YMCA University of Science and Technology, Faridabad
BCA Scheme of Studies / Examination
Semester – II

Course No.	Course Title	Schedule				Sessional Marks/ Internal	Marks for End Term Examination		Total Marks	Credits
		L	T	P	Total		Theory	Practical		
BCA-DS-111	Introduction to Database Management System	3	-		3	25	75	-	100	3
BCA-DS-112	Introduction to Data Structures	3	-		3	25	75	-	100	3
BCA-DS-113	Introduction to Data Science	3	-		3	25	75	-	100	3
BCA-DS-114	Professional English	3	-		3	25	75	-	100	3
BCA-DS-115	Fundamentals of Management	3	-		3	25	75	-	100	3
BCA-DS-116	Data Structures Lab	-		4	4	25	-	50	75	2
BCA-DS-117	Database Management Systems Lab	-		4	4	25	-	50	75	2
BCA-DS-118	Language Lab	-		4	4	25	-	50	75	2
BCA-DS-119	Presentation	-		2	2	25	-		25	1
BCA-DS-120	Group Discussion	-		2	2	25	-		25	1
	Total				31	250	375	150	775	23

Note: Exam duration will be as under
   (a) Theory exams will be of 3 hours duration
   (b) Practical exams will be of 3 hours duration

BCA -DS-111: INTRODUCTION TO DATABASE MANAGEMENT SYSTEM
BCA II Semester

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

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. 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 compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:
1. To understand the different issues involved in the design and implementation of a database system.
2. To study the physical and logical database designs, database modeling, relational, hierarchical, and network models.
3. To understand and use data manipulation language to query, update, and manage a Database
4. To develop an understanding of essential DBMS concepts such as: database security, integrity, concurrency, distributed database, and intelligent database, Client/Server (Database Server), Data Warehousing.
5. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modelling, designing, and implementing a DBMS.

SYLLABUS

UNIT – I
Basic Concepts: Data, Information, Records and files. Traditional file–based Systems, File Based Approach-Limitations of File Based Approach, Database Approach-Characteristics of Database Approach, advantages and disadvantages of database system, components of database system, Database Management   System (DBMS), Components of DBMS Environme nt, DBMS Functions and Components, DBMS users, Advantages and Disadvantages of DBMS, DBMS languages.

Roles in the Database Environment - Data and Database Administrator, Database Designers, Applications Developers and Users.

UNIT – II
Database System Architecture –Three Levels of Architecture, External,   Conceptual and Internal Levels, Schemas, Mappings and Instances.

Data Independence–Logical and Physical Data Independence, Classification of Database Management System, Centralized and Client Server architecture to DBMS.

Data Models: Records- based Data Models, Object-based Data Models, Physical Data Models and Conceptual Modeling.

UNIT – III
Entity-Relationship Model: Entity Types, Entity Sets, Attributes Relationship Types, Relationship Instances and ER Diagrams, abstraction and integration.

Basic Concepts of Hierarchical and Network Data Model, Relational Data Model - Brief History, Relational Model Terminology-Relational Data Structure, Database Relations, Properties of Relations, Keys, Domains, Integrity Constraints over Relations.

UNIT – IV
Relational algebra, Relational calculus, 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.

COURSE OUTCOMES:
After completion of this course, students will be able to
1. Write relational algebra expressions for given query and optimize the developed expressions.
2. Design the databases using given specifications.
3. Construct the SQL queries for Open source and Commercial DBMS –MYSQL and ORACLE.
4. Understand the concept of Query Optimization and Normalization.
5. Understand the concept of Serializability.

Text Books/ 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.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-DS-112: INTRODUCTION TO DATA STRUCTURES
BCA II Semester

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

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. 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 compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:
1. To impart the basic concepts of data structures and algorithms.
2. To understand concepts about searching and sorting techniques
3. To understand basic concepts about stacks, queues, lists, trees and graphs.
4. To enable them to write algorithms for solving problems with the help of fundamental data structures

SYLLABUS

UNIT–I
Introduction: Elementary data organization, Data Structure definition, Data type vs. Data structure, Categories of data structures, Data structure operations, Applications of data structures, Algorithms complexity and time-space tradeoff, Big-Oh notations.

Strings: Introduction, Storing strings, String operations, Pattern matching algorithms, Linear search, binary search.

UNIT – II
Arrays: Introduction, Linear arrays, Representation of linear array in memory, address calculations, Traversal, Insertions, Deletion in an array, Multidimensional arrays.

Linked List: Introduction, Array vs. linked list, Representation of linked lists in memory, Traversal, Insertion, Deletion, searching in a linked list, Header linked list, Circular linked list, Two-way linked list, Threaded lists, Garbage collection, Applications of linked lists.

UNIT – III
Stack: Introduction, Array and linked representation of stacks, Operations on stacks, Applications of stacks: Polish notation, Recursion.

Queues: Introduction, Array and linked representation of queues, Operations on queues, Deques, Priority Queues, Applications of queues.

UNIT – IV

Trees: Introduction, Definition, Representing Binary tree in memory, Traversing binary trees, Traversal algorithms using stacks, Minimum cost Spanning tree, Prim's and Kruskal's Algorithm.

Graph: Introduction, Graph theory terminology, Sequential and linked representation of graphs, Warshal 's algorithm for shortest path, Dijkstra algorithm for shortest path, Operations on graphs, Traversal of graph.

COURSE OUTCOMES:

1. For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.
2. For a given Search problem (Linear Search and Binary Search) student will able to imple ment it.
3. For a given problem of Stacks, Queues, linked list and Tree, student will able to implement it and analyze the same to determine the time and computation complexity.
4. Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
5. Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.

Text Books/ Reference Books:

1. Seymour Lipschutz, "Data Structure", Tata-McGraw-Hill
2. Horowitz, Sahni& Anderson-Freed, "Fundamentals of Data Structures in C", Orient Longman.
3. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applicatio ns", Mcgrraw- Hill International Student Edition, New York.
4. Mark Allen Weiss Data Structures and Algorithm Analysis In C, Addison- Wesley, (An Imprint Of Pearson Education), Mexico City.Prentice- Hall Of India Pvt. Ltd., New Delhi.
5. Yedidyan Langsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, "Data Structures Using C", Prentice- Hall of India Pvt. Ltd., New Delhi.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-DS-113: INTRODUCTION TO DATA SCIENCE
BCA II Semester

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

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. 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 compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:
1. An understanding of how the nature of the data collection, the data itself, and the analysis
2. processes relate to the kinds of inferences that can be drawn
3. Understand the limitations of data sets based on their contents and provenance
4. Knowledge of data organization, management, preservation, and reuse
5. Knowledge of what statistical analysis techniques to choose, given particular demands of
6. inference and available data
7. Knowledge of general linear models and cluster analysis methods for statistical analysis
8. Skills and knowledge in preparing data for analysis, including cleaning data, manipulating data, and dealing with missing data
9. Skills in actually analyzing data using open source data analysis tools

SYLLABUS

UNIT-I
Data Science Concept
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 data science tools
A day in the life of a data science person, R versus Python, Data science tools and technology, Regression.

Data Science in Business
Companies start in data science, real world examples and applications, Tips for recruiting data science people, "The Final Deliverable", "The Report Structure", Data science careers and additional case studies.

UNIT-III
Big data:-Introduction to Big data, big data technologies, management of big data.

Data Science People
Things data science people say, "What Makes Someone a Data Scientist?", Data Visualizatio n-Basic principles, ideas and tools for data visua lization, types of charts: line graph, pie chart, scatter plot, bar graphs, create your own visualization of a complex dataset.

UNIT-IV
Data Science and Ethical Issues
Discussions on privacy, security, ethics A look back at Data Science, Next-generation data scientists.

COURSE OUTCOMES:
1. Students will learn how to explore new data sets.
2. Implement a comprehensive set of machine learning algorithms from scratch.
3. Master all the components of a predictive model, such as data preprocessing, feature engineering, model selection, performance metrics and hyper parameter optimization.

Text Books/Reference Books:
1. Dr. Anil Maheshwari, "Data Analytics", McGraw Hil Education (India) Private Limited.
2. Jake Vander Plas "python data science handbook",Oreilly
3. Allen B. Downey "Think Python",Oreilly
4. Hadley Wickham "Advanced R",CRC Press

Note: Latest and additional good books may be suggested and added from time to time.

BCA-DS-114: PROFESSIONAL ENGLISH
BCA II Semester

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

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. 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 compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES:

The course focuses on the following aspects:
1. professional attitude and behavior;
2. clarity, correctness and concision in writing, as well as detailed proof-reading skills;
3. the acquisition of a varied and accurate contemporary professional vocabulary;
4. teamwork and cross-cultural awareness; and
5. discussion activities and presentations (both impromptu and formal).

SYLLABUS

UNIT-I
BASICS OF COMMUNICATION: Introduction to basics of communication: communica t ion and its various definitions, paths of communication, process of communication, barriers to effective communication, Myths and realities about Communication, Communication Noise, 7 C's of effective Communication, corporate Communication, impact of social media on communication.

UNIT – II
VERBAL AND NON-VERBAL COMMUNICATION: Verbal Communication and its types, principles for effective oral and written communication, listening process, effective listening, Presentation skills, presentation aids, non-verbal communication - posture–gestures-eye contact– handshaking-voice modulations–sign language- proxemics- communication skills for the interviews and group discussions, soft skills.
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UNIT – III
GRAMMAR: Synonyms/antonyms, one word substitutions, tenses, conjunctions, auxiliaries, prepositions, spotting errors.

BUSINESS WRITING: Business letter–Layout of a business letter-sales letter- letters of enquiries- orders- complaint-, notice and tenders, circulars, memos, e-mails, agendas, minutes of Meeting, letters of application and résumé writing.

UNIT – IV
PROFESSIONAL PROPOSALS AND REPORTS: Writing business proposals- characterist ics and structure- Process and mechanics of report writing - types of reports -project reports - characteristics-structure-performance appraisal reports, -product appraisal reports- progress

reports, brochures, newsletters, taking official notes, Event report, Technical Articles, Editing Strategies for effective report writing, Professional writing style and language.

COURSE OUTCOMES:

After completion of the course student will be able to:

1. Understand the concept of soft skills including communication skills, listening skills, positive thinking and also will be able to enhance own personality.

2. Able to write business letters.

3. Able to write reports.

4. Able to make effective resume and will also be able to present himself/herself in interview, speeches, presentations, talks etc.

Text Books/ Reference Books:
1. Vik, Gilsdorf, "Business Communication", Irwin
2. K K Sinha, "Business Communication", Himalaya Publishing House /Galgotia Publications.
3. Bovee, "Business Communication", Pearson ' PHI
4. Mohan, Banerjee, Business Communication, Mac million

Note: Latest and additional good books may be suggested and added from time to time.
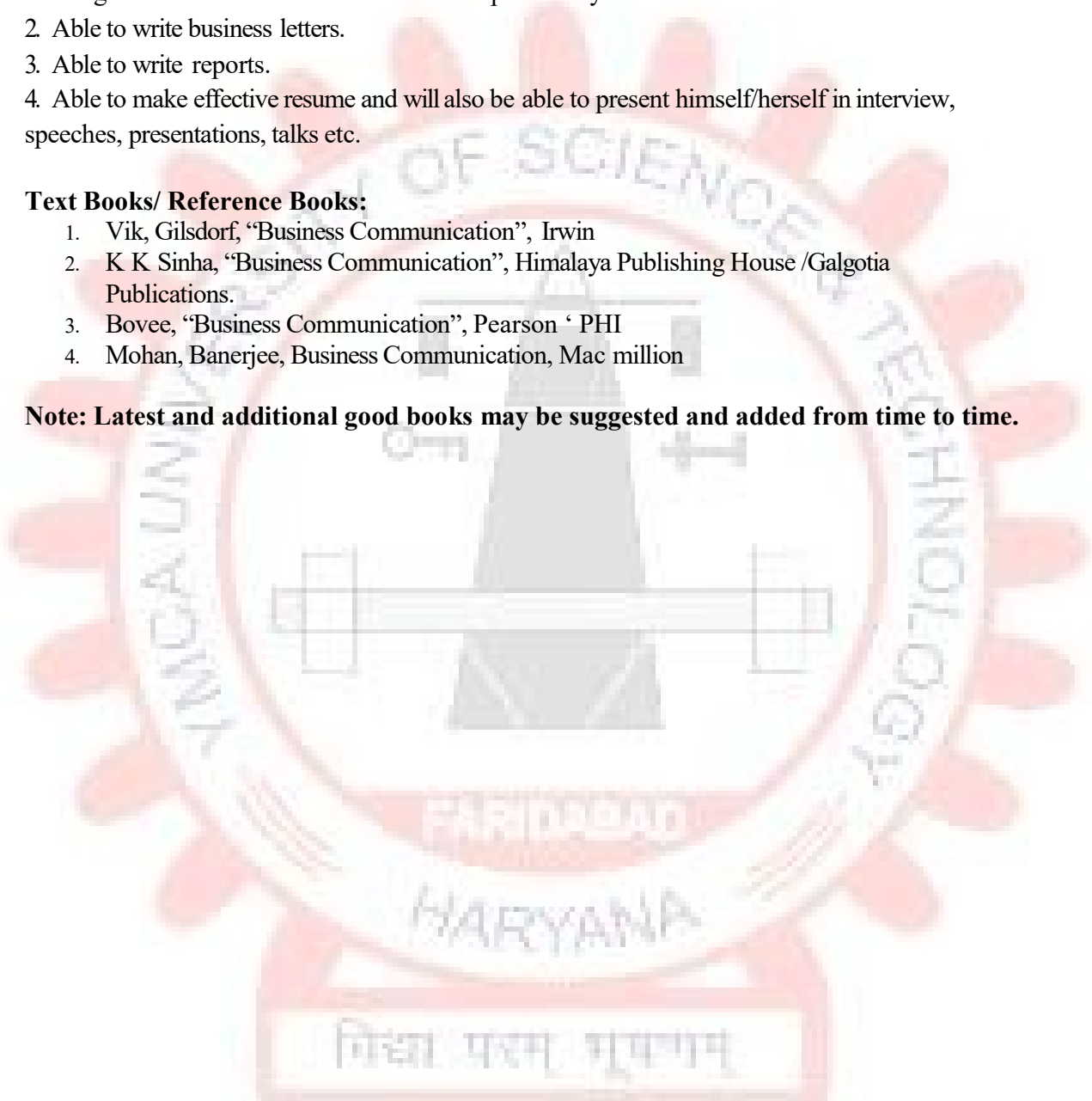
BCA-DS-115: FUNDAMENTALS OF MANAGEMENT
BCA II Semester

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

Note: Examiner will be required to set *Seven* questions in all having two parts. Part I will have Question Number 1 consisting of total 10 parts (short-answer type questions) covering the entire syllabus and will carry 15 marks. In Part II, there will be *Six* questions. 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 compulsory question, student will have to attempt four more questions from Part II.

COURSE OBJECTIVES
1. Enables the students to develop an understanding of management and organization.
2. The course focuses on important management functions such as planning, organizing, leading and controlling for successful managerial activities.
3. The students will learn how successful managers use organizational resources through organizational functions in order to effectively and efficiently achieve organizational objectives.

SYLLABUS

UNIT 1
Introduction: Meaning of management, Definitions of Management, Characteristics of management, Management Vs. Administration. Management-Art, Science and Profession. Importance of Management. Development of Management thoughts. Principles of Management. The Management Functions, Inter-relationship of Managerial functions. Nature and Significa nce of staffing, Personnel management, Functions of personnel management, Manpower planning, Process of manpower planning, Recruitment, Selection; Promotion- Seniority Vs. Merit. Training - objectives and types of training.

UNIT II
Production Management: Definition, Objectives, Functions and Scope, Production Planning and Control; its significance, stages in production planning and control. Brief introduction to the concepts of material management, inventory control; its importance and various methods.

UNIT III
Marketing Management: Definition of marketing, Marketing concept, objectives & Functions of marketing. Marketing Research - Meaning; Definition; objectives; Importance; Limitatio ns; Process. Advertising - meaning of advertising, objectives, functions, criticism.

UNIT IV
Financial Management: Introduction   of Financial Management, Objectives of Financial Management, Functions and Importance of Financial Management. Brief Introduction to the concept of capital structure and various sources of finance.

COURSE OUTCOMES:

After completion of the course student will be able to understand:

1. How organization adapt to uncertain environment.
2. Develop the process of management's 4 functions: planning, organizing, leading and controlling.
3. Evaluate leadership styles to anticipate consequences of each leadership style.
4. Identify and evaluate social corporate responsibility and ethical issues involved in business situations.

Text Books/ Reference Books:

1. Principles and Practice of Management - R.S. Gupta, B.D.Sharma, N.S. Bhalla. (Kalyani Publishers)
2. Organisation and Management - R.D. Aggarwal (Tata Mc Graw Hill)
3. Principles & Practices of Management – L.M. Prasad (Sultan Chand & Sons)
4. Management – Harold, Koontz and CyriloDonell (Mc.Graw Hill).
5. Marketing Management – S.A. Sherlikar (Himalaya Publishing House, Bombay).
6. Financial Management - I.M. Pandey (Vikas Publishing House, New Delhi)
7. Management - James A.F. Stoner &R.Edward Freeman, PHI.

Note: Latest and additional good books may be suggested and added from time to time.

BCA-DS-116: DATA STRUCTURES LAB
BCA II Semester

No. of Credits: 2	Sessional:	25 Marks
L T P Total	Practical :	50 Marks
0 0 4 4	Total :	75 Marks
	Duration of Exam:	3 Hours

List of Programs:

1. **Stack**

   Write a program to perform various operations like Push and Pop on Stack.

2. Linear Queue

   Write a program to perform Insertion and deletion operations on Linear Queues.

3. Linked List

   Write a program to perform various operations on Linked List.

4. Sorting Techniques

   Write a program to implement various sorting techniques like Bubble sort, selection sort,

   Insertion sort, Quick sort.

5. Searching Techniques

   Write a program to implement Linear Search and Binary Search.

6. Minimum Spanning Trees

   Write a program to implement Prim's and Kruskal Algorithms.

BCA-DS-117: DATA BASE MANAGEMENT SYSTEMS
LAB

BCA II Semester

No. of Credits: 2   Sessional: 25 Marks
L T   P   Total   Practical :   50 Marks
  0 0   4   4   Total :   75 Marks
                                                  Duration of Exam: 3 Hours

List of Programs:

1. Introduction to SQL.

2. Write a program to create a table in SQL.

3. Write a program to perform various operations like Drop, Alter and Truncate on a table.

4. Write a program to perform various queries in SQL.

5. Write a program to perform Selection, Projection and Join Operations on tables.

BCA-DS-118: LANGUAGE LAB
BCA II Semester

No. of Credits: 2
L T   P   Total
0 0   4   4

Sessional: 25 Marks
Practical :   50 Marks
Total :   75 Marks
Duration of Exam: 3 Hours

Corporate Interaction & Communication

1. Listening Comprehension

2. Pronunciation, Intonation, Stress and Rhythm

3. Common Everyday Situations: Conversations and Dialogues

4. Communication at Workplace

5. Interviews

6. Formal Presentations