B.Sc. Computer Science (Optional)
Programme Outcomes (POs) & Course Outcomes (COs)

Programme Outcomes (POs)

B.Sc. Computer Science (Optional) First Year(2024-25 Onwards)

Semester I

B.Sc. (Computer Science - Optional) Programme Outcomes (POs)First Year

After successful completion of the programme, students will be able to:

PO1: Fundamental Knowledge

Apply knowledge of computer science fundamentals, programming, and mathematics to solve problems.

PO2: Problem Analysis

Identify, analyze, and formulate computing problems using logical and algorithmic approaches.

PO3: Programming Skills

Design, develop, and test software using programming languages like C, C++, Java, Python.

PO4: Modern Tool Usage

Use modern tools, software, and technologies such as DBMS, Networking, Web Technologies.

PO5: System Understanding

Understand computer architecture, operating systems, and networking concepts.

PO6: Data Handling & Analysis

Analyze and manage data using appropriate tools like spreadsheets, databases, and data science basics.

PO7: Digital Competency

Use ICT tools, internet technologies, and digital platforms effectively for communication and research.

PO8: Employability Skills

Demonstrate skills in office automation, documentation, presentation, and IT-enabled services.

PO9: Ethics & Social Responsibility

Understand ethical issues, cyber security, and professional responsibilities.

PO10: Lifelong Learning

Engage in continuous learning and adapt to emerging technologies.

PO11: Teamwork & Communication

Work effectively in teams and communicate technical information clearly.

PO12: Entrepreneurship & Innovation

Apply computing knowledge for startups, innovation, and self-employment.

COs of B.Sc. Computer Science (Optional) 1 st Year (2024-25 Onwards)

COs of B.Sc. Computer Science (Optional)

1. Class: FY B.Sc. Semester I

Course Title: Fundamentals of Computer Science

Course Code: SCSCCT1101

Course Pre-requisite: HSC (XII Science) pass

Course Objectives:

- To understand the basics of computer system, its architecture.
- To understand functioning of computer components.
- To know the key terms related to the computer system
- To design Algorithm and flowcharts.
- Develop skills in analyzing the usability of a web site.
- Understand how to plan and conduct user research related to web usability.
- Learn techniques of responsive web design, including media.

Course Outcomes:

After completion of this course students will be able to:

- Identify the components of a personal computer system.
- Demonstrate input/output unit functions
- Design Algorithms and Flowcharts.
- Be able to use the HTML tags.
- Understand the principles of creating an effective web page.

COs of B.Sc. Computer Science (Optional)

2. Class: FY B.Sc. Semester I

Course Title: Computer Lab I (Based on Fundamentals)

Course Code: SCSCCP1101

Course Pre-requisite: Same as theory

Course Objectives:

(Implicit from syllabus practicals)

- To understand hardware components practically
- To perform OS and DOS operations
- To gain hands-on experience in computer basics

Course Outcomes:

- Perform basic computer operations
- Use DOS commands and Windows OS
- Identify hardware components practically

COs of B.Sc. Computer Science (Optional)

3. Class: FY B.Sc. Semester I

Course Title: Digital Literacy (GE)

Course Code: SCSCGE1101

Course Pre-requisite: HSC (Any faculty)

Course Objectives:

- Understand the software testing life cycle
- Understand various components of computers
- Work confidently with GUI based operating system
- Create documents using word processor
- Create spreadsheets and charts
- Understand internet and its functionalities
- Send/receive emails
- Create presentations and animations

Course Outcomes:

- Knowing Computer
- Computer using GUI based OS
- Understanding Word Processing
- Using Spreadsheet
- Communication using Internet
- WWW and Web Browsers

COs of B.Sc. Computer Science (Optional)

4. Class: FY B.Sc. Semester I

Course Title: PC Installation & Networking (Skill Course)

Course Code: SCSCSC1101

Course Pre-requisite: HSC Science

Course Objectives:

- Build skills in assembling & maintenance of PC
- Install operating systems
- Setup networks

Course Outcomes:

- Knowledge of hardware and peripherals
- Installation skills
- PC assembly
- Troubleshooting

COs of B.Sc. Computer Science (Optional)

SEMESTER II

5. Class: FY B.Sc. Semester II

Course Title: Programming in C

Course Code: SCSCCT1151

Course Pre-requisite: HSC Science

Course Objectives:

- Understand C programming fundamentals
- Develop problem-solving skills
- Learn data structures basics
- Write structured programs
- Understand control statements and functions

Course Outcomes:

- Use data structure operations
- Develop logic for programs
- Write programs using control statements
- Understand advanced C features

COs of B.Sc. Computer Science (Optional)

6. Class: FY B.Sc. Semester II

Course Title: Computer Lab II (C Programming)

Course Code: SCSCCP1151

Course Objectives:

- Implement C programming concepts
- Practice program development

Course Outcomes:

- Write and execute C programs
- Debug and test programs

COs of B.Sc. Computer Science (Optional)

7. Class: FY B.Sc. Semester II

Course Title: ICT

Course Code: SCSCOE1151

Course Objectives:

- Learn ICT tools for daily and research use

Course Outcomes:

- Use social networks effectively
- Apply online tools for collaboration
- Understand internet security
- Use digital platforms for research

COs of B.Sc. Computer Science (Optional)

8. Class: FY B.Sc. Semester II

Course Title: MS-Office

Course Code: SCSCSC1151

Course Objectives:

- Improve office automation
- Replace manual systems with computer-based systems

Course Outcomes:

- Understand office software
- Perform data processing and presentation
- Use Word, Excel, PowerPoint, Access effectively

POs of B.Sc. Computer Science (Optional) (2024-25 Onwards)
Programme Outcomes (POs) & Course Outcomes (COs)

Programme Outcomes (POs)
B.Sc. Computer Science (Optional) Second Year

B.Sc. (Computer Science - Optional) Programme Outcomes (POs) Second Year

Based on FY + SY progression (Data Structures, OOP, Java, DBMS, Web, Cyber Security, Data Analysis), the refined POs are:

PO1: Core Knowledge

Apply fundamental and advanced concepts of computer science including data structures, programming, databases, and web technologies.

PO2: Problem Solving & Algorithm Design

Analyze problems and design efficient algorithms using appropriate data structures.

PO3: Programming Proficiency

Develop software using C, C++, Java, and web technologies.

PO4: Modern Tools & Technologies

Use modern tools such as DBMS, Tableau, WordPress, and development environments.

PO5: System & Data Management

Design and manage databases, normalize data, and perform data analysis.

PO6: Web & Application Development

Design responsive and interactive web applications using HTML, CSS, JavaScript, and CMS tools.

PO7: Cyber Security Awareness

Understand cyber threats, legal frameworks, and implement security practices.

PO8: Data Analysis Skills

Analyze and visualize data using tools like Excel and Tableau.

PO9: Professional Ethics & Responsibility

Apply ethical practices in computing, cybersecurity, and data privacy.

PO10: Communication & Teamwork

Communicate effectively and work collaboratively in projects.

PO11: Lifelong Learning

Adapt to emerging technologies such as AI, ML, and Data Science.

PO12: Employability & Entrepreneurship

Develop skills for industry readiness, freelancing, and startups.

COs of B.Sc. Computer Science (Optional) Second Year (2024-25 Onwards)

SEMESTER III

COs of B.Sc. Computer Science (Optional)

1. Class: SY B.Sc. Semester III

Course Title: Data Structure Using C

Course Code: SCSCCT1201

Course Pre-requisite: Programming in C (FY)

Course Objectives:

1. To provide the students with solid foundations in the basic concepts of programming: data structures and algorithms.
2. To understand basic computational concepts and elementary data structures.
3. To translate well-structured plans into working programs.
4. To analyze simple problems involving text and numbers.

Course Outcomes:

1. Implement Arrays and Linked-list for representation of Data.
2. Understand how several fundamental algorithms work particularly those concerned with Stack, Queues, Trees and various Sorting algorithms.
3. Design new algorithms or modify existing ones for new applications.
4. Analyze the space and time complexity of algorithms.

COs of B.Sc. Computer Science (Optional)

2. Class: SY B.Sc. Semester III

Course Title: Programming in C++

Course Code: SCSCCT1202

Course Objectives:

1. To learn OOPs concepts
2. To understand how C++ improves C
3. To learn how to design C++ classes for code reuse.
4. To apply programming skills to develop software.

Course Outcomes:

1. Understand and apply OOPs concepts.
2. Write and execute C++ Programs.
3. Understand concept of Functions and inheritance in C++.
4. Apply programming skills to develop software.

COs of B.Sc. Computer Science (Optional)

3. Class: SY B.Sc. Semester III

Course Title: Programming Logic Concepts (Minor)

Course Code: SCSCMT1201

Course Objectives:

1. To understand fundamental problem-solving techniques, including top-down design and algorithmic thinking.
2. To analyze the efficiency of algorithms using basic complexity analysis.
3. To implement algorithms using flowcharts and pseudocode before translating them into C programs.
4. To apply core programming concepts in C.

Course Outcomes:

1. Design structured solutions using algorithmic approaches.
2. Write correct and efficient C programs.
3. Compare algorithms based on complexity.
4. Construct flowcharts for program logic.

COs of B.Sc. Computer Science (Optional)

4. Class: SY B.Sc. Semester III

Course Title: Cyber Security

Course Code: SCSCGE1201

Course Objectives:

1. Learn foundations of cyber security
2. Develop skills to defend against cyber threats
3. Implement security mechanisms
4. Understand legal and ethical aspects
5. Responsible use of social media

Course Outcomes:

1. Understand cyber threat landscape
2. Analyze cyberattacks and vulnerabilities
3. Evaluate cyber laws
4. Analyze digital payment security
5. Understand data privacy and security

COs of B.Sc. Computer Science (Optional)

5. Class: SY B.Sc. Semester III

Course Title: Web Programming

Course Code: SCSCVSC1201

Course Objectives:

1. Understand WWW architecture
2. Create HTML documents
3. Design interactive pages
4. Apply CSS
5. Implement advanced CSS

Course Outcomes:

1. Write HTML code
2. Create forms and multimedia content
3. Style pages using CSS
4. Develop complete websites

COs of B.Sc. Computer Science (Optional)

SEMESTER IV

6. Class: SY B.Sc. Semester IV

Course Title: Programming in Java

Course Code: SCSCCT1251

Course Objectives:

1. Write syntactically correct Java programs
2. Implement control structures
3. Design classes using OOP
4. Apply inheritance
5. Handle exceptions

Course Outcomes:

1. Execute Java programs
2. Apply control structures
3. Apply OOP concepts
4. Use arrays and strings
5. Handle exceptions
6. Debug and optimize programs

COs of B.Sc. Computer Science (Optional)

7. Class: SY B.Sc. Semester IV

Course Title: RDBMS

Course Code: SCSCCT1252

Course Objectives:

1. Explain DBMS architecture
2. Model databases using ER diagrams
3. Normalize databases
4. Use SQL

Course Outcomes:

1. Understand DBMS importance
2. Design ER models
3. Normalize databases
4. Write SQL queries

COs of B.Sc. Computer Science (Optional)

8. Class: SY B.Sc. Semester IV

Course Title: Web Technology (Minor)

Course Code: SDSCMT1251

Course Objectives:

1. Understand WWW and client-server
2. Create HTML5 pages
3. Apply CSS3
4. Use JavaScript

Course Outcomes:

1. Understand web architecture
2. Design web pages
3. Apply CSS
4. Develop dynamic interfaces

COs of B.Sc. Computer Science (Optional)

9. Class: SY B.Sc. Semester IV

Course Title: Data Analysis

Course Code: SDSCGE1251

Course Objectives:

1. Extract insights from data
2. Use Tableau
3. Create dashboards
4. Perform visualization

Course Outcomes:

1. Explain data analysis fundamentals
2. Work with data structures
3. Handle data using Excel/Tableau
4. Create charts
5. Predict business trends

COs of B.Sc. Computer Science (Optional)

10. Class: SY B.Sc. Semester IV

Course Title: WordPress

Course Code: SCSCVSC1251

Course Objectives:

1. Understand CMS
2. Manage content
3. Develop responsive websites
4. Deploy websites

Course Outcomes:

1. Install WordPress
2. Customize themes
3. Use plugins
4. Develop responsive websites

POs of B.Sc. Computer Science (Optional) (2021–22Onwards)
Programme Outcomes (POs) & Course Outcomes (COs)

Programme Outcomes (POs)
B.Sc. Computer Science (Optional) Third Year

B.Sc. (Computer Science – Optional, CBCS Pattern) Third Year

Programme Outcomes (POs)

After completion of the program, students will be able to:

PO1: Fundamental & Advanced Knowledge

Apply knowledge of software engineering, database systems, programming, and testing.

PO2: Problem Analysis & Design

Analyze problems and design efficient software solutions using appropriate methodologies.

PO3: Software Development Skills

Develop applications using programming languages such as Java, VB, and database tools.

PO4: Software Engineering Practices

Apply software development lifecycle (SDLC), requirement analysis, and design principles.

PO5: Database & Data Management

Design, query, and manage relational databases using SQL and DBMS concepts.

PO6: Testing & Quality Assurance

Apply software testing techniques, validation strategies, and quality assurance practices.

PO7: Modern Tools & Technologies

Use tools related to data science, system security, data mining, and web development.

PO8: Security Awareness

Understand system security, cryptography, and cyber threats.

PO9: Research & Project Skills

Develop projects using modern tools and methodologies.

PO10: Communication & Teamwork

Work collaboratively and communicate technical knowledge effectively.

PO11: Professional Ethics

Apply ethical practices in software development and data handling.

PO12: Employability & Lifelong Learning

Adapt to industry trends and pursue continuous learning.

COs of B.Sc. Computer Science (Optional) Third Year (2021–22 Onwards)

SEMESTER V

1. Class: TY B.Sc. Semester V

Course Title: Software Engineering

Course Code: OCS-301

Course Pre-requisite: Programming & Data Structure

Course Objectives (as given):

- Understand Software Engineering Process
- Understand Requirements and components of Software Engineering
- Understand software design and software testing fundamentals

Course Outcomes (Derived – since not explicitly listed):

- Understand SDLC and software processes
- Analyze requirements and design software systems
- Apply design concepts in software development
- Develop web and mobile application design understanding

COs of B.Sc. Computer Science (Optional) Third Year (2021–22 Onwards)

2. Class: TY B.Sc. Semester V

Course Title: Programming in Visual Basic

Course Code: OCS-302 (A)

Course Objectives:

- To learn Graphical User Interface Language
- To develop an application using GUI Language
- Implement VB programs to solve simple problems

Course Outcomes:

- Design GUI-based applications
- Develop VB programs
- Implement event-driven programming
- Use controls and forms effectively

COs of B.Sc. Computer Science (Optional) Third Year (2021–22 Onwards)

3. Class: TY B.Sc. Semester V

Course Title: Advanced Java Programming

Course Code: OCS-302 (B)

Course Objectives:

- Understand multithreading
- Understand applet programming
- Understand web-based programming

Course Outcomes:

- Develop multithreaded applications
- Handle exceptions
- Create applets and GUI applications
- Perform file handling

COs of B.Sc. Computer Science (Optional) Third Year (2021–22 Onwards)

4. Class: TY B.Sc. Semester V

Course Title: System Security (SEC-III A)

Course Objectives:

- Understand security models and policies
- Learn cryptography and network security
- Understand system security design

Course Outcomes:

- Understand vulnerabilities and threats
- Apply security mechanisms
- Analyze risks and auditing systems

COs of B.Sc. Computer Science (Optional) Third Year (2021–22 Onwards)

5. Class: TY B.Sc. Semester V

Course Title: Data Science (SEC-III B)

Course Objectives:

- Extract valuable information from data
- Learn data science tools
- Perform statistical analysis

Course Outcomes:

- Develop programming skills
- Perform statistical analysis
- Build data models
- Use tools like Python/R

COs of B.Sc. Computer Science (Optional) Third Year (2021–22 Onwards)

SEMESTER VI

6. Class: TY B.Sc. Semester VI

Course Title: Software Testing

Course Code: OCS-304

Course Objectives:

- Understand Software Testing Process
- Understand types of testing
- Understand testing strategies

Course Outcomes:

- Apply testing strategies
- Perform white-box and black-box testing
- Test web and mobile applications
- Ensure software quality

COs of B.Sc. Computer Science (Optional) Third Year (2021–22 Onwards)

7. Class: TY B.Sc. Semester VI

Course Title: RDBMS

Course Code: OCS-305 (A)

Course Objectives:

- Teach fundamental concepts of RDBMS
- Teach database operations

Course Outcomes:

- Understand database systems
- Use SQL and PL/SQL
- Design relational databases
- Apply normalization

COs of B.Sc. Computer Science (Optional) Third Year (2021–22 Onwards)

8. Class: TY B.Sc. Semester VI

Course Title: Data Mining

Course Code: OCS-305 (B)

Course Objectives:

(Implicit from syllabus topics)

Course Outcomes:

- Understand data mining concepts
- Apply classification and clustering
- Use association rules
- Analyze datasets

COs of B.Sc. Computer Science (Optional) Third Year (2021–22 Onwards)

9. Class: TY B.Sc. Semester VI

Course Title: Website Development

Course Code: OCS-306 (A)

Course Objectives:

- Learn web design principles
- Understand HTML & CSS
- Analyze usability

Course Outcomes:

- Design websites
- Develop UI elements
- Create forms and layouts
- Build complete websites

COs of B.Sc. Computer Science (Optional) Third Year (2021–22 Onwards)

10. Class: TY B.Sc. Semester VI

Course Title: Image Processing Software

Course Code: OCS-306 (B)

Course Objectives:

- Understand digital image processing
- Design algorithms for image processing

Course Outcomes:

- Apply image processing techniques
- Perform image enhancement
- Use software tools

COs of B.Sc. Computer Science (Optional) Third Year (2021–22 Onwards)

11. Class: TY B.Sc.

Course Title: Practical

Course Code: OCS-307

Course Outcomes:

- Implement programs based on theory
- Gain hands-on programming skills

COs of B.Sc. Computer Science (Optional) Third Year (2021–22 Onwards)

12. Class: TY B.Sc.

Course Title: Project Work

Course Code: OCS-308

Course Outcomes:

- Develop real-world project
- Apply SDLC
- Work in teams
- Present and document work