



Yogoda Satsanga Palpara Mahavidyalaya

NAAC Accredited ('B' Grade) and NCTE Recognized (B.Ed. and M.Ed Courses)
affiliated to
Vidyasagar University, Midnapore and WBUTTEPA, Kolkata, (Govt. of West Bengal)

At + P.O : Palpara, Dist : Purba Medinipur, PIN Code – 721458, West Bengal, India

B.Sc. Honours in Computer Science Programme Specific Outcome (PSO)

The student will be capable of the following after completing the UG in Computer Science programme:

- To improve the skill set and analytical capabilities required for creating computer-based systems.
- Fixes for issues that arise throughout daily life.
- To assist students in establishing a fruitful career in computer science.
- Creative business people who can create software goods.
- Apply your skills of mathematics and computing to the discipline.
- Develop your computer-based problem-solving skills.
- Create the application with coding languages.
- The capacity to comprehend computer system ideas and development approaches.
- To enhance both their general computing skills in higher education and their success in entrance exams (such as JEST, JECA, CUCET, UGC-NET, GATE, and TIFR).

Course Outcome (CO)

Semester - I

- COSHCC-01: Programming Fundamentals using C/C++ (Theory)

Outcomes: The course is intended to provide knowledge of C and C++. Students will be able to design logics that will aid in the creation of applications and programmes.

The following knowledge will be available to the students upon completion of this course:

- Be familiar with fundamental C and C++ ideas.
- Control Statements & C language fundamentals.
- Control structures, arrays, strings, and functions are looped.
- Structure, Union, Pointers, Filehandling.
- C++ fundamentals.
- Class and object overloading.
- Polymorphism and inheritance.
- Templates and exception handling.
- The capacity to read, write, and debug simple C and C++ programmes.
- Become proficient in datatypes, fundamental operations, portability concerns, and standard programming.



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COSHCC-01: Programming Fundamentals using C/C++ (Practical)

Outcomes : The following will be knowledgeable by students:

- Recognize what datatypes, loops, functions, arrays, pointers, strings, structures, and files are.
- Examine issues, mistakes, and exceptions.
- Use your knowledge of programming to compile and debug programmes to identify solutions.
- Recognize the distinction between procedural and object-oriented programming languages.
- A programme that makes use of C++ features including polymorphism, operator overloading, inheritance, and object composition.
- Create the necessary textual descriptions and graphics to convey an object-oriented

• COSHCC-02: Computer System Architecture (Theory)

Outcomes : The following will be knowledgeable by students:

- Understanding the fundamental ideas and design of computers is aided by computer architecture.
- Students will learn the following after completing the course:
- Understand the central processing unit's theory and architecture.
- Examine some of the design-related concerns in terms of cost, performance, technology, and speed.
- Create a straightforward CPU by putting the theory concepts to use.
- Design, validate, and test the CPU architecture using the proper tools.
- Become familiar with the ideas of pipelining, parallel processing, and inter-processor communication.
- Be familiar with the design and operation of the central processing unit.
- Better illustrate how I/O and memory are organised.
- Define binary addition and several number systems.

• COSHCC-02: Computer System Architecture (Practical)

Outcomes:

- Reduce the use of Boolean algebra and use logic gates in the design.
- Construct and analyse combinational circuits.
- Utilize a combinational circuit to realise the stated function.
- Create and improve sequential circuits.



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- Students will be able to comprehend how a CPU and its parts are organised.
 - Students will be able to apply memory organisation to the notion of registers set, counters, and many other memory elements.
 - The idea of addressing, instruction sets, machine cycles, CPU to memory fetching, bus organisation, etc. will be taught to students.
 - Students will have the opportunity to learn about the format and content of education.
 - Students will be able to comprehend the general idea of a CPU as well as its key elements, particularly the ALU, Registers, CU, and their subcomponents.
- GE-1(Inter disciplinary for other department)

GE-1:Computer Fundamentals(Theory)

Outcomes :

- Recognize the fundamental ideas behind computers.
- Recognize the functions of the various types of software.
- An understanding of technology and hardware components.
- A primer on computer memory.
- Emerging Technologies Overview.

- GE-1:Computer Fundamentals(Practical)

Outcomes :

- Have a fundamental understanding of how computers work.
- Real-world exercises utilising MS Office/Open Office tools for spreadsheet and document processing and preparation.
- Excel Sheet-based practical activities.

Semester – II

COSHCC-03: Programming in Java

{Theory}

Outcomes: The most well-known platform for creating programmes for embedded devices including mobile phones, laptops, tablets, and other devices is Java. Object-oriented programming is used in this language. The potential for this programming language is enormous.

Students will be able to comprehend the following after completing the course:

- Capable of comprehending OOPs ideas.
- Capable of employing OOP approaches to address problems in the real world.
- Capable of comprehending abstraction.



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- Capable of comprehending how Java's interfaces and packages are used.
- Capable of creating and comprehending multi-threaded, synchronised applications.

{Practical}

Outcomes: The following will be known by students:

- Employ fundamental control syntaxes to implement the object-oriented computing concept. Structures, strings, and functionality for honing logic-building abilities.
- Recognize the classes, objects, members, and connections between them that are necessary to solve a particular problem.
- Show off your abilities to use inheritance, interfaces, and packages, and explain how you can design applications more quickly.
- Use diverse exception handling techniques and the idea of multithreading to design applications that are reliable, quick, and effective.
- Recognize and define typical abstract user interface elements for designing a graphical user interface in Java using Applet & AWT and responding to events.

COSHCC-04: Discrete Structures

{Theory}

Outcomes: Discrete structure improves in the enhancement of logical reasoning and its use in computer science. The topic improves one's capacity for logic and their capacity to construct a credible and mathematically sound argument. Students will learn the following after completing the course:

- The essential concept supporting sets and operations.
- Support basic requirements.
- Calculate probability using counting methods.
- Be able to identify their qualities while demonstrating a comprehension of relationships and the evolution of functions.
- Recognize when a function is "onto" and 1-1.
- Showcase various tree and graph traversal techniques.
- Use graphs and trees to model computer science issues.
- Propositional logic's core concepts.

GE-2 (Inter disciplinary for other department)

GE2: Introduction to Database System

{Theory}



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Outcomes: You should be able to grasp contemporary database management theory and practise after completing this course. The course offers an excellent technical introduction of database management systems to aid in your understanding of their nature.

Students will learn the following after completing the course:

- Be knowledgeable with fundamental database principles, such as the relational data model's architecture and functionality.
- Recognize a database management system's function in an organisation.
- Create straightforward and fairly complex database queries using Structured Query Language (SQL).
- Be able to implement logical database design approaches, such as ER diagrams and 3NF database normalisation, with success.
- Create and build a simple SQL database project.

{Practical}

Outcomes: Following lessons are available to students:

- Build a Database Establishing Relational Types Of data in a Table Defining Restrictions making an index.
- Table and Record Handling Remove, Modify, Recompress Statements Using Check box and Attach Together ALTER and DROP statements.
- Using the WHERE clause and Query expression to get data from a database.

Semester – III

COSHCC-05 : Data Structures (Theory)

Outcomes: Data structures are used to arrange data in computer systems so they can work more effectively. This course teaches us about the numerous kinds of abstract data, including queues, stacks, lists, and more.

Students will be able to comprehend the following after completing the course:

- The ideas of data types, algorithms, and dynamic memory management.
- Simple data structures including queues, stacks, linked lists, and arrays.
- The collision and its resolution mechanisms, as well as the hash function.
- A variety of sorting methods, including binary search, quicksort, and merge sort.
- Creating recursive definitions of straightforward problems and putting them into practise.
- Resolve issues involving trees, heaps, and graphs.



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COSHCC-05:Data Structures(Practical)

Outcomes:

The following will be knowledgeable by students:

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- Use fundamental data structures, like arrays and linked lists.
- Programs to illustrate basic algorithmic issues, such as shortest paths, tree traversals, and graph traversals.
- Use a variety of searching and sorting methods.
- Programs that show how different stack and queue operations are implemented.

COSHCC-06:Operating System(Theory)

Outcomes: Students will learn the following

- The fundamentals of operating systems, such as the kernel, shell, and various types and viewpoints.
- Outline different CPU scheduling techniques, and dispel deadlocks.
- Describe the notion of thrashing and various memory management approaches.
- Use disc scheduling and management methods to optimise the use of external memory.
- Recognize the interface, security, and protection features of the file system.
- Describe the various features of operating systems including UNIX, Linux, and Windows.
- Cloud computing fundamentals on a Linux system.
- Policy mechanism, internal access authorization, and authentication.

COSHCC-06:OperatingSystem(Practical)

Outcomes:

- Showcase how different operating systems are installed.
- Use Virtual Machine software to implement virtualization.
- Use the operating system commands for UNIX/LINUX.
- Put different scheduling strategies into practise.
- The use of different system calls.
- Be able to run a variety of shell programmes and comprehend various UNIX/LINUX shell scripts.

COSHCC-07:ComputerNetworks(Theory)

Course outcome: You should come away from this course with a grasp of diverse computer network components, numerous protocols, new technology, and their applications. A thorough technical overview of computer networks is provided by the course.

Students should be able to comprehend the following after completing this course:

- Recognize and use the different networking components. Recognize various communication methods and create cables to set up a network.
- Outline the roles played by each layer in the OSI and TCP/IP models.
- Describe the purposes of the protocols, presentation layer, and application layer paradigms.



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- Describe the services provided by the Transport layer and Session layer.
- Sort routing protocols into categories and examine how to assign IP addresses for the given network.
- Describe the protocols and the functions of the data link layer.
- Describe the various transmission media and provide examples from current use.
- Employ network devices to implement any topology.
- Be familiar with Linux and Windows' TCP/IP setup.
- Set up network device sharing.
- Become familiar with the main hardware and software platforms used in computer networks.

COSHCC-07:Computer Networks (Practical)

Outcomes:

- Recognize and apply different networking components Recognize various communication methods and create cables to set up a network.
- Model the noisy channel Cyclic Redundancy Check (CRC) error detection mechanism.
- Create a stop-and-wait protocol for noisy channels and put it into practise.
- Model and put into practise the sliding window protocol.
- Model the selective repeat sliding window protocol and put it into practise.
- Model the distance vector routing algorithm and put it into practise.
- Model and put into practise Dijkstra's shortest path routing algorithm.
- Be familiar with Linux and Windows' TCP/IP setup.
- Become familiar with the main hardware and software platforms used in computer networks.

SEC-1:Android Programming (Theory)

Outcomes:

For smartphones running the Android operating system, a new application was developed with the help of this course. The following will be taught to students:

- Describe the architecture, platform, and features of Android.
- Create an Android app's user interface and activities.
- The Android app's Use Intent, Broadcast receiver, and Internet services.
- Create and implement content and database application providers.
- Use the Android app's multimedia, camera, and location-based capabilities.
- Go over various Android platform security vulnerabilities.

SEC-1:Android Programming(Programming)

Outcomes:

- Play around with the Integrated Development Environment for Android Application Development.
- Create and implement the Android app's user interface and layout.
- For activity and data broadcasting in Android apps, use intents.
- Create and implement content providers and database applications.
- 5. Experiment with location-based services and cameras.



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- Create Android applications with security functions.

GE-3(Interdisciplinary for other department)

GE-3T: Introduction to C and C++ Programming

Outcomes:

The course is intended to impart knowledge of C++ and C. Students will be able to build logics that will aid them in developing applications and programmes. The following knowledge will be available to the students upon completion of this course:

- Recognize fundamental C and C++ ideas.
- Control Statements & C Language Foundations.
- Strings, functions, and loop control structures.
- File handling, Union, Pointers, and Structure.
- C++ fundamentals.
- Class and object overloading.
- Polymorphism and inheritance.
- Templates and exception handling
- The capacity for reading, writing, and debugging simple C and C++ code.
- Become proficient in data types, fundamental operations, issues related to portability, and standard programming.

GE-3P: Introduction to C and C++ Programming Lab

Outcomes:

The following will be knowledgeable by students:

- Be familiar with the ideas behind data types, loops, functions, arrays, pointers, strings, structures, and files.
- Examine issues, mistakes, and exceptions.
- Use your knowledge of programming to compile and troubleshoot C applications.
- Recognize the distinction between procedurally and object-oriented programming.
- A programme that makes use of C++ features including polymorphism, operator overloading, inheritance, and object composition.
- Create the necessary textual descriptions and graphics to convey an object-oriented solution's static and dynamic behaviour.

Semester – IV

COSHCC-08: Design and Analysis of Algorithms (Theory)

Outcomes: Students will able to understand the following :

- The foundations of an algorithm.



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- Use a different technique to put the algorithm and associated operations into practise.
- Calculation of spatial and temporal complexity.
- In-depth expertise with searching, greedy algorithm, dynamic programming, and iterative technique.
- Diverse implementations of graph algorithms, such as DFS, BFS, and MST; numerous non-linear algorithms, such as decision trees and red black trees; diverse sorting techniques that make use of the divide and conquer strategy. COSHCC-08: Design and Analysis of Algorithms Lab (Practical) Experiments must incorporate some conditions, but not all of them, therefore put—
- Use of sorting techniques including radix sort with multiple comparisons, insertion sort, merge sort, heap sort, and rapid sort.
- Use of balanced Red-Black trees with insertion, deletion, number search, and reporting of the colour of the node that contains the number.
- Use of a method to calculate the LCS of two provided sequences.
- Use of the graph traversal approach BF, DF, and MST.

COSHCC-09: Software Engineering (Theory)

Course Outcome:

After completion for the course, students will learn about implementation of software its characteristics and its risk management and maintenance.

- Software crisis, software evolution, and layers of its architecture, framework, and process modules.
- Software requirements, requirement analysis, and modelling (SRS).
- Planning and management of software projects using various software criteria. Determine risk through calculation.
- Designing the architecture of software, mapping the data flow diagram, and managing the software's quality.
- Various testing methods, such as white box and black box testing.
- The upkeep of software.

COSHCC-09: Software Engineering (Practical)

Results: Students will graduate knowing how to create software in the real world. They will gain real experience utilising language-independent software and maintaining it. Understanding of fundamental SW engineering techniques and how to use them.

- Describe the tiered technology and process structure used in software engineering.
- A basic knowledge of software process models like the waterfall and evolutionary models.
- Knowledge of the SRS documentation and software requirements.
- Knowing the functions of project management, such as planning, scheduling, risk management, etc.
- Give examples of data models, object models, context models, and oral model behaviour.
- Knowledge of many software architecture styles.
- Having a working knowledge of implementation concerns like modularity and coding standards.
- Understanding of validation and verification methods, including as static analysis and reviews.



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- Understanding of unit testing and integration testing techniques for software testing.
- Describe software risks and measurement.
- knowledge of software evolution and associated topics like version control.
- knowing how to ensure high-quality software and about quality control.

COSHCC-10: Database Management Systems (Theory)

Course outcome:

This course is intended to provide you with an understanding of the current theory and practice of database management systems. To help you more fully appreciate their nature, the course provides a solid technical overview of database management systems, using a current database product as a case study. In addition to technical concerns, more general issues are emphasized. These include data independence, integrity, security, recovery, performance, database design principles, and database administration. At the completion of this course, students should be able to do the following:

- Understand the role of a database management system in an organization.
- Understand basic database concepts, including the structure and operation of the relational data model.
- Construct simple and moderately advanced database queries using Structured Query Language (SQL).
- Understand and successfully apply logical database design principles, including E-R diagram and database normalization up to BCNF.
- Design and implement a small database project using SQL.
- Understand the concept of a database transaction and related database facilities, including concurrency control, journaling, backup and recovery, and data object locking and protocols.

COSHCC-10: Database Management Systems (Practical)

Outcome :

Student will able to know Structured Query Language (SQL):

- Creating a Database Table Specifying Relational Data Types Specifying Constraints Creating Indexes.
- Handling of Tables and Records Put in a statement. SELECT and INSERT together DELETE, UPDATE, TRUNCATE statements DROP, ALTER statements.
- Retrieving Data from a Data base The SELECT statement Using the WHERE clause. Using Logical Operators in the WHERE clause. Using IN, BETWEEN, LIKE, ORDERBY, GROUPBY and HAVING Clause. Using Aggregate Functions Combining Tables.

Using JOINS Subqueries.

- Database Management Creating view Creating Column Creating Database Users Using GRANT and REVOKE Cursors in Oracle PL/ SQL Writing Oracle PL/ SQL Stored Procedures Aliases.

SEC2: HTML PROGRAMMING (Theory) Outcomes: HTML will be taught to students, which is



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the common markup common markup language for websites. You can build your own website using HTML.

- Create personal and/or company websites using an HTML editor and your knowledge of HTML and CSS code while adhering to the most recent professional and/or industry standards. Create websites using critical thinking techniques.
- To upload files to a webserver, use standalone FTP software. SEC2: HTML PROGRAMMING (Programming) Outcomes:
- Completion of a multi-page website.
- Use knowledge of HTML and CSS code and an HTML editor to create personal and/or business websites following current professional and/or industry standards.
- Use critical thinking skills to design and create websites.
- Use a stand-alone FTP program to upload files to a webserver.

GE-4(Inter disciplinary for others department)

GE-4T: Programming in Python

Outcomes: The course is intended to teach Python knowledge. Students will be able to build logics that will aid them in developing applications and programmes. The following knowledge will be available to the students upon completion of this course:

- Be familiar with the computer program's fundamental planning.
- Basic Python language concepts.
- Loop Control Functions and Structures.
- The linguistic syntax of Python.
- Recursion and iterations.
- Dictionary, strings, and lists.
- Python-based object-oriented programming.
- Sorting and searching.
- The capacity to write, read, and debug programmes.

GE-4P: Programming in Python Lab

Outcomes:

The following will be knowledgeable by students:

- Be familiar with the ideas behind datatypes, loops, functions, lists, and strings.
- Examine issues, mistakes, and exceptions.
- Use your knowledge of programming to compile and troubleshoot Python scripts.
- Recognize the various object-oriented programming techniques



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Semester - V

COSHCC-11:Advanced Java

(Theory)

Outcomes:The most well-known platform, called Java, is used to create a variety of applications.The learner must be able to:

- Understand the use of OOPs ideas after successfully completing this course.
- Capable of applying OOP principles to real-world issues.
- Capable of comprehending abstraction.
- Capable of comprehending Java's usage of packages and interfaces.
- Capable of creating and comprehending synchronised, multithreaded programmes.
- Capable of comprehending Collection Framework use.
- Capable of developing GUI-based apps and applets for web-based programmes.

(Practical)

Outcomes:Students can create a website that can connect to the servers after learning advanced javafundamentals:

- Students may use Servlet Context, Servlet Config, Deployment Descriptor, Request and Response, and CRUD Operation with Servlet after learning advanced Java.
- Students who master advanced Java ideas can grow in their careers because most real-time applications (Servlet, JSP, EJB, JPA, JSF, etc.) are created utilising these principles.
- Servlet's shortcomings: JSP's solution, JSP's scripting elements, and JSP's life cycle
- Students who master advanced Java will be able to use web servers and apps.

COSHCC-12:Theory of Computation

(Theory)

Outcomes:The course should provide a formal relation between the study of algorithms for solving problems and the theory of languages and automata. It should also help students build a mathematical (and seemingly endlessly magical) perspective on algorithm creation and processing in general. The lesson should also make clear how apps work practically.



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In these concepts in computer science theory. Following course completion, the student will be capable of:

- Create models for, evaluate, and compare various computational models using combinatorial techniques.
- Use exact formal mathematical techniques to demonstrate the characteristics of languages, grammars, and automata.
- Create algorithms for various issues and explicitly debate whether they are valid using various constrained machine models of computing.
- Identify the flaws in various computational models and potential ways to demonstrate them.
- Have a general understanding of how this course's theoretical material relates to practical applications like compiler design.

Semester – VI

COSHCC-13: Artificial Intelligence (Practical)

Outcomes: PROLOG-based artificial intelligence programme

The following programmes can be written by students using PROLOG:

- Crack the 8-queens puzzle with a computer programme.
- Use depth-first search to find a solution to any issue.
- Always use best initial search to find a solution.
- Use best first search to solve the eight-puzzle problem.
- Use End Analysis to find a solution to the robot traversal challenge.
- Address the issue with travelling salesmen.

COSHCC-14: Computer Graphics(Theory)

Outcomes:

Students will be able to learn:

- To introduce the use of the components of a graphics system and familiarise themselves with the construction methodology of graphics system components and related algorithms.
- To become familiar with the fundamentals of 3-D computer graphics.
- Explain how to translate basic geometrical primitives into scans and how to resize forms to meet the definition of a picture.



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- Explain clipping, projections, and the mapping of world coordinates to device coordinates.
- To be able to talk about how computer graphics ideas are used in the creation of video games, data visualisations, and business applications.

COSHCC-14:Computer Graphics (Practical)

Outcomes:

- Students will learn how to draw objects like buses and rectangles using library-based commands. Students can increase their knowledge by using the DDA, Bresenhamline drawing, Bresenhamcircle drawing, and midpoint circle drawing algorithms. Using prior information, they will increase their power by drawing an ellipse.
- This article introduces a few object filling programmes.
- Students can cut some objects using Cohen and Sutherland clipping.
- Using 2D operations like rotation, reflection, and some 3D operations will pay off.

DSE-3 : Digital Imageprocessing (Theory)

Outcomes:

Students will be able to:

- Recall the basic ideas behind picture processing.
- Describe several image enhancement methods.
- Recognize and study image transformations.
- Use morphological image processing to analyse the fundamental algorithms for image processing and image compression.
- Segmentation and Representation of Contrast Images6. Create and synthesise Colour image processing and its practical uses.

DSE-3 : Digital Imageprocessing(Practical)

Outcomes:

Practical experience is required to comprehend image processing using MATLAB or SCILA better. Display digital images, crop them, and change their colour.

- A few image-processing applications, such as contrast stretching and negative image.
- Image geometric operations;
- Image noise models and noise removal using spatial filters;
 - Image logical operations such as AND, OR, EX-OR, and NOT operations;
- A few frequency domain filtering techniques, such as FFT and IFFT.

DSE-4Projectwork/Dissertation



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Outcomes:

- Students will be given projects to work on under the
- The students will draught a project report in collaboration with the supervisor assigned by the department committee. After presenting the report successfully to college faculty, the students will submit the same project to the university.