BCA (Bachelor of Computer Applications)
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Course Code	**US03MABCA01**	Title of the Course	**Fundamentals of Data Structures**
Total Credits of the Course	**4**	Hours per Week	**4**

Course Objectives:	1. To study the fundamental concepts about data structures. 2. To learn the basics of arrays, stacks, queues, trees, and linked lists. 3. To understand the concepts related to sorting and searching techniques.

Course Content		
Unit	Description	Weightage* (%)
1.	**Introduction to Data Structures** – Introduction to data structures - Definition, Types of Data Structures, applications and advantages – Primitive and non-primitive data structures and operations on them – Introduction to arrays, one and two-dimensional arrays – Representation of arrays in memory: row-major and column-majororder – Address calculation of elements of one and two-dimensional arrays – Applications of arrays	25
2.	**Stack and Queues** – Introduction – Operations on the Stack- Push, Pop, Peep, Change – Applications of Stacks – Infix, Postfix, Prefix Notations – Conversion: Infix to Postfix – Types of queues : Simple queues, Circular queues, Double endedqueues, Priority Queue – Applications of Queues – Operations on Simple Queues : Insert and Delete	25

3.	**Introduction to Trees** – Definitions of basic terms : Tree, Directed Tree, Root, Leaf, Branch, Level, Node, Forest – Applications of a tree – Binary trees : introduction, linear and linked representations – Traversals of a binary tree: Preorder, Inorder and Postorder – Types of binary trees : Full Binary Tree, Complete Binary Tree, Binary Search Tree	25
4.	**Linked Lists, Sorting and Searching techniques** – Introduction to linked lists – Types of linked lists: Singly linked lists, Doubly linked lists, Circular linked lists, Circular Doubly linked list – Operations on Singly Linked Lists: Insertion: at Front, Deletion: from Beginning – Introduction to Sorting and Searching – Sorting techniques - Bubble Sort and Merge Sort – Searching techniques - Sequential Search and Binary Search	25

Teaching-Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Evaluation	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	understand the fundamental concepts of various data structures.
2.	gain knowledge on arrays, stacks, queues, trees, and linked lists.
3.	understand the basic concepts of sorting and searching techniques.

Suggested References:	
Sr. No.	References
1.	Tremblay J. & Sorenson P. G., An Introduction to Data Structures with Applications, 2nd Edition, Tata McGraw-Hill Edition, 1991.
2.	Singh Bhagat & Naps Thomas, Introduction to Data Structures, Tata McGraw-Hill Publishing Co.Ltd.,1985.
3.	R. B. Patel, Expert Data Structures with C, Khanna Publications, ISBN: 81-87522-41-0, 2018.
4.	Samanta, Classis Data Structures, 2nd Edition, PHI Publication, 2009.
5.	G. S. Baluja, Data Structures through C, 4th Edition, Dhanpat Rai & Co., 2016.

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Course Code	**US03MABCA02**	Title of the Course	**Database Management Systems - I**
Total Credits of the Course	**4**	Hours per Week	**4**

Course Objectives:	1. To study the basic concepts related to DBMS, Data Models and Relational Data Model terminologies. 2. To understand basics of SQL data types, SQL statements and concepts like DML, DDL, DCL, TCL. 3. To learn working with tables, applying and modifying constraints, functions, joins queries.

Course Content		
Unit	Description	Weightage* (%)
1.	**Introduction to DBMS and Relational Database Design** – Basics of Database and DBMS (Data, Information, field, record, file) – Three level Architecture of Database- external, conceptual and internal – Data Models concepts: Hierarchical, Network and Relational – Relation data models concept, terminologies: tuple, attribute, domain, relation (Definition) – Relationships and Relationship types – Keys: Introduction: super key, candidate key, primary key, alternate key, foreign key – Dr. E.F. Codd Rules – Consequences of Poor database design and Functional dependencies – Difference between DBMS and RDBMS – Normal Forms: 1st Normal Form, 2nd Normal Form, 3rd Normal Form – Examples of normalization	25

2.	**Structured Query Language-1** – SQL - introduction , advantages and disadvantages – Data types – Types of SQL Statements : DDL DML ,DCL, TCL – Working with SQL*Plus – overview and basic commands of SQL Plus. – Tables: Creation, Removal and Alteration – Table Data: insertion, selection, updation, deletion – Filtering data using WHERE clause, ordering using ORDER BY – Pseudo Columns – ROWID, ROWNUM, USER, UID, SYSDATE – Transaction control language statements – COMMIT, ROLLBACK and SAVEPOINT	25
3.	**Structured Query Language-2** – Operators – Arithmetic, Relational, Logical, Range Searching, Pattern Matching – Null Values, Tab Table, Dual Table – Data Constraints and its types – Modifying Constraints and Use of User_Constraints – Functions – Introduction, Types of Functions (Scalar And Aggregate) – Scalar : Numeric Functions , Character Functions, Date Functions Conversion Functions – Aggregate Functions : Avg, Count, Max, Min, Sum	25
4.	**Structured Query Language-3** – Grouping using GROUP BY and HAVING – Subquery and its types – Joining tables, Types of joins – Creation and manipulation of database objects – indexes, views, sequences – Data control language statements – GRANT and REVOKE	25

Teaching-Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Evaluation	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	understand the basic concepts associated with DBMS, Data Models and Relational Data Model terminologies.
2.	understand the basics of SQL data types, SQL statements and concepts like DML, DDL, DCL, TCL.
3.	gain knowledge on working with tables, applying and modifying constraints, functions, joins queries.

Suggested References:	
Sr. No.	References
1.	Bipin C. Desai, An introduction to Database Systems, Galgotia Publications Pvt. Ltd., 2010.
2.	Ivan Bayross, SQL,PL/SQL The programming language of Oracle, 4th edition, BPB Publications, 2010.
3.	S. Parthsarthy and B.W.Khalkar, Understanding Database Management Systems, First edition, Master Academy, 2007.

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BCA (Bachelor of Computer Application)
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Course Code	**US03MABCA03**	Title of the Course	**Practical based on US03MABCA01 and US03MABCA02**
Total Credits of the Course	**4**	Hours per Week	**8**

Course Objectives:	1. To understand the practical usage of data structures. 2. To understand the practical usage of Database Management Systems.

Course Content		
	Description	Weightage* (%)
	PART-A : Practical based on US03MABCA01	40%
	PART-B : Practical based on US03MABCA02	60%

Teaching-Learning Methodology	Practical-based learning in small groups and hands-on training through required ICT tools.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Evaluation	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	apply the knowledge of data structures.
2.	apply the knowledge of Database Management Systems.

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Course Code	**US03IDBCA04**	Title of the Course	**Web Application Development-III**
Total Credits of the Course	**2**	Hours per Week	**2**

Course Objectives:	1. To learn the basic concepts associated with scripting. 2. To understand fundamentals regarding JavaScript development.

Course Content		
Unit	Description	Weightage* (%)
1.	**Basics of JavaScript** – JavaScript basics : Syntax, Data Types, Variables, Literals, Type Casting, Operators – User interaction through dialog boxes – Built-in functions – Flow Control statements: Decision-Making and Looping – Arrays – User-defined functions,	50
2.	**Advanced JavaScript–II** – String Object (length, charAt, indexOf, substr, toLowerCase, toUpperCase), – Math Object (PI, abs, ceil, floor, max, mm, round) – Date Object (getDate, getDay, getFullYear, getMonth, getTime, getHours, getMinutes, getSeconds, setDate, setFullYear, setMonth, setTime, setHours, setMinutes, setSeconds) – Introduction to Document Object Model (DOM), DOM Hierarchy, Understanding objects & Collections m DOM, HTML Form Hierarchy – Accessing Form elements (Text, Radio, Checkbox, Dropdown, Button), Event handling	50

Teaching-Learning Methodology	Usage of multiple teaching-learning approaches: lectures and discussion, exploration and inquiry, cooperative group work, demonstrations, and presentations

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Evaluation	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	understand the basic concepts regarding scripting.
2.	understand the role of JavaScript in Web Application Development.

Suggested References:	
Sr. No.	References
1.	Ivan Bayross, "Web Enabled Commercial Applications Development using HTML, DHTML, Javascript, Perl CGI", BPB, 2004.
2.	Douglas E Comer, The Internet, PHI, Second Edition, May 2000.
3.	Xavier C., World Wide Web Design with HTML, Tata McGraw Hill Publication, 2000.
4.	Eric Meyer, Cascading Style Sheets – The Definitive Guide, O'Reilly – SPD, First Edition, 2000.
5.	Jeremy Keith, HTML 5 for Web Designers, 2005.
6.	Manuals of suitable packages.
7.	FaitheWempen, Step by Step HTML5, PHI, 2010.
8.	Thomas A. Powell, HTML& CSS: The Complete Reference, Fifth Edition,Tata McGraw-Hill, 2010.

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BCA (Bachelor of Computer Applications)
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Course Code	**US03IDBCA05**	Title of the Course	**Web Application Development–III Lab**
Total Credits of the Course	**2**	Hours per Week	**4**

Course Objectives:	1. To study practical use of scripting. 2. To provide basic knowledge on practical usage of JavaScript in Web Application Development.

Course Content		
	Description	Weightage* (%)
	Practical Based on Web Application Development – I	100%

Teaching-Learning Methodology	Practical-based learning in small groups and hands-on training through required ICT tools.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Evaluation	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	gain practical knowledge on scripting.
2.	gain practical knowledge on JavaScript in Web Application Developement.

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Course Code	**US03AEBCA06**	Title of the Course	**Discrete Mathematics**
Total Credits of the Course	**2**	Hours per Week	**2**

Course Objectives:	1. To study the basic concepts of Vectors and Matrices. 2. To understand fundamental concepts related to graph theory.

Course Content		
Unit	Description	Weightage* (%)
1.	**Vectors and Matrices** – Dot product and Norm – Matrix addition and scalar multiplication – Matrix multiplication – Transpose of matrix – Square matrices: Diagonal, upper, lower triangular, symmetric, skew symmetric, orthogonal. – Determinants up to order.	50
2.	**Graph Theory** – Definition of graph, multigraph – Degree of vertex, paths, subgraph, connected components – Cut point, bridge – Special graphs: complete, regular, bipartite. – Matrices and graphs – Planar graphs, maps and regions – Euler's formula – Colored graphs	50

Teaching-Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Evaluation	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	understand the basic concepts related to Vectors and Matrices.
2.	understand the fundamental concepts about graph theory.

Suggested References:	
Sr. No.	References
1.	S. Lipschutz and Marc Lars Lipson, Discrete Mathematics, Schaum's series, 2007.
2.	Kenneth H. Rosen, Discrete Mathematics and its applications, 2017.
3.	Jacob T. Schwartz , Introduction to Matrices and vectors, 2003.
4.	Vinay Kumar, Discrete Mathematics, BPB Publication, First edition, 2002.
5.	S. C. Gupta, Fundamentals of Statistics, Himalaya Publishing House, 2004.

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Course Code	**US03SEBCA07**	Title of the Course	**E - Commerce**
Total Credits of the Course	**2**	Hours per Week	**2**

Course Objectives:	1. To study basics of E-Commerce and its classifications and models. 2. To understand basics of Electronic Marketplace and Customer Relationship Management.

Course Content		
Unit	Description	Weightage*(%)
1.	**Introduction To E-Commerce** – Definition, communication perspective, business process perspective, service perspective – Classification by nature of transaction : B2B, B2C, C2C, C2B, Non business EC, Intra-business EC – Classification of EC Applications: electronic market, inter organizational system, customer services – Benefits to organizations, consumers, and Society – Limitations of EC, framework of EC, future of EC – E-Commerce Business Models – Introduction, eight key ingredients of a business model, major B2C and B2B business models, Introduction to M-Commerce	50
2.	**Electronic Marketplaces** – Marketspace components, types of electronic markets (electronic storefronts, electronic malls, types of stores and malls) – Portals and their types, Role of intermediaries in E-markets, E-market success factors, competitive factors, Impact of E-Market on organizations (marketing, HR, manufacturing, finance and accounting) – Customer Relationship Management (CRM) – CRM : meaning, types of CRM, benefits and limitations of CRM, issues in CRM implementation, classifications of CRM applications, one-to-one marketing (personalization, collaborative filtering, customer loyalty, trust)	50

Teaching-Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Evaluation	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	understand the basics of E-Commerce and its classifications and models.
2.	understand the basics of Electronic Marketplace and Customer Relationship Management.

Suggested References:	
Sr. No.	References
1.	Jason G. Miles, E-Commerce Power, Morgan James Publishing, 2021.
2.	Brett Standard, E-Commerce Business, Novelty Publishing, 2019.
3	P. T. Joseph, S. J. : E-Commerce - An Indian Perspective, 3rd Edition, Prentice Hall of India (PHI), 2009.
4.	Kenneth C. Laudon, Carol Guercio Traver : E-Commerce - Business, Technology, Society, 4th Edition, Pearson, 2008.

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Course Code	**US03IKBCA08**	Title of the Course	**IKS**
Total Credits of the Course	**2**	Hours per Week	**2**

Course Objectives:	

Course Content		
Unit	Description	Weightage* (%)
1.		50
2.		50

Teaching-Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Evaluation	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	
2.	

Suggested References:	
Sr. No.	References

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