



# 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.

## I - SEMESTER

## CS-1905A: English Language Lab

**Aim:**

To develop proficiency in English language.

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**Course Outcomes:**

- CO 1: Student will master English grammar.
  - CO 2: Students will understand English usage.
  - CO 3: Students will master sentence skills.
  - CO 4: Students will write with style and elegance.
  - CO 5: Students will learn to use rhetorical devices.
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**Unit-I**

Grammar: Noun, Pronoun, Adjective, Verb, Adverb, Preposition, Conjunction, Interjection, Subject, Predicate, Complements, Phrase, Clause.

**Unit-II**

Usage: Agreement of Subject and Verb, Agreement of pronoun and Antecedent, Using Verbs Correctly, Using Modifiers Correctly, Placement of Modifiers.

**Unit-III**

Mechanics: Capitalization, Punctuation (End Marks and Commas), Other Marks of Punctuation (Semicolons, Colons, Italics, Quotation Marks, Ellipsis Points, Apostrophes, Hyphens, Dashes, Parentheses, Brackets).

**Unit-IV**

Writer's Choices: Appositives, Appositive Adjectives, Compound Sentences, Relative Clauses, Noun Clauses, Adverb Clauses, Gerund Phrases, Participle Phrases, Infinitive Phrases, and Nominative Absolutes.

**Unit-V**

Rhetorical Devices: Parallelism, Antitheses, Climax, Simile, Analogy, Metaphor.

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**Text Books:**

- [ 1 ] Warriner's Handbook Sixth Course Holt
- [ 2 ] Writer's Choices Grammar to Improve Style

**Reference Book(s):**

OWL online Writing Lab

## IC-1905: English Language and Composition

### Aim:

The aim of the course is to develop proficiency in English grammar, vocabulary, and syntax, improve reading and writing skills, and enhance oral communication for confident and persuasive expression.

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### Course Outcomes:

- CO 1: Enhance reading skills through extensive engagement with English literature.
  - CO 2: Develop a strong foundation in basic language skills, including grammar and vocabulary.
  - CO 3: Improve writing skills with an emphasis on clarity, coherence, and structure.
  - CO 4: Strengthen critical thinking and analytical reading abilities.
  - CO 5: Build effective oral communication skills for confident and persuasive expression.
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### Unit-I

Literature

### Unit-II

Basic Language Skills

### Unit-III

Vocabulary

### Unit-IV

Sentence Structure

### Unit-V

Composition and Paragraph Writing

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### Text Books:

The textbooks listed for the course are:

1. English Language and Literary Heritage of India - Foundation course (English Language) published by the Commission for Scientific and Technical Terminology and M.P. Hindi Granth Academy (Edition first, 2017).
2. English Usage - Michael Swan

### Reference Book(s):

English Grammar and Composition - Wren and Martin

## CS-1019: Basic Electricals and Electronics

**Aim:**

The aim of this course is to provide an overview of evolution of electrical and electronics along with working principles of fundamental electronic devices and circuits.

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**Course Outcomes:**

- CO 1: Gain knowledge regarding the various laws and principles associated with electrical system.
  - CO 2: Understand the basic electronics and operational amplifier circuits.
  - CO 3: Apply the fundamental laws of electrical engineering to solve the simple AC circuits in steady state.
  - CO 4: Understand the Digital electronics and its applications.
  - CO 5: Acquaint the use of electrical and electronics concepts in projects and research.
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**Unit-I**

Circuit concepts: voltage, current, power and energy, circuit, network component (active and passive, unilateral or bilateral, linear and nonlinear, lumped or distributed). Resistance parameter, inductance parameter, capacitance parameter, Series and parallel elements. Energy sources (voltage source and current source), voltage and current relations.

DC resistive circuits: Kirchhoff's voltage law, Kirchhoff's current law, Practice with Examples. Voltage Division and Current Division, Series –Parallel Network Reduction Power in a Series Circuit, Power in Parallel Circuit.

**Unit-II**

Network theorems: Star-Delta transformation, Ex. 1& 2 superposition theorem Explanation with example. Thevenin's theorem, Practice with Example maximum power transfer theorem.

DC mesh and node Analysis: Mesh analysis with Example, Norton's theorem, Practice with Example. Mesh equation by inspection method. Nodal analysis, node equation by inspection method. Source transformation technique.

**Unit-III**

Circuit Transients: Introduction initially charged RC circuit, RL circuit with initial current. Time Constant, Equivalent RC or RL Circuits RL and RC Circuit with Sources. Series RLC Circuit: Overdamped, Critically Damped, Underdamped Condition. Example on RLC Circuit Two Mesh Circuits. Sinusoidal Circuit analysis: Introduction, sinusoidal voltage and current (instantaneous value, peak value, peak to peak value, average value, root mean square value, peak factor, form factor.

**Unit-IV**

Element responses (phase relation in a pure resistor, inductor and capacitor). Series RL sinusoidal Response, Examples. Phasors: Phasors as Complex Numbers. Series RC Sinusoidal Response,

Example. Power and Power Factor: Instantaneous Power, Average Power, Apparent Power and Power Factor, Reactive Power, Power Triangle.

### Unit-V

Introduction of Digital Electronics: Analog representation, Digital representation. Digital and analog systems: Advantages and Limitations of digital techniques. Digital Number Systems: Decimal system, Binary System, Binary Counting. Representing Binary Quantities, Digital Circuits/ logic circuits, Parallel and serial Transmission. Digital Computers: Block Diagram of Digital Computers, Major Part of Digital Computers. Digital Logic Gates: AND, OR, Inverter, Buffer, NAND, NOR, Exclusive- OR, Exclusive-NOR: Graphic symbol, algebraic function, Truth Table. Cascading of Gates.

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### Text Books:

1. Mahmood Nahvi, Joseph A. Edminister, "Electric circuits", Schaum's Outline Series, Indian Edition, 2020.
2. A. Sudhakar and Shyammohan, Circuits and Networks: Analysis and Synthesis, Fifth Edition, McGraw-Hill Education, 2017.
3. M.Morris Mano, Digital Logic and Computer Design, Pearson Education India, First Edition, 2016.

### Reference Book(s):

1. Wayne Tomasi and Neil Storey, A Textbook On Basic Communication and Information Engineering, Pearson, 2010
2. M.S.Sukhija and T.K.Nagsarkar, Basic Electrical and Electronics Engineering, Oxford University Press, 2012.
3. Anant Agarwal, Jeffrey Lang, Foundations of Analog and Digital Electronic Circuits, Morgan Kaufmann Publishers, 2005.

## CS-1004: Introduction to Computer Fundamentals

### Aim:

To know the basics of computer along with its operations.

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### Course Outcomes:

- CO 1: Know the basic concepts of computer system and its generations.
  - CO 2: Acquaint the students with the number system
  - CO 3: Basic knowledge of Input Output devices and storage units.
  - CO 4: Adequate knowledge to understand the various software and programming language.
  - CO 5: Exposure of various communication model and network types.
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### Unit-I

Brief history of development of computers, Computer system concepts, Computer system characteristics, Capabilities and limitations, Types of computers Generations of computers, Personal Computer (PCs) - evolution of PCs, configurations of PCs- Pentium and Newer, PCs specifications and main characteristics. Basic components of a computer system- Control unit, ALU, Input/output functions and characteristics, memory - RAM, ROM, EPROM, PROM and other types of memory.

### Unit-II

Number System - Introduction, Digital and Analog Operations, Binary Data, Binary Number System, Decimal Number System, Octal Number System, Hexadecimal Number System, conversions from one base to another base.

Codes: ASCII code, EBCDIC code, Gray code. Boolean algebra, De -Morgan's theorem.

Binary arithmetic: addition, subtraction, multiplication & division, unsigned binary numbers, signed magnitude numbers, 1's complement & 2's complement representation of numbers.

Logic gates: AND, OR, NOT, NAND, NOR, X-OR and X-NOR gates, their symbols and truth tables.

### Unit-III

Input/output & Storage Units: Keyboard, Mouse, Trackball, Joystick, Digitizing tablet, Scanners, Digital Camera, MICR, OCR, OMR, Bar-code Reader, Voice Recognition, Light pen, Touch Screen, Monitors - characteristics and types of monitor -Digital, Analog, Size, Resolution, Refresh Rate, Interlaced / Non- Interlaced, Dot Pitch, Video Standard - VGA, SVGA, XGA etc., Printers & types - Daisy wheel, Dot Matrix, Inkjet, Laser, Line Printer, Plotter, Storage fundamentals - Primary Vs Secondary , Various Storage Devices - Magnetic Tape, Magnetic Disks, Hard Disk Drives, Floppy Disks (Winchester Disk), Optical Disks, CD, VCD, CDR, CD-RW, Zip Drive, flash drives Video Disk, Blue Ray Disc, SD/MMC Memory cards. Hard Disk Drives, Floppy Disks (Winchester Disk), Optical Disks, CD, VCD, CD- R, CD-RW, Zip Drive, flash drives Video Disk, Blue Ray Disc, SD/MMC Memory cards.

#### **Unit-IV**

Software and its Need, Types of Software - System software, Application software, System Software- Operating System, Utility Program, Programming languages, Assemblers, Compilers and Interpreter, Introduction to operating system for PC/DOS Windows, Linux. Programming languages- Machine, Assembly, High Level, 4GL, their merits and demerits, Application Software and its types - Word-processing, Spreadsheet, Presentation Graphics, Data Base Management Software, characteristics, Uses and examples and area of applications of each of them, Virus working principles, Types of viruses, virus detection and prevention.

#### **Unit-V**

Use of communication and IT, Communication Process, Communication types- Simplex, Half Duplex, Full Duplex, Types of Network - LAN, WAN, MAN. Topologies of LAN - Ring, Bus, Star, Mesh and Tree topologies.

Components of LAN - Media, NIC, NOS, Bridges, HUB, Routers, Repeater and Gateways. Internet-Evolution, World Wide Web Internet Services, Convergence of technologies.

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#### **Text Books:**

Pradeep K Sinha, Priti Sinha, Computer Fundamentals, Sixth Edn. BPB Publications

#### **Reference Book(s):**

1. S. K. Basandra, "Computers Today", Galgotia Publications.
2. Alexis Leon & Mathews Leon, "Fundamentals of Information technology", Vikas Publishing House, New Delhi.
3. V. Rajaraman, Neeharika Adabala, Computer Fundamentals, PHI.

## CS-3207: Object Oriented Programming Through C++ - I

### Aim:

Aim of this course is to strengthen practical approach and develop ability to handle qualitative software through object-oriented programming language

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### Course Outcomes:

- CO 1: Demonstrate the ability to analyze and develop skill to solve programming problems through flowcharts and algorithms.
  - CO 2: Ability to declare and initialize variables of different data types and perform various operations using operators.
  - CO 3: Exposure to implement iterative problems by utilizing looping structures.
  - CO 4: Enhance knowledge to assign and modify data using array, string and structure.
  - CO 5: Ability to design, implement and utilize functions to handle real world applications.
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### Unit-I

Introduction to Computer-Based Problem Solving: Problem Identification, Definition and Problem-Solving Strategies. Program, Features of Good Program. Procedural Programming, Structured Programming and Object-Oriented Programming, Classification of Programming Languages: Low-level, High –level language, Programming Environment: Assemblers, Compiler, Interpreter, Linker, Loader. Program Design with Flow chart and Algorithm: Symbols in flowcharts, Importance of Flowchart, writing algorithm, Importance of Algorithm, Developing and debugging flowchart for programming problems.

### Unit-II

fundamentals of Object-Oriented Programming: Overview of C++, Structure of a C++ Program, C++ character set, Identifiers and Keywords, Data types, Primitive data types in C++, Variables and Constants, Variable declaration and initialization, Constant declaration. Operators and Expressions: Arithmetic operators, Logical operators, Relational operators, assignment operator and conditional operators, Expression, Implicit and explicit type conversion, Precedence and Associativity of operators, Manipulators, Evaluation of expressions.

### Unit-III

Basic Input/Output Operations: Formatted I/O, Unformatted I/O, getchar (), putchar (), gets () and puts () functions. Control Constructs: Sequence Control Structure, if-else statement, switch-case statement, Loop Control Structure, while loop, do-while loop, for loop, Jump Statements, break, Continue, goto, return, Local and Global variables, Qualifiers effecting scope and visibility of variables: Static, Auto, Extern and Register variables.

### Unit-IV

Array: Array Declaration and initialization, Array operations (like traversal, searching an element, sorting array elements), 2 D Array and multidimensional array, Declaration and initialization, Matrix

operations, Advantages and limitations of Array. String: String declaration, String manipulation, String functions. Structure and Union: definition and declaration and access members.

### **Unit-V**

Function: User defined Function, Function prototype, definition and calling, Actual and formal arguments, Function with arguments and without arguments, Communication between functions. Introduction to class: Class specification, Access class member, access specifiers in C++: Public, Private and Protected data member and member functions, defining a member function of a class outside the class using scope resolution operator.

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#### **Text Books:**

Tony Gaddis, Starting out with C++: from control structures through objects (7e).

#### **Reference Book(s):**

1. B. Lippman, C++ Primer
2. Bruce Eckel, Thinking in C++
3. K.R. Venugopal, Mastering C++
4. Herbert Schildt, C++: The Complete Reference.
5. Bjarne Stroustrup, The C++ Programming Language.
6. Sourav Sahay, Object Oriented Programming with C++

## IC-1924: Hindi Language

### Aim:

स्नातक स्तर के विद्यार्थियों को सम्प्रेषण कौशल में दीक्षित करना

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### Course Outcomes:

- CO 1: साहित्य के साथ व्यापक जुड़ाव के माध्यम से पढ़ने के कौशल को बढ़ाएं।  
CO 2: व्याकरण और शब्दावली सहित बुनियादी भाषा कौशल में एक मजबूत आधार विकसित करें।  
CO 3: स्पष्टता, सुसंगतता और संरचना पर जोर देकर लेखन कौशल में सुधार करें।  
CO 4: आलोचनात्मक सोच और विश्लेषणात्मक पढ़ने के कौशल को मजबूत करें।  
CO 5: आत्मविश्वासपूर्ण और प्रेरक अभिव्यक्ति के लिए प्रभावी मौखिक संचार कौशल का निर्माण करें।
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### Unit-I

- (क) मानक हिंदी भाषा  
(ख) अशुद्धियाँ और उनका संशोधन

### Unit-II

- (क) हिंदी का शब्द-भण्डार  
(ख) हिन्दी की वाक्य-रचना और विराम चिह्न

### Unit-III

पत्र लेखन, सार-लेखन और पल्लवन

### Unit-IV

- (क) भारत देश और उसके निवासी  
(ख) भारतीय समाज की संरचना  
(ग) सामाजिक गतिशीलता  
(घ) धर्म और दर्शन

### Unit-V

- (क) भारतीय संस्कृति का विश्व पर प्रभाव  
(ख) मध्यप्रदेश का संस्कृतिक वैभव
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### Text Books:

भारतीयता के अमर स्वर

**Reference Book(s):**

Swayam Prabha 34 DTH Channel

SCSIT, DAVV, Indore, MP - 452017