BCA(DS)
SEMESTER
IV

The scheme and syllabus approved in 8th BOS (UG) held on 21.11.2024 Item No. 3.

BCA(DS) Scheme of Studies

Semester– IV

Sr. No	Category	Course code	Course Title	Course Requirements (hrs)			Sessional Marks/End Term Marks		Total Marks	Credits
				L	P	Total	Sessional	End Term		
1	Discipline Specific-Major	BCA-23-202	Database Management System	3	-	3	25	75	100	3
2	Discipline Specific-Major	BCA-DS-23- 204	Probability and Statistics	3		3	25	75	100	3
3	Discipline Specific-Major	BCA-DS-23- 206	Data Science Using R	3	-	3	25	75	100	3
4.	Discipline Specific-Major	BCA-23-208	Logical Organization of Computer	4		4	25	75	100	4
5	Discipline Specific-Minor	BCA-23-210	Wireless Communications	4	-	4	25	75	100	4
6	Ability Enhancement Courses	AEC-108-N1	Critical Thinking and Rhetorical Communication	2	-	2	25	75	100	2
7	Value Added Course	VAC-108-N1	Indian Knowledge System	2	-	2	25	75	100	2
8	Discipline Specific Lab	BCA-23-212	Database Management System Lab	-	4	4	15	35	50	2
9	Discipline Specific Lab	BCA-DS-23- 208	Data Science using R Lab	-	4	4	15	35	50	2
10	Discipline Specific Lab	BCA-DS-23- 210	Probability & Statistics Lab	-	4	4	15	35	50	2
			Total			**33**	**220**	**630**	**850**	**27**

BCA-23-202
Database Management System
BCA-IV Semester

No. of Credits: 3

L	T	P	Total
3	0	0	3

Sessional: 25 Marks
Theory: 75 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

Note: The examiner will be required to set seven questions in all having two parts. Part I will have Question Number 1 consisting of a total of 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be six questions. The examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to the compulsory question, A student will have to attempt four more questions from Part II.

Course Objectives:

1 To understand basic terminology used in database systems, basic concepts, the applications of database systems and understand role of Database administrator in DBMS.
2 The critically evaluate the various data model like Hierarchical model, Network Model, Relational model, E-R model and will be able to make E-R diagram from data given by user and table from E-R diagram.
3 The students will become familiar with relational database theory and be able to write relational algebra expressions for query and will be able to understand the logical design guidelines for databases, normalization approach, primary key, super key, foreign key concepts.
4 To design the basic issues of transaction processing, query optimization and Concurrency, security, and control.

Syllabus:

Unit I: Basic Concepts of DBMS and Database System Architecture

Introduction to Database, Purpose of Database Systems,Characteristics of Database Approach, advantages, and disadvantages of database system. Data, Information, Records, and files. Database Administrator, Database Designers, DBMS users, DBMS Functions and Components, Databases versus information retrieval. Data models, scheme, instances, Categories of Data Models, Three-Schema Architecture, Data Independence, Component modules of a DBMS and their interactions. Centralized DBMSs Architecture, Two-Tier Client/Server Architectures for DBMS, Three-Tier and n-Tier Architectures for Web Applications, DBMS Languages, Classification of DBMS.

Unit II:**Entity-Relationship Model**

Relational Data Model - Brief History, Relational Model Terminology, Relational Data Structure, Database Relations, Properties of Relations, Keys, Domains, Integrity Constraints

over Relations Relational Model Constraints, Relational Database Schemes, Entity Types, Entity Sets, Attributes Relationship Types, Relationship Instances and ER Diagrams, abstraction and integration.
Basic Concepts of Hierarchical and Network Data Model

Unit III: Relational Algebra and Relational Calculus

Unary Relational Operations: Select and Project, Sequence of Operations, rename Operation, Relational algebra from set theory, Cartesian product, Binary relational operations, additional relational operations such as Generalized Projection, Aggregate Functions and Grouping etc. Tuple relation calculus, Domain relation calculus.

Unit Iv: Relational Database Design:

Functional dependencies, Modification anomalies, Ist to 3rd NFs, BCNF, 4th and 5th NFs, computing closures of set FDs, SQL: Data types, Basic Queries in SQL, Insert, Delete and Update Statements, Views, Query processing: General strategies of query processing, query optimization, query processor, concept of security, concurrency and recovery, introduction to distributed DBMS.

Course Outcomes:

A student will be able to:

CO1: Understand basic terminology used in database systems, basic concepts, and the applications of database systems and understand the role of Database administrator in DBMS. The students will also be able to understand various data models like the Hierarchical model, Network Model, Relational model, E- R model and will be able to make E-R diagrams from data given by the user and table from the E-R diagram

CO2: Work with relational database theory and be able to write relational algebra expressions for queries.

CO3: Demonstrate the logical design guidelines for databases, normalization approach, primary key, super key, and foreign key concepts.

CO4: Understand the issues of transaction processing, query optimization and Concurrency, security and control.

Text/ Reference Books:

1 Elmasri&Navathe, “Fundamentals of Database Systems”, 5th edition, Pearson Education.

2 Thomas Connolly Carolyn Begg, “Database Systems”, 3/e, Pearson Education

3 C. J. Date, “An Introduction to Database Systems”, 8th edition, Addison Wesley N. Delhi.

CA-DS-23-204
Probability and Statistics
BCA-IV Semester

No. of Credits: 3

L	T	P	Total
3	0	0	3

Sessional: 25 Marks
Theory: 75 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

Note: The examiner will be required to set seven questions in all having two parts. Part I will have Question Number 1 consisting of a total of 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be six questions. The examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to the compulsory question, A student will have to attempt four more questions from Part II.

Course Objectives:

1 To Apply probability theory to set up tree diagrams
2 To Describe the properties of discrete and continuous distribution functions and use method of moments and moment generating functions
3 To Assess the consistency, efficiency and unbiasedness of estimators and apply method of maximum likelihood estimation
4 To Apply the Central Limit Theorem and use statistical tests in testing hypotheses on data

Syllabus:

Unit I: Random Variables and Distribution Functions
Introduction to Probability,Probability Rules: sum and product of probability, joint probabilityDiscrete and continuous random variables - distribution function and its properties - probability mass function and probability density function - discrete and continuous probability distributions - Binomial, Geometric, Poisson, Uniform, Exponential and Normal distributions.

Unit II: Moments and Moment Generating Functions and Variables
Expectation of a random variable – probability generating function – properties - moment generating function.Two dimensional random variables: Joint marginal and conditional distribution functions - independence of random variables.

Unit III: Descriptive Statistics

Types of data - primary and secondary data, classification and representation of data, formation of frequency distribution, various measures of central tendency such as mean, mode, median, standard deviation, covariance, concept of skewness and kurtosis.

Unit IV: Correlation and Curve Fitting

Correlation and regression analysis - rank correlation - curve fitting by least square methods, fitting a straight line, parabola, power curve and exponential curves (no derivation, numerical problems only).

Course Outcomes:

A student will be able to:

CO1: Appreciate the importance of probability and statistics in computing and research.

CO2: Develop skills in presenting quantitative data using appropriate diagrams, tabulations and summaries.

CO3: Use appropriate statistical methods in the analysis of simple datasets.

CO4: Interpret and clearly present output from statistical analyses in a clear concise and understandable manner.

Text/ Reference Books:

1 Richard Arnold Johnson, Irwin Miller, John E. Freund , Miller & Freund's Probability and Statistics for Engineers, Prentice Hall, 2011.

2 Dr. P. Kandaswamy, Dr. K. Thilagavathy and Dr. K. Gunavathy, Probability and Queuing Theory, Revised edition, S. Chand Publishing, 2013.

3 T. Veerarajan, Probability, Statistics and Random Processes, Tata McGraw Hill, 2nd edition.

4 Goon, A.M., M. K. Gupta and B. Das Gupta Fundamentals of Statistics- Vol. I, World Press Ltd, Kolkata, 2002.

5 Gupta, S.C. and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi, 2002.

6 Hogg, R.V. and A. Craig, Introduction to Mathematical Statistics, McMillan Publishing co., Inc. 1978.

7 Mood A.M., F.A. Graybill and D.C. Boes, Introduction to Theory of Statistics McGraw Hill Book Co., 1974.

BCA-DS-23-206
Data Science Using R
BCA-IV Semester

No. of Credits: 3

L	T	P	Total
3	0	0	3

Sessional:	25 Marks
Theory:	75 Marks
Total:	100 Marks
Duration of Exam:	3 Hours

Note: The examiner will be required to set seven questions in all having two parts. Part I will have Question Number 1 consisting of a total of 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be six questions. The examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to the compulsory question, A student will have to attempt four more questions from Part II.

Course Objectives:

1 Tounderstandhowthenatureofthedatacollection,thedataitself,andtheanalysisprocesses relatetothekindsofinferencesthatcanbedrawn.
2 To design Framework for applying R to their own domain-specific problems and understand the concepts of objects and assignment Understand the concepts of vector and data type.
3 To Introduce the resources for continuing to develop their R skill set.
4 To Analyze the ability to perform basic data transformation, analysis, and visualization with R.

Syllabus:

Unit I: Introduction to Data Science
Data science: definition of data, data types, meaning of variables, wholeness of data analytics, data processing chain, data distributions, Paths to data science, data mining, data warehousing, difference between database and data warehouse, advices for new data scientists, introduction to cloud, artificial intelligence, Machine learning, applications in real world, learning approaches: supervised, unsupervised.

Unit II: Introduction to R
What is R, History of R, Installing R, Package installation, choosing IDE, first program, help in R, Some information about R commands, special values, Objects, Functions, Simple Manipulations: Vectors and numbers, Matrices and arrays, Factors, List, data Frames

Unit III: Programming using R

Function Creation, scripts, Logical operators, Conditional Statements, Loops in R, switch Statement. List and Data Frames: Creating a list, Common List operations, Recursive list, creating a datagram, common data frame operations, using lapply () and sapply () functions. Object oriented programming with R, S3 Classes, S4 Classes, Reference Classes

Unit IV: Data handling Mathematical and statistical Concept using R

Saving and loading R data, import and export to CSV files, import and export via ODBC, Debugging Techniques in R, Statistical Graphics: Base Graphics, ggplot2, Maximum, Minimum, Frequency distribution, Measures of central tendency, Hypothesis testing, Correlation, Different statistical distribution.

Course Outcomes:

A student will be able to:

CO1: Learn how to explore new data sets.

CO2: Understand basic concepts such as data type and index and use them in their work.

CO3: Demonstrate use of basic functions, Conceptualize, and create loops to solve different types of problems.

CO4: Create their own customized functions, Construct tables and figures for descriptive statistics.

Text/ Reference Books:

1 SandeepRakshit, R for Beginners, McGraw-Hill Education

2 Hadley Wickham,GarrettGrolemund , Hands-On Programming with R: Write Your Own Functions and Simulations.

3 Tilman M. Davies, The Book of R:A first course in Programming and Statistics.

4 Jared P. Lander, R for Everyone: Advanced Analytics and Graphics, Pearson

5 Christian Heumann, Michael Schomaker and Shalabh, Introduction to Statistics and Data Analysis - With Exercises, Solutions and Applications in R , Springer, 2016

6 By Alain F. Zuur, Elena N. Ieno, Erik H.W.G. Meesters, A Beginner's Guide to R (Use R) Springer 2009

BCA-23-208
Logical Organisation of Computer
BCA-IV Semester

No. of Credits:	4				
L	T	P	Total	Sessional:	25 Marks
4	0	0	4	Theory:	75 Marks
				Total:	100 Marks
				Duration of Exam:	3 Hours

Note: The examiner will be required to set seven questions in all having two parts. Part I will have Question Number 1 consisting of a total of 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be six questions. The examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to the compulsory question, A student will have to attempt four more questions from Part II.

Course Objectives:

1 To develop an understanding of components of computer,how Computer Systems work and the basic principles
2. To make students understand the concept of microprocessor architecture and peripherals and I/O interfacing.
3. To learn the concepts of parallel processors and pipelining techniques.
4. To Study the concept of memory organization and its techniques.

UNIT-I Functional blocks of a computer:

CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU – registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Case study – instruction sets of some common CPUs.

Data representation: signed number representation, fixed and floating point representations, character representation. Computer arithmetic – integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication – shift-and add, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic.

UNIT-II Introduction to x86 architecture:
CPU control unit design: hardwired and micro-programmed design approaches, Case study – design of a simple hypothetical CPU.
Memory system design: semiconductor memory technologies, memory organization.
Peripheral devices and their characteristics: Input-output subsystems, I/O device interface, I/O transfers – program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes – role of interrupts in process state transitions, I/O device interfaces – SCII, USB

UNIT-III Pipelining:
Basic concepts of pipelining, throughput and speedup, pipeline hazards.

Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency.

UNIT-IV Memory organization: Memory interleaving, concept of hierarchical memory organization, cache memory, cache size Vs block size, mapping functions, replacement algorithms, write policies.

Course Outcomes:

After completion of this course, the students will be able to perform the following:

1. Draw the functional block diagram of single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
2. Write assembly language program for specified microprocessors using different data representations and design the ALU, Control Unit and CPU of a computer system.
3. Analyse concepts of parallel processors and pipelining techniques
4. Given a CPU organization, apply design techniques for memory interfacing and interleaving.

TextBooks/References:

1. **"**Computer Organization and Design: The Hardware/Software Interface", 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
2. "Computer Organization and Embedded Systems", 6th Edition by Carl Hamacher, McGraw Hill Higher Education.
3. "Computer Architecture and Organization", 3rd Edition by John P. Hayes WCB/McGraw-Hill
4. "Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, Pearson Education.
5. "Computer System Design and Architecture", 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education.

BCA-23-210
Wireless Communication
BCA-IV Semester

No. of Credits: 4

L	T	P	Total
4	0	0	4

Sessional: 25 Marks
Theory: 75 Marks
Total: 100 Marks
Duration of Exam: 3 Hours

Note: The examiner will be required to set seven questions in all having two parts. Part I will have Question Number 1 consisting of a total of 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be six questions. The examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to the compulsory question, A student will have to attempt four more questions from Part II.

Course Objectives:

1 To provide an overview of the Wireless Communication Networks area and its applications and examples of wireless communication devices.
2 To understand the various terminology, principles, devices, schemes, concepts, algorithms, and different methodologies used in Wireless Communication Networks.
3 To Introduce various wireless systems and standards such as GSM and their basic operation cases. It also deals with second-generation and third-generation wireless networks.
4 To understand the characteristics of different multiple access techniques and it provides an overview of the need for Cell splitting and Cell sectoring in cellular networks.

Syllabus:

Unit I: Introduction to Wireless Communication System
Evolution of wirelesscommunications, examples of wireless communication systems, comparison of various wireless systems.
Modern Wireless Communication System: Second generation cellular networks: GSM, third generation wireless networks: CDMA, Introduction to 4G wireless networks, wireless in local loop, wireless local area networks, Bluetooth and Personal Area Networks.

Unit II: Introduction to Cellular Mobile Systems and Design Fundamental
Spectrum Allocation, Basic cellular Systems, performance criteria, Operation of Cellular systems, Analog cellular systems, Digital cellular Systems.

Cellular System Design Fundamentals**:** Frequency Reuse, channel assignmentstrategies, hand off strategies (MAHO, MCHO, NCHO), Interference and system capacity, tracking and grade off service, improving coverage and capacity: Cell splitting, Cell sectoring, Zone concepts.
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Unit III: Multiple Access Techniques for Wireless Communication

Introduction to Multiple Access, FDMA, TDMA, spread Spectrum multiple Access, space division multiple access, packet ratio, capacity of a cellular systems.

Unit IV: Wireless Networking

Difference between wireless and fixed telephone networks, development of wireless networks, fixed network transmission hierarchy, traffic routing in the wireless network, wireless data services, common channel signaling, ISDN (Integrated Service Digital Networks), Advanced Intelligent Networks.

Course Outcomes:

A student will be able to:

CO1: Aware of the overall GSM cellular concept along with Cellular systems from 1G to 3G, Wireless 4G systems.

CO2: The students will be aware of the Fundamentals of cellular communications such as hexagonal cell geometry, Co-channel interference, Cellular system design, and Sectoring using directional antennas

CO3: Have Knowledge of different spread spectrum techniques and an understanding of design considerations for how to effectively share spectrum through multiple access

CO4: Understand the basic principles channel allocation and handoffs and awareness of the technologies used in Time Division Multiple Access (TDMA), Code Division Multiple Access (CDMA)

Text/ Reference Books:

1 J. Goldsmith, Wireless Communications, Cambridge University Press, 2005.

2 D. Tse and P. Viswanath, Fundamentals of Wireless Communications, Cambridge University Press, 2005.

3 A. Molisch, Wireless Communications, John Wiley & Sons, 2005.

4 S. Haykin and M. Moher, Modern Wireless Communications, Pearson Education, 2005.

5 T. S. Rappaport, Wireless Communications, Prentice Hall, 1996.

6 G. L. Stuber, Principles of Mobile Communications, Kluwer, 1996.

7 T. Cover and J. Thomas, Elements of Information Theory, John Wiley & Sons, 1991.

AEC-108-N1
Critical Thinking and Rhetorical Communication
BCA-IV Semester

No. of Credits:			No. of Credits:	No. of Credits:	
L	L	L	L	L	L
2	2	2	2	2	2

Note: The examiner will be required to set seven questions in all having two parts. Part I will have Question Number 1 consisting of a total of 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be six questions. The examiner will set one and a half questions from each Unit of the syllabus and each question will carry 15 marks. Question Number 1 will be compulsory. In addition to the compulsory question, A student will have to attempt four more questions from Part II.

Syllabus:

Unit 1: Introduction to Critical Thinking and Rhetoric
Definition and types: Analysis, Communication, inference, Observation; Problem-Solving; Inductive and Deductive Reasoning; Edward de Bono's Thinking Hats; The Rhetorical Situation: Purpose; Audience; Topic and Context; Rhetorical strategies: compare; contrast; classify; describe; Rhetorical devices: alliteration and amplification.

Unit II: Content Analysis and Articulation
Comprehension of core ideas of an article; Identify credible sources; Evaluate and respond to arguments; Assess alternative viewpoints; Test hypotheses against relevantcriteria; analyze information and form judgments; **CRAAP test**, these queslions focus on thc currency, relevance, authority, accuracy and purpose of a source of information; bias and eliminating bias, evidence-based arguments, considering alternatives views, popular media and information literacy.

Unit III: interview Skills
STAR method: Situation, Task, Action and Result; mock-interview exercises.

Unit IV: Conflict Resolution and Group Discussion
conflict; 3 P's of conflict resolution: Problem, People and Process; strategies to resolve conflict: avoid; compromise; accommodate; compete, collaborate; GD exercises with topical issues and chronic problems of regional, national and international importance; including leadership and team-building skills.

Course Outcome:
1. Students will be familiarized with the concept and significance of critical thinking.
2. Students demonstrate critical thinking skills including comprehension analysis and interpretation of information in communication process.

3. Students are able to articulate content for clear and persuasive communication
4. Students can apply conflict-resolution and problem-solving approaches towards building and managing teams for better organizational communication.

VAC-108-N1
Subject Name: Introduction to Indian Knowledge System
BCA-IV Semester

NO. OF CREDITS: 2

L T P Total Sessional : 25 Marks
Final Exam : 75 Marks
2 0 0 2 Total : 100 Marks
Duration of Exam : 3 hours

NOTE:Questionpaperwillhavetwoparts.Part-1willbecompulsoryandhave10questionsofequalmarkscoveringtheentiresyllabus. Anyfourquestionshavetobeattemptedoutofsixfrom Part-2.

Course Objectives:

1. Toprovideanoverviewofdifferentknowledgesystemsoriginatedin India.
2. Tointroduceinthestudentsacomprehensiveunderstandingof Indianethicsandvalues.

UNIT-I: Introduction and foundational concepts of IKS (4 Hrs)

OverviewofvariousstreamsofknowledgeinIndiaandclassificationofancientIndiantexts;VariousphilosophicalsystemsofIndiaandfundamentalprinciplesinlaidinthem

UNIT-II: Psychology from Indian perspective, Yoga and Indian Linguistics (4 Hrs)

Introduction to Ashtanga Yoga; Rasa Siddhanta of Natyasastra(theory of emotions), Panini's contribution to linguistics; Contributions of the Vakyasastra and Pramanasastra to linguistics

UNIT-III: Indian Mathematics and Astronomy (8 Hrs)

An overview of Indian mathematics, Development of arithmetic geometry and Trigonometry; Introduction to spherical geometry and calculus in India.
Vedic system of arithmetic computation, Vedic sutra for arithmetic computation.
An introduction to Indian Astronomy, Pre and Post Siddhantic period

UNIT-IV: Medicinal traditions in India (3 Hrs)

An Introduction to Ayurveda; Distinct features of Ayurveda, as compared to Alopathy; Excerpts from Sutrasthana

UNIT-V: Indian Architecture and Planning (3 Hrs)
Traditional measurement system used in Vastusastra, Prescriptions for residential Vastu, City planning as per Vastusastra

UNIT-VI: Economics, Management and Governance (4 Hrs)
An overview of Indian economic thought- Arthasastra and Nitisastra, Leadership and Motivation,
Planning and Organizing, Financial Management etc.

SUGGESTED BOOKS:

1. Introduction to Indian Knowledge System, B. Mahadevan, V. R. Bhat, NagendraPavana R. N., PHI. 2022
2. Yoga System of Patanjali, J. H. Woods, Bharatiya Kala Prakashan 2009
3. Indian Philosophy Vol I and II, S. Radhakrishnan, Oxford University Press. 2009
4. Mayamatam Indian Treatise on Housing, Architecture and Iconography (2 volumes), Bruno Daegens, Indira Gandhi National centre for Arts. 2007
5. Vedanta and Management: Relevance of Vedantic Concepts in Modern Management Practices, N. V. Dave, Deep & Deep. 2002
6. Tantrasagraha with detailed Mathematical Explanatory Notes, K. Ramasubramanian, M. S. Sriram, Hindustan Book Agency. 2011
7. Karanapadhati of PutumanaSomayaji, VenkateswaraPai, Ramasubramanian, M. S. Sriram and M.D. Srinivas, Hindustan Book Agency 2018
8. New Delhi 2002
9. The NighaMotilalBanarsidass Publishers 2015
10. ga Literature, Archak K.B. Kaveri Books, New Delhi, 2012
11. Textbook of Ayurveda: Volume 1 - Fundamental Principles of Ayurveda, Vasant Lad, Ayurvedic Press; UK ed. Edition 2002
12. Sanskrit Academy, Hyderabad. 2010
13. Vedic Mathematics, Jagadguru Swami Sri BharatiKrsnaTirathjiMaharaj, MotilalBanarsidass Publishers, Delhi 1965
14. LilavatiBhaskaracarya: A Treatise of Mathematics of Vedic Tradition, K S Patwardhan, S A Naimpally and ShyamLal Singh, MotilalBanarsidass Publishers Pvt Ltd, Delhi 2006

BCA-23-212

Data Base Management System Lab

BCA-IV Semester

Discipline Specific Course

No. of Credits:			2		
L	T	P	Total	Sessional:	15 Marks
0	0	4	4	Theory:	35 Marks
				Total:	50 Marks
				Duration of Exam:	3 Hours

List of Experiments

1.Create a table and display data from table to understand the concept of create, insert and select command. Use of update, Delete, Truncate command to understand the concept of DML.Apply Alter command and Drop command to understand the concept of DDL.

2. Apply constraints to understand the concept of Primary Key, Foreign key, Unique key, integrity constraints

3. Apply Operators, Range Searching, and Pattern Matching on data to understand the concept of And, Or, Not, Arithmetic Operator, Like operator, In, Not in operator

4. Write a program to execute DDL(Create, Alter, Drop and Truncate) commands with examples.

5. For a given set of relation schemes, create tables and perform the following Simple Queries, Simple Queries with Aggregate functions, Queries with Aggregate functions (group by and having clause), Queries involving- Date Functions, String Functions , Math Functions Join Queries- Inner Join, Outer Join Subqueries- With IN clause, With EXISTS clause

6. Write a program to execute DML(Insert, Update, Delete and Select) commands with examples.

7. Write a program to perform join operations on two tables.

8. Write a program to execute Transaction control language(Commit, Rollback and Save) commands with examples.

9. Develop GUI using front end tool

10. Given the table EMPLOYEE (EmpNo, Name, Salary, Designation, DeptID) write a cursor to select the five highest paid employees from the table.

BCA-DS-23-208					
Data Science using R Lab					
BCA-IV Semester					
Discipline Specific Course					
No. of Credits:			2		
L	T	P	Total	Sessional:	15 Marks
0	0	4	4	Theory:	35 Marks
				Total:	50 Marks
				Duration of Exam:	3 Hours

List of Experiments

1. WriteaprograminRtotakeinputfromtheuser(nameandage)anddisplaythevalues.Also printtheversionofRinstallation.

2. WriteaprograminRto create a sequence of numbers from 20 to 50 and find the mean numbers from 20 to 60 and find sum of numbers from 51 to 91.

3. WriteanRprogramtocreateavectorwhichcontains10randomintegervaluesbetween-50 and +50.

4. Write a program in R to find the factors of a given number.

5. Write a program in R to find the maximum and the minimum value of a given vector.

6. Write a program in R to convert a given matrix to a 1 dimensional array.

7. Writeaprogram inRtocreateanarrayoftwo3x3matriceseach with3rows and3columns from two giventwo vectors.

8. Write a program in R to create an 3 dimensional array of 24 elements using the dim() function.

9. Write a program in R to get the statistical summary and nature of the data of a given data frame.

10. Write a program in R to extract first two rows from a given data frame.

11. Write a program in R to create a matrix taking a given vector of numbers as input. Display the matrix.

12. Write a program in R to access the element at 3rd column and 2nd row, only the 3rd row andonly the 4th column of a given matrix.

BCA-DS-23- 210					
Probability & Statistics Lab					
BCA-III Semester					
Discipline Specific Course					
No. of Credits:			2		
L	T	P	Total	Sessional:	15 Marks
0	0	2	2	Theory:	35 Marks
				Total:	50 Marks
				Duration of Exam:	3 Hours
List of Experiments					
1. Write a program using excel for basic functions:- a)Opening & Saving b) Entering data c) Arithmetic operations d) Using Formulas					
2. Write a program for generating random numbers in excel.					
3. Write a program to create Frequency tables and histograms.					
4.Write a program to calculate measures of central tendency (Mean, Mode, Median)					
5. Write a program to calculate measures of variations : Standard Deviation,variance, Covariance					
6. Write a program to calculate to measure skewness in data.					
7. Write a program to implement linear regression.					
8. Write a program to implement correlation coefficients.					
9.Case study 1 on employee dataset.					
10.Case study 2 on medical dataset.					