



School of Computer Science & IT Devi Ahilya Vishwavidyalaya

SYLLABUS

BCA 3 years/ BCA (Hons./ Research) 4 years

Program Educational Objectives (PEOs)

- PEO 1:** Exhibit a strong inclination towards higher education and actively pursue in continuous development of their professional skills.
- PEO 2:** Develop communication and soft skills to inculcate professionalism for working in cross-cultural and global environment.
- PEO 3:** Build expertise on latest technological trends to bridge gap between industry and academia for better employability.
- PEO 4:** Evolve competency to design and develop computing applications that address the societal needs.

Program Specific Outcomes (PSOs)

- PSO 1:** Apply knowledge of computing and inter-disciplinary techniques to design and develop quality software applications.
- PSO 2:** Ability to use modern tools and frameworks to create innovative solutions in emerging areas.

IV - SEMESTER

CS-2004: INTRODUCTION TO COMPUTER ARCHITECTURE

Course Outcomes (COs):

CO1: Familiar with various measuring tools and functional units of CPU.

CO2: Aware about architecture of 8085 microprocessor.

CO3: Knowledge of assembly language programming.

CO4: Aware about computer arithmetic.

CO5: Understanding about various types of instruction formats and addressing modes.

Course Contents

UNIT-I

No. of Hours: 4

Technological trends, measuring performance: MIPS, CPI/IPC, Benchmark suite, Geometric and Arithmetic means, Speed up, Amdahl's law, Types of architecture.

UNIT-II

No. of Hours: 4

Introduction of 8085 Microprocessor: Architecture of 8085 processor. Register Architecture: Accumulator, Temporally Register and Flag Register. Program Counter, Stack pointer and Instruction register.

Addressing Modes: Direct addressing mode and Register direct Addressing Mode. Register Indirect Addressing Mode, Immediate Addressing Mode and Implicit or Implied Addressing Mode.

UNIT-III

No. of Hours: 4

Introduction to Assembly Language Programming: Various Instructions Classifications: Instruction Format, Opcode, Operand and Hex code. Instruction Operation Status, Various Instruction Sets: Data Transfer Group Instructions, Arithmetic Group Instructions, Logical Group Instruction, Branch Group Instructions: Conditional and Unconditional and Machine control Instructions.

UNIT-IV

No. of Hours: 4

Concept of Parallelism and their hazards. Cache Memory: Data caches, instruction caches and unified caches, cache implementations, fully associative and direct mapped caches, write back versus write through caches, Cache coherence.

UNIT-V

No. of Hours: 4

Multiprocessor Architectures: Introduction, architectures, Performance characteristics. Multicore architectures: single chip Multiprocessors, Flynn classification.

Text Books:

1. Computer Architecture: Sagem's outlines by Dr. Rajkamal.

Reference Books:

1. Computer Architecture and organization By William Stalling, Seventh edition Reference Material(s)
2. Computer Architecture & Parallel Processing, Hwang & Briggs, McGraw Hill
3. Computer Architecture and Organization by D. A. Patterson

Online Resources:

CS-2004: INTRODUCTION TO COMPUTER ARCHITECTURE - PRACTICAL

Course Outcomes (COs):

CO1: Understand the relationship between the hardware and software and how Assembly language allows direct interaction with the CPU.

CO2: Understand addressing modes and how Assembly language allows direct control over memory.

CO3: Gain the ability to understand and analyze error messages, stack traces, and other debugging outputs at the Assembly level.

CO4: Learn how high-level languages like C, C++, and Python are eventually translated into Assembly or machine code.

CO5: Learn to interface software with external hardware components at the Assembly level.

Course Contents

UNIT-I

No. of Hours: 4

Assembly Language Programming 8085 Processor

- a. Program to transfer data
- b. Program to arithmetic operation: 8-bit data
- c. Find sum of ASCII number.
- d. Product of two multi byte number.
- e. Program to find number of one's in a given 8-bit number.

UNIT-II

No. of Hours: 4

1. Write a Program for Addition of two 8-bit Hexa-decimal Numbers and Store the Result at 3050H Location. (Without Carry)
2. Write a Program for Addition of Two 8-bit Hexadecimal Numbers and Store the Sum and Carry at Memory Locations 2051H and 2052H Respectively.

UNIT-III

No. of Hours: 4

1. Program to Subtract Two 8-Bit Numbers Without Borrow in 8085.
2. Program to Subtract Two 8-Bit Numbers with Borrow in 8085

UNIT-IV

No. of Hours: 4

1. Program to Add Two 16-bit Hexadecimal Numbers and Store the Result at Memory Location 3050H.
2. Program to Swap Two Numbers in Memory Locations.

UNIT-V

No. of Hours: 4

1. Program to Move a Block of Data of 16 Bytes from Starting Addresses 2050H to 2060H in 8085.
2. Insert the character at the end of given string.

Text Books:

1. Advanced Microprocessors and Peripherals by A K Ray, Tata McGraw-Hill Education, 2006
2. The 8051 Microcontrollers: Architecture, Programming & Applications by Dr. K. Uma Rao, Andhe Pallavi, Pearson, 2009:

Reference Books:

1. Programming from the Ground Up" by Jonathan Bartlett, First Edition (2004).
2. The Art of Assembly Language" by Randall Hyde, 2nd Edition (2010)

Online Resources:

1. https://onlinecourses.nptel.ac.in/noc23_cs93/preview

CS-2402: INTRODUCTION TO DBMS

Course Outcomes (COs):

CO1: Conceptual clarity on database systems and their evaluation.

CO2: Database design issues from ER model to normalization.

CO3: Theoretical foundation of query languages through relational algebra.

CO4: Proficiency in SQL statements.

CO5:

Course Contents

UNIT-I

No. of Hours: 4

Introduction: purpose of DBMS, view of data, data models: physical model, logical model, conceptual model, hierarchical model, network model. Object oriented model. database language, Database administrator, database user, overall system structure.

UNIT-II

No. of Hours: 4

Entity relationship model: basic concepts, mapping constraints, keys, E-R diagram, weak, entity features, design of an E-R database schema, reduction of E-R schema to table.

UNIT-III

No. of Hours: 4

Structured Query Language(SQL):basic structure, set operations, aggregate functions, null values, nested sub queries, data definition language(DDL), data manipulation language(DML), data control language(DCL), transaction control language(TCL).

UNIT-IV

No. of Hours: 4

Relational database design: Decomposition, normalization using functional dependencies, normalization using multivalued dependencies.

UNIT-V

No. of Hours: 4

Concept of RDBMS, characteristics of RDBMS, Codd's 12 rules, introduction to oracle tools, security.

Text Books:

1. Database System concepts –Henry F. Korth , Tata McGraw Hill 6th Edition.

Reference Books:

1. Fundamentals of Database Systems”, Elmasri R, Navathe S, Addison Wesley 4th Ed.

2. An introduction to database system-Bipin C. Desai, Galgotia Revised Edition

3. An introduction to Database System -C.J Date, Pearson 8th Ed.

Online Resources:

CS-2402: INTRODUCTION TO DBMS - PRACTICAL

Course Outcomes (COs):

- CO1:** Develop Entity-Relationship (ER) models and convert them into relational schemas.
- CO2:** Implement SQL queries for database creation, manipulation, and retrieval of information.
- CO3:** Apply integrity constraints, normalization, and indexing for efficient database design.
- CO4:** Design and execute queries for real-world applications such as customer sales, student library, and hospital management.
- CO5:** Demonstrate database administration tasks such as installation, backup, and recovery.
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Course Contents

UNIT-I

No. of Hours: 4

1. Suppose you are given the following requirements for a simple database for the National Cricket League (NCL):

- the NCL has many teams,
- each team has a name, a city, a coach, a captain, and a set of players,
- each player belongs to only one team,
- each player has a name, a position (such as Bowler or batsman or allrounder), a skill level, and a set of injury records,
- a team captain is also a player,
- A game is played between two teams (referred to as host_team and guest_team) and has a date (such as May 11th, 2005) and a score (such as 4 to 2).

Construct a clean and concise ER diagram for the NCL database.

2. Construct an E-R diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted.

UNIT-II

No. of Hours: 4

1. Installation of Oracle.

2. Create Database Schema for a customer-sale scenario

Customer(Cust id, cust_name)

Item(item_id, item_name, price)

Sale(bill_no, bill_data, cust_id, item_id, qty_sold)

- a. Create the tables with the appropriate integrity constraints
- b. Insert around 10 records in each of the tables
- c. List all the bills for the current date with the customer names and item numbers
- d. List the total Bill details with the quantity sold, price of the item and the final amount
- e. List the details of the customer who have bought a product which has a price>200
- f. Give a count of how many products have been bought by each customer
- g. Give a list of products bought by a customer having cust_id as 5
- h. List the item details which are sold as of today

UNIT-III

No. of Hours: 4

Database Schema for a Student Library scenario

Student(Stud_no, Stud_name)

Membership(Mem_no, Stud_no)

Book(book_no, book_name, author)

Iss_rec(iss_no, iss_date, Mem_no, book_no)

- a. Create the tables with the appropriate integrity constraints
- b. Insert around 10 records in each of the tables
- c. List all the student names with their membership numbers
- d. List all the issues for the current date with student and Book names
- e. List the details of students who borrowed book whose author is CJDATE
- f. Give a count of how many books have been bought by each student
- g. Give a list of books taken by student with stud_no as 5
- h. List the book details which are issued as of today

UNIT-IV

No. of Hours: 4

Database Schema for a student-Lab scenario

Student(stud_no, stud_name, class)

Class(class, descrip)

Lab(mach_no, Lab_no, description)

Allotment(Stud_no, mach_no, dayofweek)

- a. Create the tables with the appropriate integrity constraints
- b. Insert around 10 records in each of the tables
- c. List all the machine allotments with the student names, lab and machine numbers
- d. List the total number of lab allotments day wise
- e. Give a count of how many machines have been allocated to the 'CSIT' class
- f. Give a machine allotment details of the stud_no 5 with his personal and class details
- g. Count for how many machines have been allocated in Lab_no 1 for the day of the week as "Monday"
- h. How many students class wise have allocated machines in the labs

UNIT-V

No. of Hours: 4

1. Prepare an ER model for College admission and Result Preparation.

2. Create database for the above ER model and write queries for following.

- a. Find the students name who are admitted in BCA Course.
- b. Show the detail of all student who pass in all subjects.
- c. Show the result of all student who obtain more than average marks in semester.
- d. Show detail of student who got highest percentage.
- e. List all students who obtain same marks as "Amit".
- f. List all students who appear in examination.

- g. Find how many students are admitted in college in year 2024.
- h. List all students along with their results.

Text Books:

1. NoSQL Distilled- Pramod J. Sadalage, Martin Fowler, Addison-Wesley, 2013
2. SQL, PL/SQL The programming language of Oracle-Ivan Bayross

Reference Books:

1. Oracle Database 10g: The Complete reference, Kevin Loney.

Online Resources:

1. https://onlinecourses.nptel.ac.in/noc22_cs91
2. https://onlinecourses.swayam2.ac.in/cec19_cs05

CS-2517: ADVANCED ICT TOOLS

Course Outcomes (COs):

CO1: Understand key concepts of advanced ICT tools.

CO2: To explore different ICT tools for different purposes.

CO3: Gain proficiency in creating and managing databases, querying data, and generating reports.

CO4: Develop skills to analyse, organize, and visualize data using formulas, functions, and charts.

CO5: To learn skills in using Web 2.0 tools for collaboration, content creation, and communication.

Course Contents

UNIT-I

No. of Hours: 6

ICT's definition and meaning, different ICT approaches, ICT's components and characteristics, its applications, the numerous types of interactive ICT tools, the benefits and drawbacks of ICT, Models of Access to ICT, significance of ICT in education.

UNIT-II

No. of Hours: 6

Different ICT tools used for different purpose like, developing Literacy, Quizzing /testing /Gaming, Presentation, Creative Creations, online collaboration etc. Creating Google forms and analyzing it.

UNIT-III

No. of Hours: 6

Advanced use of MS Access

Key features, parts or objects, file formats, security features, creating tables, types of databases, creating queries and relationships between tables in Access Database. Creating a form, report, report wizard, different sections of report, filter records, creating Pivot table view, sum up a column in a table.

UNIT-IV

No. of Hours: 6

Advanced use of MS Excel

Absolute and relative addressing, creating absolute reference, working with graph, function and its syntax, data sort, data filter, access macros in excel, recording and executing a Macros, Pivot table-creating, adding fields and grouping. VLOOKUP function and use of VLOOKUP function.

UNIT-V

No. of Hours: 6

Web 2.0 tools, Comparison between web1.0, web2.0, web3.0 and major features of web 2.0 and web3.0

Text Books:

1. Linda Foulkes, Learn Microsoft Office 2019, Packet Publishing Limited; Illustrated edition (29 May 2020).

2. Kevin Wilson, Exploring Microsoft Office: The Illustrated, Practical Guide to Using Office and Microsoft 365, Elluminet Press; 1st edition (30 November 2020)

Reference Books:

Online Resources:

1. <https://swayam.gov.in>
2. <https://www.geeksforgeeks.org/ms-access-a-gui-database>
3. <https://www.geeksforgeeks.org/excel-tutorial>

CS-2517: ADVANCED ICT TOOLS - PRACTICAL

Course Outcomes (COs):

CO1: To explore various ICT tools for diverse purposes and applications.

CO2: Develop proficiency in creating, managing databases, querying data, and generating reports by using MS Access.

CO3: Enhance skills to analyze, organize, and visualize data using formulas, functions, and charts.

CO4: To acquire skills in using Web 2.0 tools for collaboration, content creation, and communication.

CO5:

Course Contents

UNIT-I

No. of Hours: 4

To explore and practice some ICT tools used in different purpose-

- Developing Literacy, Quizzing/testing/gaming, Presentation, Creative Creation, Online collaboration, Creating Google forms and analysing it.

UNIT-II

No. of Hours: 6

Microsoft Access's Components: Tables, Queries, Forms and Reports

A. Create a Student Table with the following features:

Roll Number

Student Name

Class

Marks in Subject1, Subject2, Subject3, Subject4, Subject5

Total

Percentage

Division

B. Create a Library Database of your college having following fields and enter at least 30 records in it.

Field Name: Description

Book Code: Primary Key

Book Title: Subject Name

Publisher: Book Publisher Name

No. of Copies: Quantity in Invoice

No. of Pages: Total Pages in Book

Edition: Book Printing Edition

C. From the College Library database find out the following-

Total No. of Copies of Book subject wise

A report displays all books group by publisher

A report displays all books group by Book Title

A report displays all books group by Book Edition

UNIT-III

No. of Hours: 6

3) To design a simple database in MS Access to store customer information, product details, and order data, then perform basic operations like adding new customers, placing orders, and generating reports on sales and customer details.

1. Create Tables:

- Customers Table:

Fields: CustomerID (AutoNumber, Primary Key), FirstName, LastName, Address, PhoneNumber, Email

- Products Table:

Fields: ProductID (AutoNumber, Primary Key), ProductName, Price, Category

- Orders Table:

Fields: OrderID (AutoNumber, Primary Key), CustomerID (Foreign Key referencing Customers), ProductID (Foreign Key referencing Products), Quantity, OrderDate
Customers), ProductID (Foreign Key referencing Products), Quantity, OrderDate

2. Design Queries:

- Customer List:

- o Select all fields from the "Customers" table

- Product Details by Category:

- o Select ProductName, Price, Category from "Products" where Category = "Electronics"

- Order Summary:

- o Select CustomerID, OrderID, ProductName, Quantity, OrderDate from "Orders"

- o Join with "Customers" and "Products" tables using foreign keys

3. Create Forms:

- New Customer Form:

- o Fields: FirstName, LastName, Address, PhoneNumber, Email (allow data input for new customers)

- Place Order Form:

- o Fields: CustomerID (dropdown from "Customers" table), ProductID (dropdown from "Products" table), Quantity

4. Build Reports:

- Sales Report:

- o Display OrderID, CustomerName, ProductName, Quantity, Price, Total (calculated) from "Orders" table, joined with "Customers" and "Products" tables

- Customer List with Order History:

- o Display customer details from "Customers" table with a sub-report showing their order history from "Orders" table

UNIT-IV**No. of Hours: 8**

MS Excel understanding and using basic functions

- Using functions and graph- Sum, Average, Max, Min, Count, if and nested if function etc.
- Absolute, Mixed, and Relative Referencing.
- Various Chart- Bar chart/Pie chart /Line chart etc.
- Filtering and Sorting- filtering on text, numbers and colours
- Creating Pivot Tables- adding field and grouping
- Lookup functions- VLookup/HLookup
- Access Macros, recording and executing of it

UNIT-V**No. of Hours: 2**

5) Explore web 2.0 tools.

Text Books:

1. Linda Foulkes, Learn Microsoft Office 2019, Packet Publishing Limited; Illustrated edition (29 May 2020).
2. Kevin Wilson, Exploring Microsoft Office: The Illustrated, Practical Guide to Using Office and Microsoft 365, Elluminet Press; 1st edition (30 November 2020)

Reference Books:**Online Resources:**

1. <https://swayam.gov.in>
2. <https://www.geeksforgeeks.org/ms-access-a-gui-database>
3. <https://www.geeksforgeeks.org/excel-tutorial>

CS-3210: JAVA PROGRAMMING

Course Outcomes (COs):

CO1: identify classes, data members and member function for a specific problem.

CO2: Implement the concept of Inheritance and polymorphism.

CO3: Implement Packages.

CO4: Handle Exception, Multithreading, I/O basics and Applets.

CO5:

Course Contents

UNIT-I

No. of Hours: 8

Features of java: Object-Oriented programming overview: Introduction of java Technology, Installing java, java program development, java source file, compilation, execution. Data Types, Variables, Memory concepts, Naming conventions, primitive data type, declarations, variable name, numeric, literals, character literals, String, string literals, printing to console and taking input through console (scanner class).

Expressions: Assignment operator arithmetic operators, relational operators, logical operators, increment and decrement operators, conditional operator, operator precedence.

UNIT-II

No. of Hours: 8

Statements: conditional: if, else if, switch statement. Break and Continue, type conversion and casting, command-line arguments. Introduction to class, Objects, Methods and Instance Variable, primitive type vs reference type, Initializing objects with constructors, access modifiers, and encapsulation. Final instance variable, this reference, garbage collection and finalize method, overloading methods.

UNIT-III

No. of Hours: 8

Array declaring and creating array, passing array to methods, multidimensional array, variable length. Static method, static field and Math Class. String Handling: String constructors, data and member functions, character extraction, string comparison, string buffer etc. Inheritance: Inheritance basics, member access and inheritance, using super keyword, creating a multilevel hierarchy. Polymorphism: Method overriding, dynamic method dispatch, final method and classes, abstract classes and methods, instances of operator, The object class.

UNIT-IV

No. of Hours: 8

Package: defining a package, understanding CLASSPATH, access protection, importing packages, creating own packages. Interface: defining an interface, properties of interface, advantage of interface, achieving multiple inheritance through interfaces, variables in interfaces. Exception Handling: Introduction, Keywords (try, catch, throw, throws), finally keyword, chained exception, user defined exception.

UNIT-V**No. of Hours: 8**

Multithreading: what are threads, the java thread model, thread priorities, thread life cycle, creating thread and executing thread. Streams and Files: Introduction, files and streams, java stream class hierarchy. Executing file handling Applets: Applet basics, applet architecture, applet life cycle method, applet HTML tag and attributes, executing applet in web browser and in the appletviewer.

Text Books:

1. The complete reference by Herbert Schildt, Tata McGraw-Hill
2. JAVA how to program by Deitel & Deitel, Pearson education

Reference Books:

1. Head First JAVA by KathySierra & Bert Bates.

Online Resources:

IC-2911: COMMUNICATION SKILLS

Course Outcomes (COs):

CO1: Nurture students into well-balanced and positive thinking human beings. Developing students into professionals, who are capable of facing new challenges and becoming the winners in Life.

CO2: Enhancing Communication skills by practicing functions, processes and models.

CO3: Understanding of Effective Communication, Barriers to Effective Communication, order, advice, suggestions, motivation, persuasion, warning, education, raising morale, conflicts and negotiation, group decision making.

CO4: Practicing of various activities using dimensions of Communication- Upward, Downward, Lateral/Horizontal, Diagonal, grapevine, consensus, Channels of Communication- Formal, Informal; Patterns of Communication; Media of Communication-Verbal, Nonverbal.

CO5: Developing and delivering effective presentation, effective interpersonal communication, skills that maximize team effectiveness, good time management and effective problem solving.

Course Contents

UNIT-I

No. of Hours: 8

Communication : An Overview Definitions, Nature and Attributes, Purpose, Directions, Types, Kinds of communication network- Internal and External Communication, Channels of communication, Methods of communication- verbal and non-verbal.

UNIT-II

No. of Hours: 8

The Process of Communication Basics elements of communication process, Effective Communication - 7Cs of communication, Barriers to communication-Physical and external barriers, semantic and language barriers, socio-psychological barriers and corporate communication barriers; Methods of overcoming communication barriers.

UNIT-III

No. of Hours: 8

Listening Skills

Introduction, Definitions of listening, Importance of listening, Difference between hearing and listening, Principles of good listening, Types of listening, Barriers to effective listening, Strategies to improve listening skills, Ten commandments of listening.

UNIT-IV

No. of Hours: 8

Interview Meaning and definition, purpose, methods, types of interviews, Preparation of candidate for the interview, Interview Do's and Don'ts, Possible job interview questions, job interview mistakes, Handling job interview questions conclusion.

UNIT-V

No. of Hours: 8

Written Communication Business Letters, Types of business letters, Meetings documentation and minutes, Writing Memorandum, E-Mail writing, Paragraph writing, Job application and resume writing, Report Writing.

Text Books:

1. Business Communication by Bhagaban Das (Sathya Swaroop Debashish).

Reference Books:

1. Business Communication by K.K. Sinha

Online Resources: