

# **DEPARTMENT OF COMPUTER SCIENCE**

## **BISWANATH COLLEGE**

### **PROGRAMME OUTCOME AND COURSE OUTCOMES**

**PROGRAMME: B.C.A.**

#### **About BCA Programme**

The Bachelor of Computer Application (BCA) is a 3-year (6 semesters) undergraduate degree programme affiliated to Gauhati University. It is valuable for the students wishing to learn about the world of computer languages and information technology. It caters to students with specific interests with the core computer science courses and wide range of skill enhancement and elective courses. The course aims to develop students with intellectual and logical skills and at the same time implementation of mathematical and physics problems using popular programming languages.

The department mainly focuses on skilling the students in numerous courses like Data Structure & Algorithms, Programming Languages, Computer Architecture, Operating System, Database Management System, Computer Networks, Numerical Analysis, Data Mining etc. To facilitate continuous learning the department has taken various approaches to bring theoretical and practical knowledge to the students.

#### **Programme Outcome**

After successful completion of three years degree programme in BCA the students will be able to:

1. Develop programming & logical skills, networking skills and modern techniques of IT.
2. Learn different programming languages such as C, C++, Java, and VB.NET.
3. Design and implement organization specific databases using latest technologies.
4. Design and analyze algorithms as per need by relating the data structure and algorithms.
5. Get detailed idea of design principles of Operating Systems.
6. Develop organization specific software, web sites and mobile applications.
7. Work as Software Engineer, Mobile Application Developer, Software Tester, Junior Programmer, Web Developer, System Administrator etc.
8. Get skills about research & technical writing, graphing, data analysis and computer presentation using LaTeX, SciLab and Office Automation.
9. Develop strong communication skills in both written and verbal.

10. Understand contemporary issues and provide engineering solutions for solving social problems.
11. Get skill and information not only about computer and information technology but also in common organization and management.

### Program Specific Outcomes

1. Pursue higher studies in the area of Computer Science/Applications
2. Knowledge of computer system architecture.
3. Knowledge of Compilation and execution of computer programs.
4. Knowledge of word processing and its applications.
5. Application of networking in organizations.
6. Application of algorithms in research and development.
7. Application of *data-mining* techniques in financial analysis and higher education.
8. Uses of computers in Education such as distance learning, online examinations and online training resources.

### **Course Outcomes Of BCA Core Paper(cbs)**

Course	Outcomes (After the course the students are expected to be able to )
<b>SEMESTER 1</b>	
<b>BCA-HC-1016</b> <b>Introduction to C Programming</b>	<ul style="list-style-type: none"> <li>● Demonstrate an understanding of computer programming language concepts.</li> <li>● Build up the foundation of programming along with the concepts of data structures, functions and other core part of C Programming.</li> <li>● Implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.</li> <li>● Identify the problem, solve it using logical reasoning and implement it by writing C programs instructing computers to effectively solve the task.</li> </ul>
<b>BCA-HC-1026</b> <b>Computer Fundamentals &amp; ICT Hardware</b>	<ul style="list-style-type: none"> <li>➤ Selecting search results in a systematic and coherent fashion, according to the set targets;</li> <li>➤ Analysing information quality using approved instruments;</li> <li>➤ Analysing the relevance of information in the context of a given project;</li> <li>➤ Learning criteria for assaying the credibility of information sources;</li> </ul>

	<ul style="list-style-type: none"> <li>➤ Assessing the quality of the information collected by checking different sources, authorship and up-to-datedness.</li> </ul>
<b>SEMESTER II</b>	
<b>BCA-HC-2016</b> <b>Mathematics-I</b>	<ul style="list-style-type: none"> <li>➤ Understand the foundations of mathematics.</li> <li>➤ Be able to perform basic computations in higher mathematics.</li> <li>➤ Be able to read and understand middle-level proofs.</li> <li>➤ Be able to write and understand basic proofs.</li> <li>➤ Develop and maintain problem-solving skills.</li> <li>➤ Use mathematical ideas to model real-world problems</li> </ul>
<b>BCA-HC-2026</b> <b>Digital Logic Fundamentals</b>	<ul style="list-style-type: none"> <li>➤ Convert different type of codes and number systems which are used in digital communication and computer systems.</li> <li>➤ Employ the codes and number systems converting circuits and Compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance and efficiency.</li> <li>➤ Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.</li> <li>➤ Design different types of with and without memory element digital electronic circuits for particular operation, within the realm of economic, performance, efficiency, user friendly and environmental constraints.</li> </ul>
<b>SEMESTER III</b>	
<b>BCA-HC-3016</b> <b>Software Engineering</b>	<ul style="list-style-type: none"> <li>➤ Basic knowledge and understanding of the analysis and design of complex systems.</li> <li>➤ Ability to apply software engineering principles and techniques.</li> </ul>
<b>BCA-HC-3026</b> <b>Data Structure and Algorithms</b>	<ul style="list-style-type: none"> <li>➤ Ability to analyze algorithms and algorithm correctness.</li> <li>➤ Ability to summarize searching and sorting techniques</li> <li>➤ Ability to describe stack, queue and linked list operation.</li> </ul>

	<ul style="list-style-type: none"> <li>➤ Ability to have knowledge of tree and graph concepts</li> </ul>
BCA-HC-3036 Database Management System	<ul style="list-style-type: none"> <li>● Understand the concept of database and database management system.</li> <li>● Understand the file system Vs database system.</li> <li>● Design any database system wherever required.</li> </ul>
<b>SEMESTER IV</b>	
BCA-HC-4016 Computer Organization and Architecture	<ul style="list-style-type: none"> <li>➤ Describe the fundamental organisation of a computer system</li> <li>➤ Explain the functional units of a processor</li> <li>➤ Explain addressing modes, instruction formats and program control statements</li> </ul>
BCA-HC-4026 Mathematics-II	<ul style="list-style-type: none"> <li>➤ Understand the foundations of mathematics.</li> <li>➤ Be able to perform basic computations in higher mathematics.</li> <li>➤ Be able to read and understand middle-level proofs.</li> <li>➤ Be able to write and understand basic proofs.</li> <li>➤ Develop and maintain problem-solving skills.</li> <li>➤ Use mathematical ideas to model real-world problems.</li> </ul>
BCA-HC-4036 Object Oriented Programming in C++	<ul style="list-style-type: none"> <li>➤ To describe the advantages of a high level language like C/C++, the programming process, and the compilation process. ...</li> <li>➤ To describe and use software tools in the programming process. ...</li> <li>➤ To apply good programming principles to the design and implementation of C/C++ programs.</li> </ul>
<b>SEMESTER V(TDC)</b>	
BCA 5.1 System Administration using Linux	<ul style="list-style-type: none"> <li>➤ Explain the fundamental concepts of open-source operating system Linux</li> <li>➤ Understand the basic set of commands and editors in Linux operating system.</li> <li>➤ Discuss shell programming in Linux operating system</li> <li>➤ Demonstrate the role and responsibilities of a Linux system administrator.</li> <li>➤ Distinguish various filter and server commands</li> </ul>
BCA 5.2 Computer Networks	<ul style="list-style-type: none"> <li>➤ Recognize the technological trends of Computer Networking.</li> <li>➤ Discuss the key technological components of the</li> </ul>

	<p>Network.</p> <ul style="list-style-type: none"> <li>➤ Evaluate the challenges in building networks and solutions to those.</li> </ul>
BCA 5.3 Open Source Software	<ul style="list-style-type: none"> <li>➤ Ability to build and modify one or more Free and Open Source Software packages.</li> <li>➤ Ability to use a version control system and to interface with version control systems used by development communities.</li> <li>➤ Ability to contribute software to and interact with Free and Open Source Software development projects.</li> </ul>
<b>SEMESTER VI(TDC)</b>	
<b>General Elective</b>	
<b>BCA Elective 6.1 Data Mining &amp; Warehousing (5-1-0-6)</b>	<ul style="list-style-type: none"> <li>➤ Identify the key processes of data mining, data warehousing and knowledge discovery process.</li> <li>➤ Understand the basic principles and algorithms used in practical data mining and their strengths and weaknesses.</li> <li>➤ Apply data mining techniques to solve problems in other disciplines in a mathematical way.</li> </ul>
<b>BCA Elective 6.2 Cyber Law (5-1-0-6)</b>	<ul style="list-style-type: none"> <li>• Analyze and evaluate the cyber security needs of an organization.</li> <li>• Determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation.</li> <li>• Measure the performance and troubleshoot cyber security systems.</li> <li>• Implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools.</li> <li>• Comprehend and execute risk management processes, risk treatment methods.</li> </ul>

**General Elective(cbs)**

**SEMESTER-I**

GE 1B: BCA-HG-1026: Office Automation	<ul style="list-style-type: none"> <li>· to perform documentation</li> <li>· to perform accounting operations</li> <li>· to perform presentation skills</li> </ul>
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## SEMESTER-II

GE 2B: BCA-HG-2026:Introduction to Bio-Informatics	<ul style="list-style-type: none"><li>➤ Classify different types of Biological Databases.</li><li>➤ Introduction to the basics of sequence alignment and analysis.</li><li>➤ Overview about biological macromolecular structures and structure prediction methods.</li><li>➤ To gain knowledge about various Biological databases that provide information about nucleic acids and protein.</li></ul>
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## SEMESTER-III

GE 3A: BCA-HG-3016:Introduction to Indian History	<ul style="list-style-type: none"><li>• This course is an introductory paper intending to introduce prehistory, protohistory and important political events till 400 BCE of India to the students.</li><li>• The course also intends to give a brief idea about the different sources and the changing interpretations of ancient Indian history.</li></ul>
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## SEMESTER-IV

GE 4B: BCA-HG-4026:Information Security and Cyber Laws	<ul style="list-style-type: none"><li>➤ Make Learner Conversant With The Social And Intellectual Property Issues Emerging From 'Cyberspace.</li><li>➤ Explore The Legal And Policy Developments In Various Countries To Regulate Cyberspace</li><li>➤ Develop The Understanding Of Relationship Between Commerce And Cyberspace</li><li>➤ Give Learners In Depth Knowledge Of Information Technology Act And Legal Frame Work Of Right To Privacy, Data Security And Data Protection.</li><li>➤ Make Study On Various Case Studies On Real Time Crimes</li></ul>
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## SEMESTER-V/TDC

Computer Oriented Numerical Methods and Statistical techniques (5-0-1-6)	<ul style="list-style-type: none"><li>➤ Recognize the error in the number generated by the solution.</li><li>➤ Compute solution of algebraic and transcendental equation by numerical methods like Bisection method and Newton Rapshon method.</li><li>➤ Apply method of interpolation and extrapolation for prediction.</li><li>➤ Recognize elements and variable in statistics and summarize qualitative and quantitative data.</li><li>➤ Calculate mean, median and mode for individual series.</li><li>➤ Outline properties of correlation and compute Karl-Pearson's coefficient of correlation.</li></ul>
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### **Skill Enhancement Course(cbs)**

#### SEMESTER-III

SEC-1C: BCA-SE-3034: Open Source Software	<ul style="list-style-type: none"><li>• Ability to build and modify one or more Free and Open Source Software packages.</li><li>• Ability to use a version control system and to interface with version control systems used by development communities.</li><li>• Ability to contribute software to and interact with Free and Open Source Software development projects.</li></ul>
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#### SEMESTER-IV

SEC-2B: BCA-SE-4024: Mobile Applications	<ul style="list-style-type: none"><li>➤ Recognizes the concept of application development for mobile devices.</li><li>➤ Recognizes mobile development environments.</li><li>➤ Explains the basic concepts of Android phone features and capabilities.</li><li>➤ Understands the basic technologies used by the Android platform.</li></ul>
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## **Ability Enhancement Compulsory Course(cbc)**

### SEMESTER-I

(English Communication) ENG-AE-1014/	<ul style="list-style-type: none"><li>➤ develop vocabulary and improve the accuracy in grammar.</li><li>➤ produce words with right pronunciation.</li><li>➤ Improve LSRW- listening, speaking, reading and writing skills and the related sub-skills.</li><li>➤ demonstrate positive group communication exchanges.</li></ul>
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### SEMESTER-II

Environmental Science ENV-AE-2024/	<ul style="list-style-type: none"><li>➤ Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.</li><li>➤ Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.</li></ul>
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## **Practical/Minor/Major Project(cbc/Tdc)**

### SEMESTER-I

Lab work using C Language	<ul style="list-style-type: none"><li>➤ Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.</li><li>➤ Demonstrate an understanding of computer programming language concepts.</li><li>➤ To be able to develop C programs on linux platform.</li><li>➤ Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.</li><li>➤ Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures. Student must be able to define union and</li></ul>
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	<p>enumeration user defined data types.</p> <ul style="list-style-type: none"> <li>➤ Develop confidence for self education and ability for life-long learning needed for Computer language.</li> </ul>
Lab work using ICT Tools	<ul style="list-style-type: none"> <li>➤ How to install software</li> <li>➤ How to format tools and device</li> <li>➤ How to use monitor and keyboard properly</li> </ul>

### SEMESTER-III

Lab work of Data Structure	<ul style="list-style-type: none"> <li>➤ Develop simple C Programs using pointers and Functions</li> <li>➤ Develop C program for Linear data structure operations and its applications</li> <li>➤ Experiment with File Manipulation concepts</li> <li>➤ Develop programs using various sorting algorithms</li> <li>➤ Develop programs using different searching methods</li> </ul>
Lab work of DBMS	<ul style="list-style-type: none"> <li>➤ Apply the basic concepts of Database Systems and Applications.</li> <li>➤ Use the basics of SQL and construct queries using SQL in database creation and interaction.</li> <li>➤ Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system.</li> <li>➤ Analyze and Select storage and recovery techniques of database system</li> </ul>

### SEMESTER-IV

Lab work using C++	<ul style="list-style-type: none"> <li>➤ Creating simple programs using classes and objects in C++.</li> <li>➤ Implement Object Oriented Programming Concepts in C++.</li> <li>➤ Develop applications using stream I/O and file I/O.</li> <li>➤ Implement simple graphical user interfaces.</li> <li>➤ Implement Object Oriented Programs using templates and exceptional</li> </ul>
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SEMESTER-V/TDC

Lab work using Linux	<ul style="list-style-type: none"> <li>• To learn to develop software for Linux/UNIX systems.</li> <li>• To learn the C language and get experience programming in C.</li> <li>• To learn the important Linux/UNIX library functions and system calls.</li> <li>• To understand the inner workings of UNIX-like operating systems.</li> <li>• To obtain a foundation for an advanced course in operating systems.</li> </ul>
Lab work of OSS	<ul style="list-style-type: none"> <li>• Compiling from source : Learn about the various build systems used like the cmake /make / ant etc. instead of just running the commands.</li> <li>• Introduction to package management system : Given set of RPM or DEB, how to build and maintain , serve packages over http or ftp. And also how do you configure client systems to access the package repository.</li> <li>• Install various software packages</li> <li>• Install Samba and share files to windows</li> <li>• Install Common Unix Printing System (CUPS)</li> </ul>

SEMESTER-VI/TDC

Major Project	<ul style="list-style-type: none"> <li>➤ Students will prepare their individual project based on different language like java,C,Php,Asp.net HTML,CSS etc and create various web based and android based project</li> </ul>
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Head  
Department of Computer Science