Gour Mahavidyalaya
Department of Computer Science
B.Sc. Computer Science (Hons.) CBCS

Semester	Topic	Course Outcome
I	DC1: Discrete Mathematics	After successfully completing this course, students will be able to: CO1: Able to work with graphs and identify certain parameters. CO2: Develop the skill of converting mathematical problem graphically and vice versa. CO3: Motivates to solve real life problems. CO4: Develop suitable techniques of analysis of problems. CO5: Enable students to develop a positive attitude towards mathematics as an interesting and valuable subject to study. CO6: Develop the logical thinking of students. CO7: Apply mathematical foundations to design computer based algorithms. CO8: Perform certain algorithms, justify why these algorithms work, and give some estimates of the running times of these algorithms.
	DC2: Introduction to Programming through C	After successfully completing this course, students will be able to: computers. CO1: Understand algorithms and flowchart for solving problems using computers. CO2: Understand and can choose the loops and decision-making statements to solve the problem. CO3: Implement different Operations on arrays and will use functions to solve the given problem. CO4: Implement different Operations using pointers, ADT and file system to solve the given problem. CO5: To enrich the students in logic development required for programming. CO6: To help the students to build carrier in various branches of software development.
II	DC3: Data Structure & Algorithm	After successfully completing this course, students will be able to: CO1: Students will understand system related Programming such as Operating System functioning. CO2: Students will capable to develop problem solving abilities using a computer. CO3: To build the necessary skill set and analytical abilities for developing computer based solutions for real life problems. CO4: To imbibe quality software development practices. To create awareness about process and product standards. CO5: Students will train in professional skills related to Software Industry. CO6: To prepare necessary knowledge which is related to operating system and base for research and development in Computer Science.
	DC4: Digital Logic System	After completion of this course student will be able to: CO1: Solve problems based on interconversion of number systems. CO2: Reduce the expression using Boolean theorems. CO3: Reduce expressions using K maps in SOP and POS forms. CO4: Understand the operation of all types of Logic Gates, their families etc. CO5: Understand how to use Combinational Logic circuits using Logic Gates and using ICs.
III	DC5: Computer Organization & Architecture	After completion of this course student will be able to: CO1: Understand the working of different Sequential logic circuits CO2: Understand working operations of different types of Flip flops as a basic building block. CO3: Know the operations of shift registers and Binary Counters. CO4: Understand the basic Computer System and general organization of different blocks. CO5: To understand the organization of memory in the Computer system and know different types of Memories.

	DC6: Operating System	After completion of this course student will be able to: CO1: Master functions, structures and history of operating systems. CO2: Master understanding of design issues associated with operating systems. CO3: Master various process management concepts including scheduling, synchronization, deadlocks. CO4: Be familiar with multithreading. CO5: Understand concepts of memory management including virtual memory. CO6: Master system resources sharing among the users. CO7:Master issues related to file system interface and implementation, disk management. CO8: Be familiar with protection and security mechanisms. CO9: Understand the basics of Unix system administrator.	
	DC7: Object Oriented Programming with C++	After completion of this course student will be able to: CO1: Understand and can choose the loops and decision-making statements to solve the problem. CO2: Implement different Operations on arrays and will use functions to solve the given problem. CO3: Implement different Operations using pointers, ADT and file system to solve the given problem. CO4: Understand the concept of object oriented programming. CO5: Use the benefits of object oriented design and understand when it is an appropriate methodology to use. CO6: Design object oriented solutions for small systems involving multiple objects.	
IV	DC8: Theory of Computation	After successfully completing this course, students will be able to: CO1: Design a finite automaton to recognize a given regular language. CO2: Transform a language into regular expression or finite automaton or transition graph and define deterministic and nondeterministic finite automata. CO3: Prove properties of regular languages and classify them. CO4: Define relationship between regular languages and context-free grammars. Prove properties of regular languages and classify them. CO5: Building a context-free grammar for pushdown automata. CO6: Determine whether a given language is context-free language or not and Prove properties of context-free languages. CO7: Design Turing machine and Post machine for a given language. CO8: Students are exposed to a broad overview of the theoretical foundations of computer science.	
	DC9: Database Management System	After successfully completing this course, students will be able to: CO1: Understand the fundamental concepts of database. CO2: Understand user requirements and frame it in data model. CO3: Understand creations, manipulation and querying of data in databases CO4: Solve real world problems using appropriate set, function, and relational models. CO5: Design E-R Model for given requirements and convert the same into database tables. CO6: Use SQL.	
	DC10: Introduction to Microprocessor	After the completion of the course the student will be able to: CO1: Analyze and design various microprocessor types and their characteristics. CO2: To evaluate several applications of Microprocessor. CO3: Develop practical understanding, limitations and constraints of the theory they learn. CO4: Understand the architecture of 8085 and 8051. CO5: Impart the knowledge about the instruction set.	
V	DC11: Data Communication & Networking	After successfully completing this course, students will be able to: CO1: Students will get acquainted with fundamentals of Networking like PAN, LAN, MAN, WAN, topologies and Home & Business applications of Networks. CO2: Students will clear their basic concepts about the standards, their need & types of standards.	

VI		CO3: Students will know the design issues for the layers, layered architecture of the Network Models & functions performed at each layer. CO4: Students will come to know the role played by different addresses at different layers of the network models. CO5: Students will understand very basic networking hardware like transmission media types & tools description. CO6: Students will be able to understand the need and importance of protocols at each layer in the communicating computers.
	DC12: Computer Graphics	After successfully completing this course, students will be able to: CO1: Understand how to use graphics objects represented in computer. CO2: Will able to correlate between user and computer through graphics. CO3: Able to increase the productivity through graphics. CO4: Understand programmer's perspective of working of computer graphics. CO5: Compare various graphics algorithm used in 2D and 3D Be able to understand fundamentals of graphics used in various real life applications. CO6: Understand and identify the performance characteristics of graphics algorithms.
	DSE1-E2: Introduction to Python Programming	After successfully completing this course, students will be able to: CO1: Understand why Python is a useful scripting language for developers. CO2: Learn how to use lists, tuples, and dictionaries in Python programs. CO3: Learn how to identify Python object types. CO4: Learn how to use indexing and slicing to access data in Python programs. CO5: Define the structure and components of a Python program. CO6: Learn how to write loops and decision statements in Python. CO7: Learn how to write functions and pass arguments in Python. CO8: Learn how to build and package Python modules for reusability. CO9: Learn how to design object-oriented programs with Python classes.
	DSE2- E2: Intelligent System	After undergoing the course, Students will be able to: CO1: Learn the use of AI in different real life problems. CO2: Use the heuristic search techniques for AI related problems. CO3: Analyze and formalize the problem (as a state space, graph, etc.) and select the appropriate search method. CO4 : Choose an appropriate problem-solving method. CO5 : Know how knowledge is represented in computer system and different knowledge-representation scheme.
	SEC-1: Sensor Network & IOT	After undergoing the course, Students will be able to: CO1: Examine the potential business opportunities that IoT can uncover. CO2: Identify how IoT differs from traditional data collection systems. CO3: Use real IoT protocols for communication CO4: Determine the right sensors and communication protocols to use in a particular IoT system. CO5: Establish data migration techniques from IoT devices to the cloud. CO6: Implement security features to protect data stored in the cloud. CO7: Understanding the fundamentals of Internet of things and Its architecture CO8: Understand of IOT Protocols and IOT Applications
VI	DC13: Software Engineering	After undergoing the course, Students will be able to: CO1: Understand basic concepts of software engineering. CO2: Implement Software life cycle models and have a knowledge of different phases of Software life cycle. CO3: Calculate the cost & staff for a particular project at the start. CO4: Schedule their software in an appropriate way & make it track. CO5: Make an unambiguous SRS (software requirement specification) after collecting requirements of any client.
	DC14: Compiler Design	After the completion of the course the student will be able to: CO1: Understand how to build symbol tables and generate intermediate code. CO2: Understand compiler architecture.

		CO3: Design & conduct experiments for Intermediate Code Generation in compiler. CO4: Design & implement a software system for backend of the compiler. CO5: Deal with different translators.
	DSE3-E2: Introduction to Data Science	After undergoing the course, Students will be able to: CO1: Summarize the basic concepts of data science and its importance. CO2: Analyze the data quantitatively or categorically , measure of averages, variability. CO3: Identify different trends in scatter plots, strengths of association between two numerical variables. CO4: Classify the concepts of data science and its importance. CO5: Build and assess data-based models. CO6: Execute statistical analyses with professional statistical software. CO7: Demonstrate skill in data management.
	DSE - 4: Project	After undergoing the course, Students will be able to: CO1: Work with a group to solve a problem. CO2: Utilise the technical resources. CO3: Write technical/training reports. CO4: Give oral presentation related to the work completed.
	SEC - 2: Internet Technology & Web Design	After undergoing the course, Students will be able to: CO1: Gain an in-depth understanding of the web and Internet technologies CO2: Understand the basic concepts for network implementation CO3: Understand the basic working scheme of the Internet and the World Wide Web CO4: Learn about the fundamental tools and technologies for web design CO5: Comprehend the technologies for Hypertext Mark-up Language (HTML) CO6: Specify the design rules in constructing websites and web pages. CO7: Effectively deal with the programming issues related to HTML,CSS, and PHP.

Arijit Bhattacharya   Akhil Kumar Das   Ekram Alam

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	DC2: Introduction to Programming through C	After successfully completing this course, students will be able to: CO1: Understand algorithms and flowchart for solving problems using computers. CO2: Understand and can choose the loops and decision-making statements to solve the problem. CO3: Implement different Operations on arrays and will use functions to solve the given problem. CO4: Implement different Operations using pointers, ADT and file system to solve the given problem. CO5: To enrich the students in logic development required for programming. CO6: To help the students to build carrier in various branches of software development.
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	DC10: Introduction to Arduino sensors	After the completion of the course the student will be able to: CO1: To learn basic electronic concepts, breadboard and electronic components, and writing lab reports. CO2: To learn how the Arduino platform works in terms of the physical board and libraries and the IDE CO3: To develop skills to design and implement various smart system applications.	

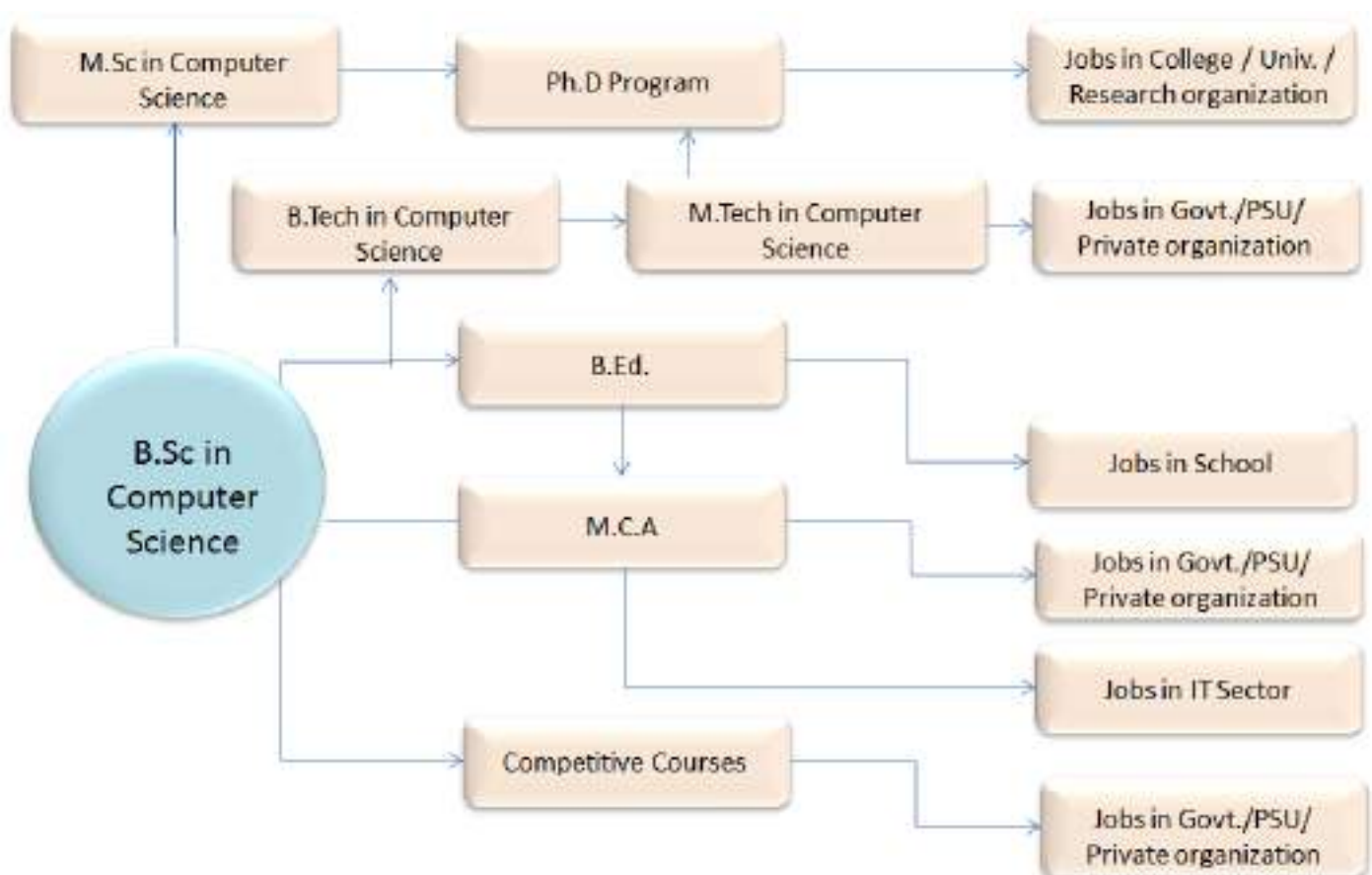|			
		CO4: basic elements of arduino, i/o functions and interrupts working with LED and buttons CO5: analog & digital communication with arduino and UART, I2C& SPI communication protocol CO6: integration of sensors and actuators with arduino	
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	DC14: Web Design	After the completion of the course the student will be able to: CO1: envision, evaluate, and communicate interaction design ideas within a web-based environment using industry-standard tools. CO2: Provide a insight on the basics of Internet CO3: Ability to understand the basics of web page creation CO4: Acquire knowledge on creating cascading style sheets CO5: Ability to work with XML CO6: Ability to work with Java Script
	DSE3-E2: Introduction to Data Science	After undergoing the course, Students will be able to: CO1: Summarize the basic concepts of data science and its importance. CO2: Analyze the data quantitatively or categorically , measure of averages, variability. CO3: Identify different trends in scatter plots, strengths of association between two numerical variables. CO4: Classify the concepts of data science and its importance. CO5: Build and assess data-based models. CO6: Execute statistical analyses with professional statistical software. CO7: Demonstrate skill in data management.
	DSE - 4: Project	After undergoing the course, Students will be able to: CO1: Work with a group to solve a problem. CO2: Utilise the technical resources. CO3: Write technical/training reports. CO4: Give oral presentation related to the work completed.
	SEC - 2: Introduction to PHP	After undergoing the course, Students will be able to: CO1: Analyze the construction of a web page and relate how PHP and HTML combine to produce the web page. CO2: Compare and contrast PHP variable types, and relate the advantages and disadvantages of PHP variables with local or global scope. CO3: Formulate, design and create PHP control structures, including selection and iterative structures CO4: Create PHP programs that use various PHP library functions, and that manipulate files and directories. CO5: PHP Arrays PHP Functions

Arijit Bhattacharya   Akhil Kumar Das   Ekram Alam

PROGRAM OUTCOME

The course in B.Sc. Computer Science helps to develop a widely applicable skill set in computing with strong programming and mathematics skills, as well as wide ranging skills in project management, effective presentations and teamwork. Graduate with a portfolio of work fit to present to potential employers. Depending on the chosen pathway, they can focus on particular areas of interest such as machine learning, web development, data science and video games etc. The explosive and ever-growing use of technology in business and commerce means that there's a whole range of different career possibilities for computing graduates. In terms of job opportunities and salaries, the IT sector is well ahead of most other industrial and commercial sectors.

Possible Pathways for Higher Education as well as Carrier Opportunities is shown in the following figure.

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