SEMESTER - I

Course Mathematics for Computer Science

Course Type: Core Course (CC) **Couse Code:** BCA-CC-1
Credit: 03 **LTP:** 3:0:0

Course Outcomes: On successful completion of the course the learner will be able to

CO#	Cognitive Abilities	Course Outcomes
1	Remembering	Identify logical propositions, define truth tables, relations, sets, graphs and trees
2	Understanding	Understand properties of relation, relate them to sets and further to the concept of trees & graphs
3	Applying	Build different types of sets, graphs and trees
4	Analyzing	Analyze various algorithms for graphs and trees and apply them to solve problems
5	Evaluating	Priortise on the best algorithm or technique to solve the problems
6	Creating	Formulate solutions to real world problems that are based on sets, graphs and trees

Unit No.	Content	Contact Hr.
1	**Mathematical Logic** Meaning of Statement, Primitive and Compound Statements, Truth Values of a Statement, Logical Operations: Negation, Conjunction & Disjunction Implication, Double Implication, Equivalence, Equivalence of Logical Statements, Equivalence of Logical Statements, Truth Tables & Construction of Truth Tables, Tautology and Contradiction	6
2	**Relations** Relations and Their Properties, Representing Relations, Closures of Relations, Equivalence Relations, Partial Orderings.	6

3	**Algebraic Structures [Sets]** Groups, Semigroup, Monoid, Abelian Group, Group Codes, Error Detection in Group Codes, Parity Check Matrix	**6**
4	**Graphs** Introduction to Graphs and Graph Models, Terminology and Special Types of Graphs, Representations of Graphs, List Structures and storage representation of Graphs, Isomorphism, Connectivity, Euler and Hamiltonian, Paths Shortest Path problems- Dijkstra's shortest path algorithm, Planar Graphs- Graph Coloring	**6**
5	**Trees** Introduction to Trees, Applications of Trees, Traversals, Spanning Trees, Minimum Spanning Trees- Kruskal's and prims	**6**

Text Book

Sr. No.	Title / Edition	Author	Publisher
1	Discrete Mathematics	J.P.Tremblay R.Manohar	Tata McGraw-Hill Publishing Company, New Delhi.

Reference Books

Sr. No.	Title / Edition	Author	Publisher
1	Discrete Mathematics and its Applications, Sixth Edition	Kenneth. H. Rosen	Tata McGraw-Hill Publishing Company, New Delhi.
2	Discrete Mathematics for Computer Scientists & Mathematicians, Third Edition	Joe L. Mott, Abraham Kandel,T. P. Baker	Prentice Hall of India Ltd, New Delhi.

Course Modern Operating System Concepts

Course Type: Core Course (CC) **Couse Code:** BCA-CC-2
Credit: 03 **LTP:** 3:0:0

Course Outcomes: On successful completion of the course the learner will be able to

CO#	Cognitive Abilities	Course Outcomes
1	Remembering	Familiarize with fundamental components of operating system by analyzing operating system structure, kernel data structures and system calls.
2	Understanding	Illustrate the concept of process management and various policies for scheduling, Inter Process Communication (IPC) and the role of Operating System in IPC
3	Applying	Apply the functionalities of an Operating System as a resource manager, process synchronizer and methods used to implement the different parts of OS
4	Analysing	Formulate solutions towards deadlock prevention and detection in operating system environment.
5	Evaluating	Evaluate and use the system calls for memory management concepts and the file system operations
6	Creating	Formulate the need of special purpose operating system with the advent of new emerging technologies

Unit No.	Content	Contact Hr.
1	**Operating System Basics** Introduction, Computer-System Organization, Computer-System Architecture, Operating-System Structure, Kernel Data Structures, System calls, Computing Environments, Open-Source Operating Systems	6
2	**Process Management** Processes, Process Scheduling algorithms, Threads, Multithreading Models, Thread Libraries, Inter process Communication, Communication in Client-Server Systems	6

3	**CPU Scheduling** Basic Concepts, Scheduling Criteria, Scheduling Algorithms: FCFS, SJF, Priority, Round Robin, Semaphores.	**6**
4	**Deadlocks** System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock	**6**
5	**Memory Management** Address Binding - Linking and Loading, Swapping, Contiguous Allocation Paging, Segmentation, Demand Paging, Process Creation, Page Replacement - FIFO, OPT, LRU, Allocation of Frames.	**6**

Text Books

Sr. No	Title / Edition	Author	Publisher
1	Operating System Concepts	Peterson Silber chats, Galvin	Addition Wesley Publication
2	Operating Systems: Internals and Design Principles	W. Stallings	PHI India Publication

Reference Books

Sr. No	Title / Edition	Author	Publisher
1	Operating System Concepts	Peterson Silber chats, Galvin	Addition Wesley Publication
2	Operating Systems: Internals and Design Principles	W. Stallings	PHI India Publication

Course Web Skilled Development -I

Course Type: Core Course (CC) **Couse Code: BCA CC-03**
Credit: 03 **LTP: 3:0:3**

Course Outcomes: After Studying that subject students would have capability to make own web site and host their own web site on internet. Also, students would have enough knowledge about what are the technologies used in internet.

CO#	Cognitive Abilities	Course Outcomes
1	Remembering	Define an appropriate planning strategy for developing websites.
2	Understanding	Explain and manipulate web media objects using HTML5 and CSS
3	Applying	Develop a webpage, using scripting languages to transfer data and add interactive components to other web pages
4	Analysing	Analyze a webpage and modify the web structure using the DOM model and utilize graphic design to enhance web pages.
5	Evaluating	Perceive a responsive website that works in the cross-platform environment and also a host and maintain that website in the real-time environment
6	Creating	Develop and implement solutions to problems encountered in all phases of the design process

Unit No.	Content	Contact Hr.
1	**Introduction to WWW:** Introduction, Concept of Internet- History of Internet, Protocols of Internet, Secure Connections, World Wide Web, URL, Web Server- Linux, Windows, Web Browser. **Web Design:** Web site design principles, planning the site and navigation	6
2	**Introduction to HTML:** Markup Language, Basic Structure of HTML, Head Section and Elements of Head Section, Creating an HTML document, Mark up Tags, Heading-Paragraphs, Line Breaks, HTML Tags. Working with Lists, Tables and Frames, Working with Hyperlinks, Images and Multimedia, Working with Forms and controls.	6

3	**Introduction to Cascading Style Sheets:** Need for CSS, introduction to CSS, basic syntax and structure, CSS Styling- Background, Text Format, Controlling Fonts, Working with Lists and Tables, CSS Selectors, CSS Advanced - Grouping, Dimension, Display, Positioning, Floating, Align, Navigation Bar, CSS Color, Creating page Layout and Site Designs.	**6**
4	**Introduction to JavaScript**: Introduction to Client-Side Scripting, Introduction to Java Script, How to develop JavaScript, simple JavaScript, variables, Operators, functions, conditions, loops and repetition, JS Popup Boxes, Validation of Forms	**6**
5	**Introduction to Web Publishing or Hosting:** Creating the Web Site Saving the site, working on the web site, creating web site structure, Creating Titles for web pages, Themes-Publishing web sites.	**6**

Text Books

Sr. No.	Title / Edition	Author	Publisher
1	HTML5 and CSS3 in Simple Steps, 2011, 6th Edition	Josh Hill	Pearson
2	JavaScript: The definitive Guide	David Flanagan	Oreilly Media
3	Principles of Web Design, 2014, 5th Edition	Joel Sklar,	Cengage Learning

Reference Books

Sr. No.	Title / Edition	Author	Publisher
1	HTML, XHTML, and CSS Bible, 5edition	Steven M. Schafer	Wiley India
2	Beginning HTML, XHTML, CSS, and JavaScript	John Duckett	Wiley India
3	Beginning CSS: Cascading Style Sheets for Web Design	Ian Pouncey, Richard York	Wiley India
4	Web Technologies: HTML, JavaScript	Kogent Learning	Wiley India

Course Programming Abstraction

Course Type: Core Course (CC) **Couse Code:** BCA-CC-4
Credit: 03 **LTP:** 3:0:3

Course Outcomes: On successful completion of the course the learner will be able to

CO#	Cognitive Abilities	Course Outcomes
1	Remembering	Define the basic concepts of Programming
2	Understanding	Explain the basic elements of programming language like data types, variables, operators, input & output etc.
3	Applying	Apply various operations on control flows like decision making, looping, arrays, string and functions.
4	Analysing	Analyse the drawbacks of POP comparing with the concepts of OOP paradigm & Identify and analyse the role of Classes &Objects, constructors &destructors in program design.
5	Evaluating	To know the importance of runtime polymorphism using virtual function and justify the concept of exception handling.
6	Creating	To Design & Implement various forms of Inheritance, and operator overloading.

Unit No.	Content	Contact Hr.
1	**Basics of Programming:** History of C++, Elements of C++: Character Set, Identifier & Keywords, datatypes, Variables & Constants, Comments, Assignment Statements. Input & Output in C++, Operators.	6
2	**Control Flow and Functions:** Decision Making, Looping Statements, break, continue, go to statement. Array & Strings, Functions: parameter passing (call by value, call by reference), return statement, recursion, function overloading, default arguments, inline function, built-in string functions.	6

3	**Object Oriented Programming with C++** Introduction to Object Oriented Paradigm, Characteristics of Object-Oriented Programming, Class & Object: Creation of Class, Object, Data Member, Member Function, Static Data member, Static Member Function, Access Specifiers. Constructor & Destructor: Types of Constructor, difference between constructor and destructor, friend function, friend class.	**6**
4	**Operator Overloading & Inheritance:** Introduction to Operator Overloading Overloading Unary & Binary Operators using member function. Overloading Unary & Binary Operators using friend function. Introduction to Inheritance: definition, concept. Types of Inheritance, Visibility Modes: Public, Private, Protected.	**6**
5	**Virtual Function & Exception Handling** Function Overriding, Virtual Function, Pure Virtual Function, Virtual Base Class, Abstract class. Exception Handling: Type of Errors, Exception, Exception Handling Constructs: Try-catch block.	**6**

Text Books

Sr. No.	Title / Edition	Author	Publisher
1	Object Oriented Programming with C++, 2013, Sixth Edition	E Balagurusamy	Tata McGraw-Hill
2	Mastering C++, 2013, Second Edition	Venugopal K R and Rajkumar Buyya	Tata McGraw Hill
3	The C++ programming Language, 2013, Fourth Edition	Bjarnestroustrup	Addison Wesley

Reference Books

Sr. No.	Title / Edition	Author	Publisher
1	The Complete Reference C++,2010, Fifth Edition	Herbert Schildt	Tata McGraw Hill
2	C++ By Example	Steve Donovan	Techmedia Publication
3	Professional C++	Nicholas A. Solter, Scott J. kleper	Wrox Publication
4	C++ Primer	Stanley B. Lippman, Josee Lajoie, Barbara E. Moo	Pearson Education

Course LAB-Web Skilled Development -I

Course Type: Core Course Laboratory (CCL) **Couse Code: BCA L-01**
Credit: 03 **LTP: 3:0:3**

Sr No.	Content
1	Design web pages for your college containing a description of the courses, departments, faculties, library etc, use href, list tags.
2	Create your class timetable using table tag.
3	Create user Student feedback form (use textbox, text area, checkbox, radio button, select box etc.)
4	Create a web page using frame. Divide the page into two parts with Navigation links on left hand side of page (width=20%) and content page on right hand side of page (width = 80%). On clicking the navigation Links corresponding content must be shown on the right-hand side.
5	Write html code to develop a webpage having two frames that divide the webpage into two equal rows and then divide the row into equal columns fill each frame with a different background colour.
6	Design a web page of your home town with an attractive background color, text color, an Image, font etc. (use internal CSS).
7	Use External CSS to format your class timetable as you created.
8	Use External, Internal, and Inline CSS to format college web page that you created.
9	Develop a JavaScript to display today's date.
10	Create HTML Page that contains form with fields Name, Email, Mobile No, Gender, Favorite Color and a button now write a JavaScript code to combine and display the information in textbox when the button is clicked.
11	Implement Validation in Feedback Form.
12	Simple Project (Any One) a) A Tribute Website b) Restaurant Website c) An Event Website d) A Conference Website e) Music Website f) Photography Website

Course Lab Based on BCA-CC-4 – Programming Abstraction

Course Type: **Core Course Laboratory (CCL)** **Couse Code:** **BCA-L2**
Credit: **03** **LTP:** **3:0:3**

Tools / Platforms: Visual Studio, Turbo C++-TCWin 4.5.

List of Practical:

Sr. No.	Contents
1	Write a program to demonstrate different types of operators used in CPP.
2	Write a program/s to demonstrate use of decision-making statements. 2.1 Write a program to demonstrate use of simple if statement. 2.2 Write a program to demonstrate use of if-else statement. 2.3 Write a program to demonstrate use of if-else-ladder statement. 2.4 Write a program to demonstrate use of switch-case statement.
3	Write a program/s to demonstrate use of looping constructs. 3.1 Write a program to demonstrate use of for loop. 3.2 Write a program to demonstrate use of while loop. 3.3 Write a program to demonstrate use of do-while loop. 3.4 Write a program to demonstrate use of nested for loop.
4	Write a program to implement function overloading.
5	Write a program to demonstrate use constructor and Destructor.
6	Write a program to demonstrate use of friend function.
7	Write a program to demonstrate use of friend class.
8	Write a program/s to demonstrate use of Inheritance. 8.1 Write a program to demonstrate use of single Inheritance. 8.2 Write a program to demonstrate use of multi-level Inheritance. 8.3 Write a program to demonstrate use of multiple Inheritance. 8.4 Write a program to demonstrate use of Hierarchical Inheritance.

9	Write a program/s to demonstrate use of operator overloading. 9.1 Write a program to demonstrate use of operator overloading using member function. 9.2 Write a program to demonstrate use of operator overloading using friend function.
10	Write a program to demonstrate use of Virtual functions.
11	Write a program to demonstrate use of Exception Handling.
12	List of Projects (Any One of the below) 12.1 Snake and Ladder Game 12.2 Library Management System 12.3 Banking Management System 12.4 Student I Card System

Course MS-Word essentials

Course Type: **Foundation Course (FC)** **Couse Code:** **BCA-FC-1**
Credit: **01** **LTP:** **1:0:0**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	Cognitive Abilities	Course Outcomes
1	Remembering	Show basic menus of Microsoft Word on the screen and recall the functionality
2	Understanding	Demonstrate the use various tabs, function and tools of Microsoft Word
3	Applying	Use various tabs, function and tools of Microsoft Word to create documents
4	Analysing	Analyze various documents, and inbuilt templates in MS-Word
5	Evaluating	Develop customize themes in MS-Word
6	Creating	Create a quality MS Word Document

Unit No.	Content	Contact Hr.
1	**Unit I** File Menu: New, Open, Save, Save As, Print. Home Menu: Clipboard, Font, Paragraph, Editing. Insert Menu: Pages, Table, Pictures, Illustrations, Header & Footer, Text, Symbols.	**5**
2	**Unit II** Design Menu: Document Formatting, Page Background. Layout Menu: Page Setup, Paragraph Mailings Menu: Start Mail Merge. Review Menu: Proofing. Views Menu: Views, Show, Zoom, Window.	**5**

Reference Books

Sr. No.	Title / Edition	Author	Publisher
1	Microsoft Word 2016 Step by Step	JoanLambert / Steve Lambert	Microsoft Press
2	Microsoft Word in 30 Minutes	Angela Rose	Quick Guides

Course Netiquette: Modern Tech Manners

Course Type: **Institute Level Course (ILC)** **Couse Code:** **BCA-IL-1**
Credit: **02** **LTP:** **2:0:0**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	Cognitive Abilities	Course Outcomes
1	Remembering	List basic email manners and show how to use them
2	Understanding	Understand the modern email manners and appropriate tones in the Email
3	Applying	Construct emails by applying the manners learnt
4	Analysing	Categorize the global and social email manners as per their use across the globe and time zones
5	Evaluating	Choose appropriate social media platform and its etiquette accordingly
6	Creating	Improve on all the manners as per their use in daily digital communication

Unit No.	Content	Contact Hr.
1	**Modern Email Manners** Subject Line Importance, Addressing Recipients, Reply, Reply All, bcc, Appropriate Tone, Finishing Touches, Closing Options, Professional Signatures, Appropriate Attachments	**7**
2	**Global Email Manners** Email Handshakes & Personal Introductions, Establishing Rapport, Destination Culture Greetings & Closings, Degrees of Urgency, Metric System & Temperature Conversions, 12-hour Clock and Date Formats, Culture Specific Tone & Humor, Important Contact Information	**7**

3	**Social Media Manners** Social Media Platforms, Privacy, Introductions, Virtual Relationships, Setting Boundaries & Limits, Online Respect and Conflict Resolution, What to Post, PR, Virtual Mistakes & Online Ego	**6**

Reference Books

Sr. No.	Title / Edition	Author	Publisher
1	Netiquette: Modern Manners for a Modern World	Nasrine Abushakra	CreateSpace Independent Publishing Platform
2	Netiquette Essentials	Scott Steinberg	CreateSpace Independent Publishing Platform

Course: Bridge Course for English

Course Type: Foundation Course (FC) **Course Code: FC-01**
Credit: 01 **LTP: 0:2:1**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	Cognitive Abilities	Course Outcomes
1	Remembering	Label the different parts of sentence, spell and pronounce correctly and can use words effectively while speaking the language
2	Understanding	Show and Integrate the use of language skill i.e. Reading, Writing & Speaking
3	Applying	Express distinctly the ideas using appropriate punctuation and cohesive devices
4	Analysing	Effective participation in conversations using Social and Professional Language
5	Evaluating	Check written and audio-visual content for grammatical correction
6	Creating	construct short paragraphs and essays for a specified task, to elicit to select to describe and summarize information

Unit No.	Content	Hr.
1	**Unit-I Reading** 1. Types of reading (skimming and scanning) 2. Types of reading (same with examples Newspaper / Magazine article, TV, feature and documentary, radio bulletins, advertising copy, press release in English, Hindi and Marathi) 3. Right pronunciation **4.** Comprehension Test	**3**
2	**Unit-II Writing** 1. Grammatical structure – Vocabulary, structure of sentences, Active / Passive voice, tenses. 2. Letter Writing – Application Letter, E-mail drafting, Informal, Paragraph writing 3. Idioms and Phrases	**3**

	4. Introduction to feature and script writing. 5. 100 frequently used management jargons	
3	**Unit-III Listening Skills & Speaking Skills** a. Importance of listening b. Types of listening **c.** Listening barriers d. Voice Modulation- Tone, e. Pitch f. Intensity g. Audibility and loudness h. Practical on Spoken English	**1**

Reference Books

Sr. No.	**Title / Edition**	**Author**	**Publisher**
1	Fundamentals of English Grammar	N.C. Sinha	Prabhat Prakashan
2	Basic Vocabulary In Use	Micheal McCarthy, Felicity O'Dell	Cambridge University Press
3	Professional Communication	Aruna Koneru	Tata Mc Graw Hill

SEMESTER II

Course Computer Organization Architecture

Course Type: **Core Course (CC)** **Couse Code:** **BCA CC-5**
Credit: **03** **LTP:** **3:0:0**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	Cognitive Abilities	Course Outcomes
1	Understanding	Basic Computer concepts.
2	Analysing	Computer I/O system
3	Remembering	Memory Concept
4	Applying	Would be able to perform function & operations
5	Relating	Decision making while operating PC's.

Unit No.	Content	Contact Hr.
1	**Introduction & Data Representation, Boolean Algebra** Concept of Digital Computer, Types of Software – System software / Application software / Utility Software., Compilers, Interpreters, Assemblers, Linker, Loader. Binary, Octal, Hexadecimal and their inter-conversion, 1's and 2's complement. Binary Arithmetic. & Number Systems – BCD, EBCDIC, ASCII. Logic Circuits: NOT, AND, OR, NAND, NOR, XOR, XNOR, Gated diagrams.	**6**
2	**Structure of Computers & Input / Output & Processor** Functional units of Computer, Bus Structures, The Arithmetic and Logic Unit, Instruction and Instruction Sequencing, Addressing Modes, Basic Input / Output Operations. Instruction types, Interrupt driven I/O- interrupt processing, design issues.	**6**

3	**Memory System** Memory Hierarchy, Primary Memory – DRAM, SDRAM, DDR, RDRAM. ROM, PROM, EPROM, EEPROM, Cache memory Structure, Cache memory principles, Elements of cache design- cache address, size, mapping functions, replacement algorithms, write policy, line size, number of caches, one level and two-level cache, performance characteristics of two-level cache- locality & operations. Onwards cache organization: DMA, DMA interfacing with processor.	**6**
4	**Superscalar Concept** I/O Instruction Execution – with timing diagram, Instruction **Cycle-** The machine cycle and Data flow. **Instruction Pipelining-** Pipelining Strategy, pipeline performance, pipeline hazards, dealing with branches, Instruction set: CISC and RISC.	**6**
5	**Parallel Processing** Parallel Processing, Concept and Block Diagram, Types (SISD, SIMD, MIMD, MISD), Multiprocessor Organization and performance measure Clusters Concept, Cluster Architecture.	**6**

Text Book

Sr. No.	Title / Edition	Author	Publisher
1	The essentials of Computer Organization and Architecture	Jones Bartlett Publication	Linda Null and Jullia Lobur

Reference Books

Sr. No	Name of Book	Publication	Author Name
1	Computer System Architecture	Pearson Education India	M. Morris Mano
2	Computer Architecture and Organization	Mc Graw -Hill	Hayes John P
3	Computer Organization and Architecture Designing for Performance	PHI Pvt. Ltd	William Stallings
4	Computer Organization	Mc Graw -Hill	Hamacher Carl ; Vranesic Zvonko ; Zaky Safwat

Course Open Source Operating System

Course Type: Core Course (CC) **Couse Code:** BCA-CC-6
Credit: 03 **LTP:** 3:0:0

Course Outcomes: On successful completion of the course the learner will be able to

CO#	Cognitive Abilities	Course Outcomes
1	Remembering	Outlined the basics of Linux OS
2	Understanding	Explanation of Linux logging in and logging out and create file systems and directories and operate them
3	Applying	Apply various operations on file and assign the file permissions.
4	Analysing	Compare the editors in Linux and commands of zipping the file.
5	Evaluating	Illustrate linux utilities like mv,cp,ls etc….
6	Creating	To develop the basic skills required to write programs in Linux OS

Unit No.	Content	Contact Hr.
1	**Linux Preamble** A Brief History of Linux, Basic features of Linux OS, components of Linux System, Benefits of Linux, Linux Distributions.	6
2	**System Access & User Accounts** Logging in And Logging out using Linux System, Basics Commands, Creating Additional User Accounts, Creating & Managing Users., Creating & Managing Groups,	6
3	**Files and Directories** File concepts, File system structure, file I/O operations (open, create, read, write, append, copy, move, delete), understanding and changing the file permissions file ownership.	6

	Directories: Creating, removing and changing Directories	
4	**Creating and Viewing Files & Archiving Files** Editors in Linux, Examining File Contents using Vi Editor, Redirection. Archiving Files (With Tar, CPIO, gzip) Zipping Files.	**6**
5	**Working in X Windows** Introduction to X Windows And GNOME, Managing Files and File Systems, Customizing X Windows, Choosing and Changing Window Managers and Desktops Remote X Window Access	**6**

Text Books

Sr.No	Book Name	Author Name	Publication
1	Linux Administration: A Beginner's Guide	Wale Soyinka	Tata McGraw Hill
2	Linux Pocket Guide: Essential Commands	Daniel J Barrett	Kindle Edition

Reference Books

Sr.No	Book Name	Author Name	Publication
1	Linux Administration Handbook,4th Edition	E.Nemeth, G. Snyder, T. Hein	Pearson Education
2	Suse Linus-1	McCallister	Pearson Education
3	Beginning Shell Scripting	Foster Johnson Welch, Anderson	Wiley India (Wrox)
4	Linux: The Complete Reference	Richard Petersen	Tata McGraw-Hill Education, 2007
5	Introduction to Linux – A Hands on Guide	Garrels, Machtelt	Wiley India (Wrox)

Course Database Management System

Course Type: Core Course (CC) **Couse Code:** BCA CC-7
Credit: 03 **LTP:** 3:0:3

Course Outcomes: On successful completion of the course the learner will be able to

CO#	Cognitive Abilities	Course Outcomes
1	Remembering	Define basic and fundamental Database concepts.
2	Understanding	Explain & manipulate the database using MySQL
3	Applying	Identify the model which are used to create the database.
4	Analyzing	Examine SQL queries for fetching of data from the database.
5	Evaluating	Determine the normalization technique to develop a database application.
6	Creating	Design and build a simple database system.

Unit No.	Content	Contact Hr.
1	**Database Management System Concepts** Introduction to file processing system and RDBMS, Significance of Database, Overview of DBMS, Components of DBMS, Database Architecture, Advantages and Disadvantages of Database Management System, DBMS Vs RDBMS, Role of DBA.	6
2	**ER & Data model** Entities and their Attributes, E-R Diagram, Relationship & Types, Development stages of E-R diagram & Examples, reduction of an ER diagrams to tables, Data Modelling for a Database.	6
3	**SQL (Structured Query Language)** SQL: SQL Introduction, SQL data type, Types of SQL commands, Concepts of Keys, Aggregate Functions – GROUPBY – HAVING , Numeric & character Function, DISTINCT keyword, AND & OR operator, DIVISION operator ,nested sub queries, Joined	6

4	**Constraints & Views** What are constraints, Types of constrains, Integrity constraints Normalization: Anomalies in a Database, Normalization Process, 1st NF, 2nd NF, 3rd NF. Views: Introduction to views, updates on views, comparison between tables and views, Sequence, Index	**6**
5	**Transaction Management in DBMS** Properties of transactions, transaction log, and transaction management with SQL using commit rollback and savepoint, Indexing and Hashing. Query Processing, Query Optimization.	**6**

Text Book

Sr.No	Book Name	Author Name	Publication
1	Database System Concepts	Silberschatz Abraham	Tata McGraw Hill
2	Database Management Systems	Narang Rajesh	Prentice Hall of India Pvt. Ltd.

Reference Books

Sr.No	Book Name	Author Name	Publication
1	Principles of Database Systems	Ullman Jeffrey D	Galgotiya
2	Fundamental Of Database Systems	Elmasri Ramez, Navathe Shamkant B	Pearson Education
3	Database System Concepts	Silberschatz A, Korth Henry, Sudarshan S.	Mc Graw -Hill
4	Database Management System	Raghu Ramkrishanan & Johannes Gehrke	Mc Graw -Hill
5	Foundations of databases	Serge Abiteboul, Richard Hull, Victor Vianu	Addison-Wesley, 1995

Course Java Programming

Course Type: Core Course (CC) **Couse Code:** BCA-CC-8
Credit: 03 **LTP:** 3:0:3

Course Outcomes: On successful completion of the course the learner will be able to

CO#	Cognitive Abilities	Course Outcomes
1	Remembering	To define the features and the advantages of Java Programming.
2	Understanding	To illustrate the structure of java program using basic programming concepts, like input output, control flow, array, string.
3	Applying	To apply various operations on control flows like decision making, looping, arrays, string methods.
4	Analysing	To analyze the role of Packages, Interfaces, Abstract classes, inner classes and implement wrapper classes.
5	Evaluating	To determine the uses of collection framework using different classes and interfaces of collection framework
6	Creating	To create GUI based applications using AWT controls and Explore the concept of Event handling

Unit No.	Content	Contact Hr.
1	**Basics of Java** Concepts of OOPs, JDK Environment & tools, Features of Java, Difference between C++ and Java, Structure of java program, Data types, Variables, Operators, Keywords, Comments, Compiling and Running Java Program using command lines, Input & Output in Java, Command line arguments, Decision Making, Looping, Type Casting, Array, String – String Methods.	6
2	**Class, Object & Packages in Java** Classes and Objects, Constructor, static field, static method, Inheritance, uses of super keyword, Method Overloading, Method Overriding, Abstract classes, Interfaces, Inner classes,	6

	Packages: Java Built in packages java.lang.math , java.util.Random, java.util.Date, java.util.Hashtable, Creating user defined packages, Wrapper classes, uses of Final keyword.	
3	**File and Exception Handling** Exception, Exception types, Using try-catch, multiple catch, throw, throws and finally, Creating user defined Exceptions File Handling, Stream Byte Stream Classes, Character Stream Classes, File: IO basics, creating file, Reading file (character, byte) Writing file (character, byte)	**6**
4	**Collection in Java** Collection Framework, Interfaces (Collection, List, Set, Sorted Set, Enumeration, Iterator, List Iterator), Classes (LinkedList, Array List, Vector, HashSet, Tree Set, Hash table), Working with maps, Map interface, Map classes - HashMap – Tree Map	**6**
5	**Applet, AWT Programming** Introduction, Applet Life cycle, Applet Classes (Color, Graphics, Font AWT), Components and container used in AWT, Layout managers, Listeners and Adapter classes.	**6**

Text Book

Sr. No.	Title / Edition	Author	Publisher
1	Head First Java, 2nd Edition	O'Reilly Media, Inc.	Bert Bates, Kathy Sierra

Reference Books

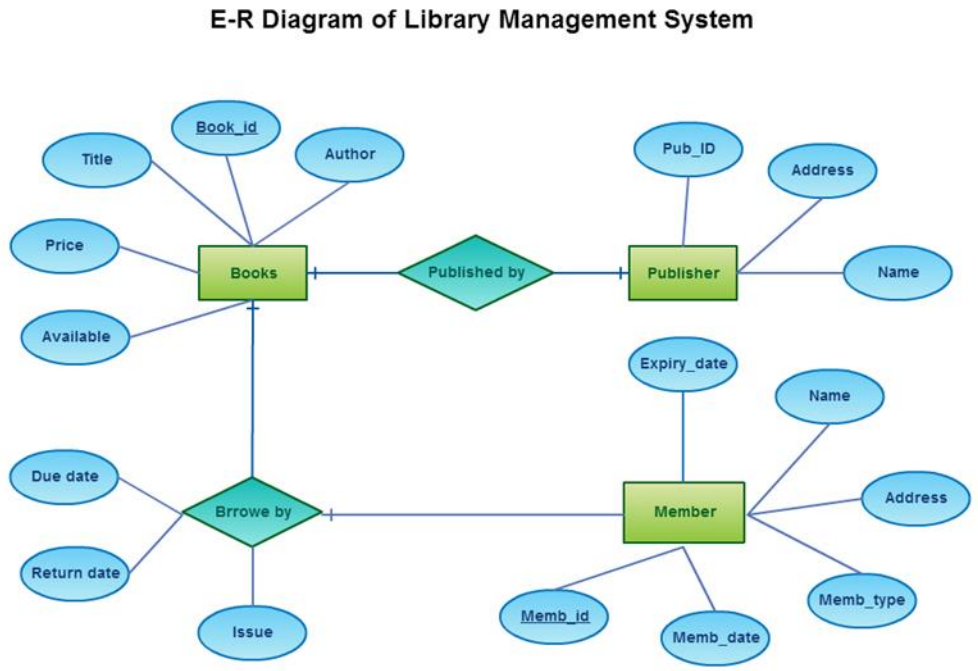
Sr. No.	Title / Edition	Author	Publisher
1	Java: The Complete Reference, Seventh Edition	Herbert Schildt	McGraw-Hill
2	Core Java Volume I—Fundamentals Ninth Edition	Cay S. Horstmann, Gary Cornell	Prentice Hall
3	Java A Beginner's Guide Sixth Edition	Herbert Schildt	McGraw-Hill Education
4	Java 2 Programming Black Book	Holzner Steven	Dreamtech

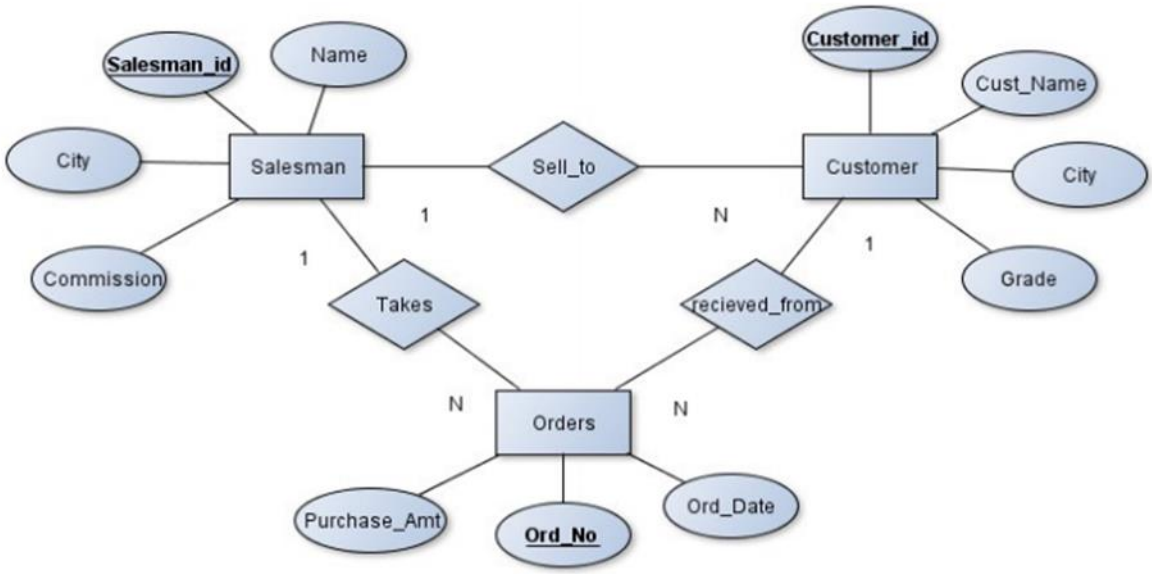
Course Lab on Database Management System

Course Type: Core Course Laboratory (CCL) **Couse Code:** BCA-L3
Credit: 03 **LTP:** 3:0:3

List of Practical:

Sr. No.	Practical
1	**Consider the following schema for a Library Database:** BOOK (Book_id, Title, Publisher_Name, Pub_Year) BOOK_AUTHORS (Book_id, Author_Name) PUBLISHER (Name, Address, Phone) BOOK_COPIES (Book_id, Branch_id, No-of_Copies) BOOK_LENDING (Book_id, Branch_id, Card_No, Date_Out, Due_Date) LIBRARY_BRANCH (Branch_id, Branch_Name, Address) **Create & insert values in a table**
2	**Perform following queries** a) List all the tables in the current database b) Display the structure of the employee table c) Add a new column Designation to the employee table
3	**Demonstrate CRUD (Create, Read, Update, Delete) operation**



4	**Create schema for above ER diagram & perform following operations** a) Retrieve details of all books in the library – id, title, name of publisher. b) Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation. c) Create a view of all books that are currently available in the Library.
5	**Create tables of given ER diagram & perform following operations** a) Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted. b) Create a view that finds the salesman who has the customer with the highest order of a day. c) List of all Salesman who had an customer from Jalgaon city. 
6	**Demonstrate Queries using Aggregate functions.**
7	**Defining different types of database constraint.** Create table with various constraints as PRIMARY KEY, FOREIGN KEY, and CHECK & NOT NULL Constraints.

8 Consider the following schema for a Hospital Database:

DOCTOR (Did, Dname, DAddress, Qualification)
PATIENTMASTER (Pcode, Pname, Padd, age, gender, bloodgroup, Pid)
ADMMITTEDPATIENT (Pcode, EntryDate, DischargeDate, WardNo, Disease)

1) Find the detail of doctor who are treating the patient of ward no3
2) Find the detail of patient who are admitted within period 03/03/2020 to 25/05/2020
3) Find the detail of patient who are suffered from blood cancer
4) Create view on DOCTOR & PATIENTASTER tables.

9 Consider the following schema & create table
CREATE TABLE EMPLYOEE INSERT RECORDS TO SOLVE QUERRY

Field Name	Data Type	Constraint
EMP_NO	INT	PRIMARY KEY
E_NAME	VARCHAR(30)	-
SALARY	INT	
HIRE_DATE	DATETIME	
JOB	VARCHAR(20)	
DEPT_NO	VARCHAR(20)	FOREIGN KEY

CREATE TABLE DEPT INSERT RECORDS TO SOLVE QUERRY

Field Name	Data Type	Constraint
DEPT_NO	VARCHAR(20)	PRIMARY KEY
D_NAME	VARCHAR(30)	-
LOC	VARCHAR(20)	-

1) Create a view emp_view insert , update view.
2) Find the detail of employee who work in dept no 20
3) Write a query to count the number of employee in each dept.
4) Demonstrate truncate and drop table.

10 Create the Following Table name as Actor And Solve Following Queries And Apply Any Three Constraints.

Field Name	Data Type	Constraint
NAME	VARCHAR(30)	-
BIRTHDATE	Date	-
SEX	VARCHAR(10)	Check Sex='Male' Or Sex='Female'
Salary	Int	
FlimName	VARCHAR(30)	-
Language	VARCHAR(30)	-

1) Update film name where actress name is 'Madhuri'.
2) Display actor name & salary where salary is in range of 60,000 & 90,000.
3) Display record of actress where name is Preeti, Madhuri, rani, Aishwarya.
4) Delete the record where actor's name is Salman.

11 Create A Table As Student

Field Name	Data Type	Constraint
Rollno	Int	Primary Key
Name	Varchar(30)	-
City	Varchar(30)	-
Sex	Varchar(10)	Check Sex='Male' Or Sex='Female'
Class	Varchar(30)	-
Subject	Varchar(30)	-

1) Change All Classes With 'BCA II' & Subject With 'DBMS'
2) List Of All Students For City As Jalgaon & Sex As Female.
3) Create view as Student_View

Course Lab Based on BCA-CC-8 - Java Programming

Course Type: Core Course Laboratory (CCL) **Couse Code:** BCA-L4
Credit: 03 **LTP:** 3:0:3

Tools / Platforms: JDK, Visual Studio, Text pad.

List of Practical:

Sr. No.	Practical
1	Write a program(s) to demonstrate a structure of Java program. 1.1. Write a program to find out a factorial of given number. 1.2. Write a program to print a Fibonacci series up to given terms. 1.3. Write a program to print a given number is prime or not.
2	Write a program to demonstrate a use of command line argument.
3	Write a program to implement different types of string methods.
4	Write a program to demonstrate a use of class and object.
5	Write a program to implement interface in java.
6	Write a program to demonstrate use of inner class. 6.1 Write a program to demonstrate use of local inner class. 6.2 Write a program to demonstrate use of member inner class. 6.3 Write a program to demonstrate use of Anonymous inner class.
7	Write a program to demonstrate how to create user defined package.
8	Write a program to demonstrate the exception handling mechanism.
9	Write a program to demonstrate file handling.
10	Write a program that demonstrates the use of Collection Classes
11	Write a program to demonstrate use of graphics methods using applet. 11.1 Write a program to draw a smiley face. 11.2 Write a program to draw a simple home.
12	Write a program to demonstrate use of AWT components of java.

13	List of Projects (Any One of the below) 1. Design simple calculator in Java 2. Develop Simple Library management system using Java 3. Online Exam Project in Java without database 4. Fee Report - Student Management System in Java

Course G-suite services

Course Type: **Institute Level Course (ILC)** **Couse Code:** **BCA-IL-2**
Credit: **02** **LTP:** **0:0:2**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	Cognitive Abilities	Course Outcomes
1	Remembering	Listing Google features
2	Understanding	Discuss all options in E-Mail
3	Applying	Expose various services provided by G-suit
4	Analysing	Illustrate google form and Google classrooms
5	Evaluating	Compare different template of Google form
6	Creating	Construct a quality Google form including the validation and ADD ON.

Unit No.	Content	Contact Hr.
1	**Unit I** Google account and Security, G-Mail Management System	4
2	**Unit II** Docs, Google sheets, Google calendar, Google Drive, google keep and google jam board	**8**
3	**Unit III** Google forms, Google classrooms	8

Reference Books

Sr. No.	Title / Edition	Author	Publisher
1	The Ridiculously Simple Guide to Google Apps (G Suite)	Scott La Counte	Ridiculously Simple Books
2	Hands-On G Suite for Administrators	Cesar Anton Dorantes	Packt Publishing

Course Internet Basics

Course Type: **Core Course (CC)** **Couse Code:** **BCA FC-3**
Credit: **01** **LTP:** **1:0:0**

Course Outcomes: On successful completion of the course the learner will be able to

CO#	Cognitive Abilities	Course Outcomes
1	Understanding	Illustrate the Basic Internet concepts.
2	Analyzing	Discover Communication Over Internet

Unit No.	Content	Contact Hr.
1	**Introduction to Internet, WWW and web browsers:** Internet Concepts: - WWW, Browser, Search-engine, Webpage, Client, Server, Broadband, Dial-u service, Domain name, Applications of Internet.	**3**
2	**Communicating Over the Internet:** What is ISP, Basics of internet connectivity related troubleshooting, Understanding URL, IP Address, Basic of Computer networks: LAN, WAN, MAN, Distinction between Internet and Intranet.	**3**

Reference Book

Sr. No.	Title / Edition	Author	Publisher
1	Computer Fundamental	Sinha P.K. And Sinha Priti	Bpb publications