



School of Computer Science & IT Devi Ahilya Vishwavidyalaya

SYLLABUS

M.Sc (Integrated) Cyber Security 5 years

Program Educational Objectives (PEOs)

- PEO 1:** Acquire comprehensive knowledge in cybersecurity and develop global competence for pursuing higher education or taking up advanced research challenges.
- PEO 2:** Demonstrate technical, analytical, teamwork, and entrepreneurial skills to innovate and address global cybersecurity challenges.
- PEO 3:** Excel as a cybersecurity professional, not only to address challenging issues of cybercrime but also to create awareness in society about potential threats.

Program Specific Outcomes (PSOs)

- PSO 1:** Acquire knowledge of secure computing systems and networks, and apply that knowledge to design and implement robust security solutions.
- PSO 2:** Develop expertise in identifying, assessing, and mitigating cyber threats using modern tools, while adhering to ethical and legal standards in cybersecurity.

I - SEMESTER

CS-1201: Fundamentals of Programming and Problem Solving through C

Aim:

The aim of this course is to develop problem-solving skills through C programming language and apply the skills to software project development

Course Outcomes:

- CO 1: Understand a problem and develop flowchart for it
 - CO 2: Understand the syntax and rules of C programming language
 - CO 3: Develop the problem-solving skills to solve logical & mathematical problems through C
 - CO 4: Design solutions to intermediate level problems
 - CO 5: Apply your skills in real world software development
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Unit-I

Overview of Problem Solving: Introduction to Computer based Problem Solving, Classification of programming languages, Programming Environment: Assemblers, compilers, interpreters, linkers, and loaders. Programming Concepts with Flowcharting and algorithms, Developing and debugging flowcharts for Programming Problem

Unit-II

Fundamentals of C Language: Overview of C, C character set, identifiers and keywords, Data types, Various Constructs of a C Program, Coding style, Data types and Format Specifiers, Constants and Variables, Expressions and Operators, Basic Input/ Output operations, Formatting Characters, Sequence Control Structures, Decision Control Structures

Unit-III

Arrays and Loop Control Structures: Introduction to Arrays, Array initialization, bound checking. Advantages and disadvantages of Arrays, 2D and multidimensional array, Loop Control Structures, Case Control Structures, Nesting of loops

Unit-IV

Functions: Introduction to user defined functions, Functions with and without arguments, Communication between functions (Function calling other functions), Recursive function, Self and Mutual recursion

Unit-V

Pointers: Introduction to Pointers: Pointer declaration, pointer arithmetic and operations on Pointer. Dynamic Memory allocation and pointer, Uses of pointers and its pitfalls, pointers to various user-defined and standard data types. Concept of function pointers, function pointer prototype and parameter passing, Call by reference and Call by value, Dynamic Memory allocation using malloc() and calloc(), String Handling: Pointers and strings, standard library string functions, array of pointers to strings and its limitation, Matrices Operations along with examples. Introduction of Storage classes (register, static, auto and extern) and their differences

Text Books:

Herbert Schildt, "C The Complete Reference", Osborne/Mc-Graw Hill Education, Fourth Edition, 2000

Yashavant Kanetkar, "Let us C", BPB Publications, Fifteenth Edition, 2018

E. Balaguruswamy, "Programming in ANSI C", Tata Mc-Graw Hill Education, Seventh Edition, 2016

Reference Book(s):

B.W. Kernighan & D.M. Ritchie, "The C Programming Language", Prentice Hall India, Second Edition, 1988

Yashwant Kanetkar, "Pointer in C", BPB Publication, First Edition, 2003

V. Rajaraman, "Computer Programming in C", Prentice Hall India, First Edition, 1994

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CS-1103: Physics

Aim:

The course aims to provide students with a comprehensive understanding of the fundamental concepts of physics, its impact on society and the role of physics in computer science

Course Outcomes:

- CO 1: Learn the basics of quantum physics, electromagnetic waves and its applications.
 - CO 2: Understand the importance of nanotechnology, lasers and fiber optics.
 - CO 3: Gain the knowledge of semiconductors and working principles of semiconductor devices.
 - CO 4: Develop the ability to apply knowledge of devices used in the field of computer science
 - CO 5: -
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Unit-I

Quantum physics

Unit-II

Semiconductors and devices

Unit-III

Dielectric and magnetic materials

Unit-IV

Nanotechnology

Unit-V

LASER and Fiber optics

Text Books:

A text book of engineering physics by M.N. Avadhunulu, P.G. kshirsagar, S. Chand publications
Engineering physics by shatendra sharma and jyotsna sharma, Pearson publication, 2019

Reference Book(s):

Quantum physics, H.C. verma, TBS Publications, 2nd edition 2012
Fundamentals of physics- Holliday, Resnick, John willey & sons, 11th edition, 2018
Introduction to solid state physics, Charles Kittle, Wiley Eastern, 2019
Nano Materials, A.K. Bandhopadhy, New age internation, 1st edition 2007

CS-2005: Digital System Design

Aim:

To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.

Course Outcomes:

- CO 1: Gain knowledge regarding the various laws and principles associated with electrical system.
 - CO 2: Understand and examine the structure of various number systems and its application in digital design
 - CO 3: Solve Boolean expressions using Boolean Theorems and K-maps.
 - CO 4: Analyze the working mechanism of combinational and sequential circuit in designing digital logic circuit.
 - CO 5: Apply the concept of VHDL in designing of Digital Logic circuits
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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.

Unit-II

Number Representation: Binary – Octal – Hexadecimal - BCD – excess three – Gray codes – Error correcting and Detecting Codes – Representation of signed number – arithmetic operation on signed number - Alphanumeric data representation

Unit-III

Boolean Algebra and Logic Gates: Boolean relations – Laws and theorems – And, OR, NOT, NAND and NOR gates – Exclusive OR gates – Positive and negative logic system – Simplification – Karnaugh maps and simplifications – Don't care condition – NAND-NAND realizations-PAL and PLA Logics.

Unit-IV

Design of Arithmetic and Logic Unit: Combinational logic circuits – Encoder, decoder, Multiplexer and Demultiplexer – Representation of integer data, Integer adder, Integer multipliers, Design of integer unit- floating point representation of real data –IEEE representation Floating-point adder/subtractor- Floating-Point multiplier, Design of Floating point unit- Design of ALU.

Unit-V

Design of Registers and Memory Unit: Flip-flops, Synchronous sequential circuits- Registers and counter; Memory unit construction – State Machine Design – State machine as a sequential Controller, Moore and Mealy state machines; Derivation of state graph and tables; sequence detector.

Text Books:

- 1.C.H. Roth and L.L.Kinney,"Fundamentals of Logic Design", Cengage Learning, 2014
- 2.William Stallings, "Computer Architecture and Organization Designing for Performance", Pearson Education, 2014
- 3.C.Hamacher, Z.Vranesic,S.Zaky and N.Manjikian, "Computer Organization and Embedded Systems", McGraw-Hill, 2012

Reference Book(s):

- 1.Mano M.M, "Computer System Architecture", Pearson Education, 2017
- 2.S. Brown, Z Vranesic, "Fundamentals of Digital Logic with VHDL Design", McGraw-Hill Education, 2009

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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.

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

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-1101: Mathematics – 1

Aim:

The aim of this course is to provide mathematical background to the students so that they can understand the importance of mathematics in computer science.

Course Outcomes:

- CO 1: Learn basic knowledge of differential calculus and integral calculus.
 - CO 2: Solve differential equations and matrices.
 - CO 3: Gain adequate knowledge to understand the boolean algebra.
 - CO 4: Develop the ability to apply knowledge of mathematics in computer science.
 - CO 5: Basic understanding of mathematics is used to computer application scientific computing, computer security, structural problem solving, analyze and simplify digital circuits, research areas of computer science.
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Unit-I

Basic of calculus, Successive differentiation, Leibnitz theorem and problems, Maclaurin's and Taylor's series, Partial differentiation, Euler's theorem and its application in approximation and error, Maxima and minima of two variables, tangents and normals, subtangent and subnormal, Curvature, radius of curvature, centre of curvature (Cartesian and polar co-ordinates).

Unit-II

Definite integral as limit of a sum, Application in Summation of series, Double and Triple integrals, change of order of integration, beta and gamma functions. Length of the curve, volume and surfaces, using double and triple integral.

Unit-III

First Order Ordinary Differential Equation, Exact Differential Equation. Higher Order Ordinary Differential Equation: Linear differential equation with constant coefficients Homogeneous linear differential equation, simultaneous differential equations.

Unit-IV

Matrix Algebra. Elementary Operation on Rows and Columns, Normal Form, Linear Dependence, Rank, Application of Rank Theory in Solving System of Linear Equations, Linear transformation, solution of simultaneous equation by elementary transformation, consistency of equation. Eigen value and Eigen vectors, Cayley-Hamilton theorem and its application to find the inverse.

Unit-V

Algebra of logic, Boolean algebra, principle of duality, basis theorems, Boolean expression and function. Graph theory, Graphs, Sub-graphs, degree and distance, Tree, Cycles and Network, Elementary concept of fuzzy logic.

Text Books:

1. Dr. D.C. Agarwal, "Engineering Mathematics-I", Shree Sai Prakashan, 2022.
2. H. K. Dass, "Higher Engineering Mathematics", S. Chand & Company, 2014.

Reference Book(s):

1. Dr. B. S Grewal, "Higher Engineering Mathematics", 36th Edition, Khanna Publishers, 2001.
2. BV Ramana, "Higher Engineering Mathematics", Tata McGraw-Hill Education, 2006.

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