBMS,

Hadoop features: Understanding HDFS, understanding Map Reduce, understanding different Hadoop modes, Hadoop installation.

UNIT - III

HDFS: HDFS architecture: Definition, understanding the HDFS components, Blocks, Name Nodes, Data Nodes, HDFS files, HDFS federation, HDFS high availability, Basic file system operations, Reading data from a Hadoop URL, Reading data using the file system API, Writing and Deleting data

**BACHELOR OF COMPUTER APPLICATIONS WITH BIG DATA & MACHINE
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UNIT – IV

MAPREDUCE: Map Reduce architecture: definition, Mappers and Reducer, Understanding MapReduce components – Job Tracker and Task Tracker. Map Reduce Terminology, listing Hadoop MapReduce entities, Limitation of MapReduce, different java concepts used in Hadoop programming.

UNIT-V

Hadoop Map Reduce Scenario: Loading data into HDFS, Executing the Map phase, Shuffling and sorting, Reducing phase execution. Map reduce objects, Number of maps in Map Reduce, number of reduces in Map Reduce, Map Reduce dataflow, steps to run a Map Reduce job, exploring HDFS data .

Text Books:

1. Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning, Raj Kamal, Preeti Saxena 2019, Mcgraw-Hill Education
2. Boris Lublinsky, Kevin T. Smith Alexey Yakubovich, “Professional Hadoop Solutions”. Wiley, ISBN : 9788126551071,2015.
3. Big data analytics with R and Hadoop BY Vignesh Prajapati, Packt Publishing.
4. Tom White, “HADOOP” : The Definitive Guide”, O Reilly 2012.

Reference Books:

1. Big Data Analytics, Seemaacharya, Subhasinichellappan, Wiley 2015.
2. Chris Eaton, Dirk DeroosEt Al., “Understanding Big Data”, McgrawHill, 2012.

**BACHELOR OF COMPUTER APPLICATIONS WITH BIG DATA & MACHINE
LEARNING Syllabus
Vikrama Simhapuri University, Nellore with effect from 2020-2021**

Semester	Course Code	Course Title	Hours/Week	Hours	Credits
IV	C15-P	Big Data using Hadoop	2	30	1

1. Implement various commands in Hadoop environment
2. Implement the Linked List Data Structures
3. Implement the Stack Data Structures
4. Implement the Queue Data Structures
5. Implement the Set Data Structures
6. Implement word count program with Hadoop Map Reduce.
7. Implement Matrix Multiplication program with Hadoop MapReduce.
8. Implement the adding data into files in Hadoop
9. Implement the adding directories in Hadoop
10. Implement the retrieving data from files in Hadoop
11. Implement the deleting data in files in Hadoop
12. Implement the modifying data in files in Hadoop

**BACHELOR OF COMPUTER APPLICATIONS WITH BIG DATA & MACHINE
LEARNING Syllabus
Vikrama Simhapuri University, Nellore with effect from 2020-2021**

**BIG DATA USING HADOOP
MODEL QUESTION PAPER**

Time: 3 Hours

Max. Marks : 75

SECTION-A

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

(5 x 5= 25 Marks)

1. Explain about characteristics of data.
2. Elaborate the importance of big data
3. Contrast the Hadoop with RDBMS
4. Briefly explain Map Reduce
5. Write about files used in HDFS
6. Explain briefly about reading data from Hadoop
7. What is Map Reduce? Write limitations of Map Reduce
8. Briefly explain Trackers in Map Reduce
9. Write and explain Map Reduce dataflow
10. What is shuffling and sorting?

SECTION – B

Answer any FIVE of the following Questions

(5 × 10 =50 Marks)

11. Elaborate the four V's in big data
12. Explain about Big data applications.
13. Explain Hadoop ecosystem components
14. Write the various features of Hadoop
15. Define HDFS and explain its architecture.
16. Explain basic file system operations with an example
17. Illustrate the Map Reduce Architecture
18. Explain different terms used in Map Reduce
19. Explain how will you load data into HDFS
20. Explain about maps in Map Reduce

Instruction to Paper Setter:

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

MODEL QUESTION PAPER

Time: 3 Hours

Max. Marks : 75

SECTION-A

Answer any FIVE of the following Questions:

(5 x 5= 25 Marks)

- | | | |
|-----|---|---------------|
| 1. | } | UNIT-1 |
| 2. | | |
| 3. | } | UNIT-2 |
| 4. | | |
| 5. | } | UNIT-3 |
| 6. | | |
| 7. | } | UNIT-4 |
| 8. | | |
| 9. | } | UNIT-5 |
| 10. | | |

SECTION - B

Answer any FIVE of the following Questions

(5 × 10 =50 Marks)

- | | | |
|-----|---|---------------|
| 11. | } | UNIT-1 |
| 12. | | |
| 13. | } | UNIT-2 |
| 14. | | |
| 15. | } | UNIT-3 |
| 16. | | |
| 17. | } | UNIT-4 |
| 18. | | |
| 19. | } | UNIT-5 |
| 20. | | |