HIRALAL BHAKAT COLLEGE
Nalhati, Birbhum,

Program Outcomes (POs), Program Specific Outcomes (PSOs) and Course Outcomes (COs)

Department of Computer Science

Program Name: 3-year UG Programme in Computer Science under CCFUP as per NEP 2020 of BU

Program Outcomes (POs)

PO1: Students will acquire a scientific temperament.

PO2: Students will gain fundamental practical skills and technical understanding along with domain knowledge of different disciplines in the science stream.

PO3: Students will be equipped fundamental knowledge required for advanced higher studies, professional and applied courses such as Management Studies, Law etc.

PO4: Students will learn about a variety of social and environmental challenges and be able to tackle them with a solution-focused mindset.

PO5: Students who pass all competitive exams in India go on to pursue academic careers and further study.

PO6: Students will be imbibed with ethical values and social concerns to ensure peaceful society.

PO7: Students will be able to comprehend the basic concepts learnt and apply in real life situations with analytical skills.

B.Sc., COMPUTER SCIENCE (Major & Minor)
(Program specific outcomes)

PO. No.	Programs specific outcomes On completing all the courses, the graduates can
PSO 1	Acquire strong fundamental knowledge of computer science and engineering along with mathematics.
PSO 2	Utilize various development tools and have programming expertise in a variety of modern programming languages.
PSO 3	Apply problem-solving skills and the knowledge of computer science to solve real world problems.
PSO 4	Develop skills to synthesize research-based knowledge in the design and analysis of data for providing solutions to complex problems.
PSO 5	Students get knowledge and training of technical subjects so that they will be technical professional by learning C programming, Relational Database Management, Data Structure, Software Engineering, Graphics, Java, Networking, Theoretical Computer Science, System programming, Object Oriented Software Engineering.
PSO 6	A student should be able to work both independently and cooperatively in group projects and team building exercises.
PSO 7	Apply software application-oriented skills to innovate solution to meet the ever-changing demands of IT industry.

COURSE OUTCOMES:

Semester	Course Type	Course Title & Code	Course learning outcomes (COs)
1st Semester	Major/DS Course (Core)	Computer Fundamentals & Digital Logic COMP 1011	Students will be able to: ⊹ Acquire the basic knowledge of digital logic to understand digital electronics circuits. ⊹ Prepare students to perform the analysis and design of various digital electronic circuits. ⊹ Design and simplify combinational and sequential circuits using basic building blocks. ⊹ Represent data in binary form, convert numeric data between different number systems and perform arithmetic operations in binary. ⊹ Simulate the design of a basic computer using a software tool/ digital trainer kit
	Minor Courses	Computer Fundamentals & Digital Logic COMP 1021	
	Skill Enhancement Course (SEC)	Programming in Python (Practical) COMP 1051	Students will be able to: ⊹ Develop, document, and debug modular Python programs of reasonable complexity. ⊹ Implement arrays and user defined functions in Python. ⊹ Solve real life problems of reasonable complexity using suitable and efficient programming constructs in Python. ⊹ Solve real life problems of reasonable complexity using the concepts of object-oriented programming in Python.

2nd Semester	Major/DS Course (Core)	Programming Fundamentals using C COMP 2011	Student will be able to: ➕ Develop problem solving skills coupled with top-down design principles. ➕ Become skilled at developing simple algorithms and flow charts. ➕ Convert the algorithms into simple C programs. ➕ Understand code organization and functional hierarchical decomposition. ➕ Develop simple C programs for solving real life problems.
	Minor Courses	Python Programming COMP 2021	Students will be able to: ➕ Develop, document, and debug modular Python programs of reasonable complexity. ➕ Implement arrays and user defined functions in Python. ➕ Solve real life problems of reasonable complexity using suitable and efficient programming constructs in Python. ➕ Solve real life problems of reasonable complexity using the concepts of object-oriented programming in Python.
	Skill Enhancement Course (SEC)	System Administration and Maintenance (Practical) COMP 2051	Student will be able to: ➕ Troubleshoot and fix issues that compromise system performance or access to an IT service. ➕ Make regular system improvements, such as upgrades based on evolving end-user and business requirements. ➕ Maintain common system and network administration tasks and practices and how to implement and maintain standard services like email, file sharing, DNS and similar tasks.

3rd Semester	Major/DS Course (Core)	Discrete Structures COMP 3011	Students will be able to: 🔸 Relate mathematical concepts and terminology to examples in the domain of Computer Science. 🔸 Model real world problems using various mathematical constructs. 🔸 Use different proofing techniques; construct simple mathematical proofs using logical arguments. 🔸 Formulate mathematical claims and construct counter examples
	Major/DS Course (Core)	Data Structures COMP 3012	Students will be able to: 🔸 Compare two functions for their rates of growth. 🔸 Understand abstract specification of data-structures and their implementation. 🔸 Compute time and space complexity of operations on a data-structure. 🔸 Identify the appropriate data structure(s) for a given application and understand the trade-offs involved in terms of time and space complexity. 🔸 Apply recursive techniques to solve problems
	Skill Enhancement Course (SEC)	PHP Programming (Practical) COMP 3051	Student will be able to: 🔸 How to use PHP's built-in server to serve static resources 🔸 How to use PHP to add some dynamic aspects to our pages 🔸 How to use HTML forms 🔸 The difference between GET and POST requests 🔸 How to use cookies to store some data in the browser and pass it to the next request 🔸 How to use a session cookie to store data on the server instead of in the browser. 🔸 How to build an authentication system 🔸 How to restructure the project 🔸 How to upload files to the website 🔸 How to build a custom solution that catches PHP errors and exceptions and shows a proper error page for them 🔸 How to describe and test all the features you've built in this course using an automated test runner

4th Semester	Major/DS Course (Core)	Operating Systems COMP 4011	Student will be able to: ↓ Understand the need of an Operating System & Define Multiprogramming and Multithreading concepts. ↓ Implement Process Synchronization service (Critical Section, Semaphores), CPU scheduling service with various algorithms. ↓ Learn Main memory Management (Paging, Segmentation) algorithms, Handling of Deadlocks ↓ Identify and appreciate the File systems Services, Disk Scheduling service
		Programming in Java COMP 4012	Students will be able to: ↓ Explain significance of object-oriented paradigm. ↓ Solve programming problems using Java. ↓ Create classes and reuse them. ↓ Implement programs using dynamic memory allocation. ↓ Handle external files as well as exceptions.
		Database Management Systems COMP 4013	Students will be able to: ↓ Use database management system software to create and manipulate the database. ↓ Create conceptual data models using entity relationship diagrams for modelling real-life situations and designing the database schema. ↓ Use the concept of functional dependencies to remove redundancy and update anomalies. ↓ Apply normalization theory to get a normalized database scheme. ↓ Write queries using relational algebra, a procedural language. ↓ Implement relational databases and formulate queries to get solutions of a broad range of data retrieval and data update problems using SQL. ↓ Write and execute SQL queries through a high-level language via ODBC connection. ↓ Database administration commands such as creating/removing users, granting/revoking different privileges to the database users; creating assertions, triggers, and indexes. ↓ Learn the importance of index structures and concurrent execution of transactions in database systems.

Minor Courses	Programming in C COMP 4021	Students will be able to: 🔸 Develop problem solving skills coupled with top-down design principles. 🔸 Become skilled at developing simple algorithms and flow charts. 🔸 Convert the algorithms into simple C programs. 🔸 Understand code organization and functional hierarchical decomposition. 🔸 Develop simple C programs for solving real life problems.	

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