HIRALAL BHAKAT COLLEGE

Nalhati, Birbhum,

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

Department: Computer Science

Program Name: B.Sc (General) under CBCS 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

(*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	CC	Problem Solving using Computer (CC-1A)	Students will be able to ❖ learn fundamental of computing system and develop Computer program by using computational and mathematical knowledge appropriately. ❖ learn different techniques of Problem Solving and detail study of python programming.
		Software Lab using Python	❖ Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements. ❖ Write, Test and Debug Python Programs ❖ Implement Conditionals and Loops for Python Programs. ❖ Use functions and represent Compound data using Lists, Tuples and Dictionaries.
2nd Semester	CC	Database Management Systems (CC-2A)	Students should be able to: ➢ Describe the fundamental elements of relational database management systems ➢ Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL. ➢ Design ER-models to represent simple database application scenarios ➢ Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data. ➢ Improve the database design by normalization. ➢ Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.
		Software Lab based on Database Management Systems	❖ Will understand the fundamental concepts of database. ❖ Will understand user requirements and frame it in data model. ❖ Will understand creations, manipulation and querying of data in databases ❖ Solve real world problems using appropriate set, function, and relational models. ❖ Design E-R Model for given requirements and convert the same into database tables. ❖ Implement Basic DDL, DML and DCL commands.

3rd Semester		Operating Systems (CC-1C)	❖ Describe the basic components of an operating system and their role in implementations for general purpose, real-time and embedded applications. ❖ Explain what multi-tasking is and outline standard scheduling algorithms for Multi-tasking. ❖ Define the concepts of processes, threads, asynchronous signals and competitive system resource allocation. ❖ Discuss mutual exclusion principles and their use in concurrent programming including semaphore construction and resource allocation. ❖ Expose the details of major operating system concepts, overview of system memory management and the implementation of file systems.
		Software Lab based on Operating Systems	➢ Demonstrate the installation process of various operating systems. ➢ Implement virtualization by installing Virtual Machine software. ➢ Apply UNIX/LINUX operating system commands. ➢ Understand different UNIX/LINUX shell scripts and execute various shell programs.
	SEC-1	Office Automation Tools	❖ To prepare students in understanding ICT basics and to make aware of Office automation using MS- Office.
		Computer Lab Based on Office Automation	❖ Students learn the various word processing features which is very helpful in preparing project reports and other documentations in future. ❖ Students learn the features of electronic spreadsheets which is a prerequisite in any global market.
		System Administration and Maintenance	Students will be able to- ➢ Basics of Linux/Unix & Window operating system. ➢ Installation and configuration, maintenance and history, versions. ➢ Difference between linux/unix and windows operating systems.
		Software Lab Based on System Administration and Maintenance Linux:	Students will be able to- **Linux/Unix** ❖ Configuring desktop environment and desktop settings. ❖ Basic Commands, Package Installation, Synaptic package manager. **Windows** ❖ Creating users, Path of their personal files, Adding and changing passwords, Difference between workgroup and domain, Concept of roles. ❖ Computer Management, Local security Policy, Performance Monitor, Task Scheduler, Antivirus and firewall.

4th Semester	CC	Computer System Architecture (CC-1D)	❖ Know about the basic functioning of various parts of computer system from hardware point of view and interfacing of various peripheral devices used with the system. ❖ Learn different types of logic gates and Minimize the logic expressions. ❖ Define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation. ❖ Learn how to design Combinational & Sequential circuits.
		Computer System Architecture Lab	➢ The students will understand the function of all components of Computer architecture. ➢ The students will understand various types of basic, combinational & universal logic gates. ➢ The students will learn how to design Combinational circuits like Adder, Subtractor, Decoder, Encoder, Multiplexer, Demultiplexer ➢ The students will learn how micro operations and associate with instructions.
	SEC-2	HTML Programming	Students will be able to- ❖ The Basics concept of HTML Programming. ❖ Insert a graphic within a web page. ❖ Create a link within a web page. ❖ Create a table within a web page. ❖ Insert heading levels within a web page. ❖ Insert ordered and unordered lists within a web page. ❖ Use cascading style sheets. ❖ Create a web page. ❖ Validate a web page. ❖ Publish a web page.
		Software Lab Based on HTML	Students will be able to- ➢ How to create an HTML document. ➢ Create a link within a web page. ➢ Create a table within a web page. ➢ Insert ordered and unordered lists within a web page. ➢ Create an HTML document which implements Internal linking as well as External linking. ➢ Create a form using HTML which has the diff. types of controls.
		XML Programming	Students will be able to- ➢ Understanding Mark-up Languages, Introduction to XML and its Goals. ➢ XML Structure and Syntax, Document classes and Rules. ➢ Style Sheet Basics, XSL basics, XSL style sheets.

		Software Lab Based on XML	Students will be able to- ➢ Iidentifying the structure of an information object. ➢ Identifying the explicit structure within an XML document. ➢ understanding of the constraints for well-formedness. Creating some XML Markup.
5th Semester	DSE	Programming in Java (DSE-1A)	Students will be able to: ➢ Understand the basic concepts of Procedure–Oriented Programming and object oriented programming. ➢ Achieve the Knowledge of developing simple java programs. ➢ Develop computer programs to solve real world problems. ➢ Design simple GUI interfaces to interact with users, using Applets and swings. ➢ Achieve Knowledge of multi-threading and to comprehend the event-handling techniques.
		Software Lab based on Java	➢ Write Java application programs using OOP principles and proper program structuring. ➢ Write programs using Java collection API as well as the java standard class library. ➢ write java programs using inheritance, exceptions, threads, graphics and iostreams.
		Software Engineering (DSE-1A)	Students will be able to- ➢ Aware about the engineering approach to analysis, design and built the software. ➢ Understand the phases and activities involved in the conventional software life cycle models. ➢ Analyze problems, and identify and define the computing requirements appropriate to its solution. ➢ Apply design and development principles in the construction of software systems of varying complexity. ➢ Apply current techniques, skills, and tools necessary for computing practice.
		Lab based on Software Engineering	Students will be able to- ➢ Elicit, analyze and specify software requirements. ➢ Analyze and translate a specification into a design. ➢ Realize design practically, using an appropriate software engineering methodology. ➢ Plan a software engineering process life cycle. ➢ Use modern engineering tools for specification, design, implementation, and testing.

	SEC-3	MySQL/ PL-SQL	Students will be able to- ➢ SQL Commands and Data types, Operators and Expressions. ➢ Introduction to SQL * Plus. ➢ Managing Tables and Data. ➢ Transaction Control Statements.
		Software Lab Based on MySQL (SQL/PL-SQL)	Students will be able to- ➢ SQL* formatting commands. ➢ To create a table, alter and drop table. ➢ To make use of different clauses viz where, group by, having, order by, union and intersection. ➢ To perform select, update, insert and delete operation in a table. ➢ To use oracle function viz aggregate, numeric, conversion, string function. ➢ To understand use and working with joins. ➢ To make use of transaction control statement viz rollback, commit and save point. ➢ To understand working with PL/SQL.
		Concepts of Software Testing	Students will be able to- ➢ Introduction to Software Testing. ➢ Functional Testing\ Black-box Testing. ➢ Structural Testing\ White-box Testing.
		Computer Lab Based on Software Testing	Students will be able to- ➢ Learn the programming language and its application in computer lab. ➢ Develop programming code for evaluating areas perimeters on different types of triangles. ➢ Find real and complex root of algebraic and transcendental equations.
6^{th} Semester	DSE	Computer Networks (DSE-1B)	Students will be able to- ➢ Different Network Models. ➢ Understand different network technologies and their application. ➢ Discussion of various networking technologies. ➢ Describe about wireless networking concepts, contemporary issues in networking technologies, network tools and network programming. ➢ Explain the analysis of different types of protocol and the comparison of number of data link, network and transport layer protocols.
		Software Lab based on Computer Networks:	Students will be able to- ➢ Learn the programming language and Develop C programming code for Checksum Algorithm, CRC Algorithm , Stop & Wait Protocol. Go-Back-N Protocol.

6th Semester	DSE	Internet Technologies	Students will be able to- ➢ Understand fundamental tools and technologies for web design. ➢ Basic concept of Internet technologies. ➢ Comprehend the technologies for Hypertext Mark-up Language (HTML). ➢ Effectively deal with programming issues relating to VB Script, JavaScript, Java, ASP, Front Page and Flash.
		Software Lab based on Internet Technologies	Students will be able to- ➢ Apply appropriate constructs of java Programming language, coding standards for application development. ➢ Develop logic of various programming problems. ➢ Design web pages that apply various dynamic effects on the web site.
	SEC-4	PHP Programming	Students will be able to- ➢ Concept of PHP Programming. ➢ Handling HTML form with PHP. ➢ PHP conditional events and Loops, ➢ PHP Functions. ➢ String & Array Manipulation and Regular Expression.
		Software Lab Based on PHP	Students will be able to- ➢ Install and configure PHP, web server, MYSQL . ➢ Write a program to print “Welcome to PHP” . ➢ Write a simple PHP program using expressions and operators.
		Programming in Visual Basic	Student will be able to: ➢ Design, create, build, and debug Visual Basic applications. ➢ Implement syntax rules in Visual Basic programs. ➢ Explore Visual Basic‘s Integrated Development Environment(IDE). ➢ Apply arithmetic operations for displaying numeric output.
		Software Lab Based on Visual Basic:	A student will be able to: ➢ Design, create, build, and debug Visual Basic applications. ➢ Apply decision structures and loop structures for determining different operations. ➢ Write Visual Basic programs using object-oriented programming techniques including classes, objects, methods, instance variables, composition, and inheritance, and polymorphism. ➢ Write Windows applications using forms, controls, and events.

		Software Lab Based on Visual Basic:	A student will be able to: ➢ Design, create, build, and debug Visual Basic applications. ➢ Apply decision structures and loop structures for determining different operations. ➢ Write Visual Basic programs using object-oriented programming techniques including classes, objects, methods, instance variables, composition, and inheritance, and polymorphism. ➢ Write Windows applications using forms, controls, and events.

Coordinator
Science Wing
Hiralal Bhakat College

Head
Department of Comp. Science
Hiralal Bhakat College
Nalhati, Birbhum

Signature,
Teacher-in-Charge
Hiralal Bhakat College
Nalhati, Birbhum.

Teacher- in- Charge
Hiralal Bhakat College
Nalhati, Birbhum

HIRALAL BHAKAT COLLEGE
Estd-1986
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