Course – Bachelor of Computer Application (BCA)

Course Duration: 3 years.

PROGRAM OBJECTIVE:

With the growing use of Computers and Information Technology in our day to day life, it is necessary that we have the trained man power to manufacture, maintain and use the Computers as well as write the software required for the effective and efficient use of the computers and IT. If we try to understand one of the most common features that have enabled the businesses to become successful is that they all have evolved to become information enabled business. Role played by Information technology is that of a driver rather than an enabler. I.T. is used from Simple Office Automation to Decision Support, Re-Engineering and Organization Transformation. A new genre of manpower / managers is required to harness the awesome capabilities of Information Technology and to tap the potential of this tool to its maximum. This course, Bachelor of Science in Information Technology, is designed and introduced by Gauhati University in 2008 to bridge this gap and produce employable graduate in Information technology which will enable the industry to grow and he graduates to become successful in the field of Information Technology. Students who choose B.Sc in IT Programme, develop the ability to think critically, logically, analytically and to use and apply current technical concepts and practices in the core development of solutions in the form of Information technology .The knowledge and skills gained with a degree in Computer Science prepare graduates for a broad range of jobs in education, research, government sector, business sector and industry.

The program covers the various essential concepts in Computer Science.

- The course lays a structured foundation of Computer fundamentals, Numerical methods, Data structure, and Algorithm and Complexity analysis, Software Engineering.
- Programming Concepts in various languages(C, C++, Java, Visual Basic etc.)
- The program covers the concept of Computer Networking, System Programming and Administration, Operating System, Digital Image Processing, Embedded systems, Computer Architecture, Microprocessor,
- It also provides detail knowledge PHP programming, Numerical methods, Combinatorial optimization, Computer Graphics and Database management system.

- An exceptionally broad range of topics covering current trends and technologies in computer science: Programming in Python, Cyber Security, Data mining, R-Programming, Data Sciences, Artificial Intelligence and Android Programming.
- Also, to carry out the hand on sessions in Computer lab using various Programming languages and tools to have a deep conceptual understanding of the topics to widen the horizon of students self-experience.

COURSE OUTCOME:

FIRST SEMESTER	
PAPER CODE	COURSE OUTCOME
HC-1016 Introduction to C Programming	Upon completion of this course, students will acquire knowledge about: a) Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems. b) Demonstrate an understanding of computer programming language concepts. c) To be able to develop C programs on Linux platform. d) Ability to design and develop Computer programs, analyses, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage. e) 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. f) Student must be able to define union and enumeration user defined data types. g) Develop confidence for self-education and ability for life-long learning needed for Computer language.
HC-1026 Computer Fundamentals and ICT Hardware	Upon completion of this course the student will be able to : a) Indicate the names and functions of hardware ports and the parts of the motherboard. b) Identify the names and distinguishing features of different kinds of input and output devices. c) Describe how the CPU processes data and instructions and controls the operation of all other devices. d) Identify the names, distinguishing features, and units for measuring different kinds of memory and storage devices. e) Search your personal computer for the various hardware components it contains.
ENG-AE-1014	Upon completion of course: a) Acquire knowledge about the various principles of communication, understand its various stages and the role of audience and purpose, deal with the barriers that affect communication in a professional set up.

	b) Understand the different channels that are functional at the work place. c) Learn the importance of verbal and non-verbal communication in the professional world along with its uses. d) Learning the uses and application of RP to improve pronunciation. E) Understanding the importance of intonation, word and sentence stress for improving communicative competence, identifying and overcoming problem sounds, Importance of syntax for cultivating effective language skills. Understanding the need of skill developed.
HG-1026 Office Automation	Upon completion the student is able to : a) 0ffice tools course would enable the students in crafting professional word documents b) Excel spread sheets c) Power point presentations using the Microsoft suite of office tools. d) To familiarize the students in preparation of documents and presentations with office automation tools. e) By learning the course, the students will be able · to perform documentation · to perform accounting operations · to perform presentation skills
SECOND SEMESTER	
HC-2016 Maths – I	Upon completion of course: a) Learn fundamental concepts of set theory, operation on sets, venn diagrams, statement problems, laws, duality, partitioning of a set. b) Understand the concept of graph theory and how to make various types of graphs. c) Understand the concept of relation and types of relations, graph of relations, properties of relations and matrix representation. d) Understand logic operations, truth tables, arguments and laws of logic, mathematical system and propositions over universe. Principle of mathematical induction, recursion, recurrence relations, binomial theorem.
HC-2026 Digital Logic	Upon completion of the course: a) Able to perform the conversion among different number systems b) Familiar with basic logic gates -- AND, OR & NOT, XOR, XNOR; Independently or work in team to build simple logic circuits c) Understand Boolean algebra and basic properties of Boolean algebra d) Able to simplify simple Boolean functions by using the basic Boolean properties. e) 3. Able to design simple combinational logics using basic gates. Able to optimize simple logic using Karnaugh maps, understand "don't care". f) 4. Familiar with basic sequential logic components: SR Latch, D Flip-Flop and their usage and able to analyse sequential logic circuits. g) 5. Understand finite state machines (FSM) concept and work in team to do sequence circuit design based FSM and state table using D-FFs. h) 6. Familiar with basic combinational and sequential components used in the typical data path designs: Register, Adders, Shifters i) Comparators; Counters, Multiplier, Arithmetic-Logic Units (ALUs), RAM.

ENV-AE-2014	Upon completion of the course: a) Measure environmental variables and interpret results. b) Evaluate local, regional and global environmental topics related to resource use and management c) Propose solutions to environmental problems related to resource use and management d) . Interpret the results of scientific studies of environmental problems. e) Describe threats to global biodiversity, their implications and potential solutions.
HG-2016 Basic Electronics	Upon completion of the course: a) An ability to understand theory of Digital Design and Computer Organization to provide an insight of how basic computer components are specified. b) An ability to understand the functions of various hardware components and their building blocks c) An ability to understand and appreciate Boolean algebraic expressions to digital design An in depth understanding of sequential! Combinational circuits d) An in depth understanding of realization of different combinational/sequential circuits An in depth understanding of different stages of an instruction execution e) An in depth understanding of how different hardware components are related and work in coordination f) An ability to understand computer buses and input/output peripherals
THIRD SEMESTER	
HC-3016 Software Engineering	Upon completion of the course: a) Understand the process to be followed in SDLC. b) Define formulate and analyze a problem. c) Apply design and testing principles to software project development & Design Methodologies. d) Apply the project management and analysis principles to software project development. e) Knowledge about software development life cycle and problem articulation
HC- 3026 Data Structure and Algorithm	Upon completion of this course the student will be able to : a) Designs and analyses simple algorithms. b) Defines the meaning of iterative and recursive algorithms. c) Calculates the running time of iterative algorithms. d) Uses Big 'O' notation to express algorithmic running time. e) Describes and analyses elementary sorting algorithms such as Selection sort, Bubble sort, Insertion sort, and Shell sort. f) Understands and restates the fundamentals of basic data structures. g) Understands and explains the concept of Abstract Data Types (ADT) – separation of definitions of data types from implementations.

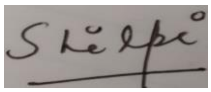
	h) Discusses basic ADTs such as stacks, queues, and trees i) Discusses recursion and tree traversal algorithms. j) Develops skills in implementations and applications of data structures. k) Implements basic algorithms for sorting and searching. l) Implements basic data structures such as stacks, queues and trees. m) Applies algorithms and data structures in various real-life software problems.
HC-3036 Database Management System	Upon Completion of the course: a) Describe fundamental elements of RDBMS. b) Explain the basic concepts of relational data model, relational database design, relational algebra and database language SQL. c) Design E-R diagram to represent simple database applications scenarios. d) Criticize a database and improve the design by normalization. e) Basic of Database protection & Distributed databases
SE-3014 Web Technology	Upon completion of this course: a) Fundamentals of how the Internet and the Web function b) A basic understanding of graphic production with a specific stress on creating graphics for the Web c) General grounding introduction to more advanced topics such as programming and scripting d) Analyse a web page and identify its elements and attributes. e) Create web pages using XHTML and Cascading Style Sheets. f) Build dynamic web pages using JavaScript (Client side programming). Create XML documents and Schema.
HG-3016 Introduction to Indian history	Upon completion of this course: a) This course is an introductory paper intending to introduce prehistory, proto history and important political events till 400 BCE of India to the students. b) The course also intends to give a brief idea about the different sources and the changing interpretations of ancient Indian history. c) After completing this course students are expected to have a fair knowledge about the prehistory, protohistory and the sources of Ancient Indian History.
FOURTH SEMESTER	
HC-4016 Computer Organization and Architecture	Upon completion of the course: a) Introduction to computer and CPU, Stored Program concepts. b) Introduction to Registers, Micro operations, Common Bus System. c) Introduction to Instruction, Instruction Cycle, Interrupt and Interrupt Cycle. d) Addressing Modes, Concept of I/O bus, DMA Controller. e) Memory Hierarchy, Cache Memory, Replacement Algorithms, Mobile Devices Architecture & Synchronous and Asynchronous Data Transfer.

HC-4026 Maths - II	Upon completion of the course: f) Understand the process to be followed in SDLC. g) Define formulate and analyze a problem. h) Apply design and testing principles to software project development & Design Methodologies. i) Apply the project management and analysis principles to software project development. j) Knowledge about software development life cycle and problem articulation
HC-4036 Object Oriented Programming in C++	Upon completion of the course: The course is designed for to providing knowledge of C & C++. Students will be able to develop logics which will help them to create programs, applications. After the completion of this course, the students will be able to develop applications in C & C++.
SE-4024 Mobile Application	Upon completion of the course: a) To facilitate students to understand android SDK b) To help students to gain a basic understanding of Android application development c) To inculcate working knowledge of Android Studio development tool . d) At the end of this course, students will be able to: 1. Identify various concepts of mobile programming that make it unique from programming for other platforms, e) Critique mobile applications on their design pros and cons, f) Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces, g) Program mobile applications for the Android operating system that use basic and advanced phone features. h) Deploy applications to the Android marketplace for distribution.
HG-4026 Information Security and Cyber laws	Upon Completion of the course: a) To introduce Information Security Concepts, Principles of Security, Policy Framework, Role based Security in an organization, Components and Balancing Information Security Approaches to information Security Implementation, Security Systems Development Life Cycle. b) To clear the concepts of Security Threats and Vulnerabilities, Desktop Security, PGP and S/MIME, Web Security, Web authentication, Database Security, Firewalls. c) To learn the techniques of Security Management and Laws, Access Control , Intrusion Detection Systems and Intrusion Prevention Systems, Security Procedures and Guidelines, Business Ethics and Best Practices, Security Assurance, Security Laws, IPR, International Security Standards, Security Audit. d) To make students aware of Cryptography: Concepts and Techniques, Symmetric and Asymmetric Key Cryptography, Steganography,

	e) Symmetric Key Ciphers-DES, AES (Structure and Analysis), RSA Algorithm and its Analysis. Digital Signatures. 5. Use the concepts of Authentication Protocols
FIFTH SEMESTER	
HC-5016 JAVA Programming	Upon completion of the course: a) Understand the concept of OOPs as well as the purpose and usage principles of Inheritance, polymorphism, encapsulation etc. b) Understand the basic concepts of classes and objects. c) Understand JVM Concept , Data types and Operators, Strings d) Understand Internet Programming Using Java Applets & Graphic Programming & Make use of array, constructors, Inheritance, Packages and Interfaces. Understand the concept of Exceptional Handling/Event Handling & Java I/O Handling
HC-5026 Operating System	Upon completion of course: a) Identify the role of Operating System. b) To understand the design of control unit. c) Understanding CPU Scheduling, Synchronization, Deadlock Handling and Comparing CPU Scheduling Algorithms. d) Solve Deadlock Detection Problems. e) Describe the role of paging, segmentation and virtual memory in operating systems. Description of protection and security and also the Comparison of UNIX and Windows based OS. Defining I/O systems, Device Management Policies and Secondary Storage Structure and Evaluation of various Disk Scheduling Algorithms.
HE-5016 Project Work	Upon completion of this course: a) Able to do some innovative work with applying the knowledge gained from various courses undergone in the earlier years. b) Able to exhibit both analytical and synthetically skills. c) Able to know the complete project life cycle and the project time estimation & its management. d) Able to gain knowledge of various simulation tools. Able to culture working in a team.
HE-5046 Programming in Python	Upon completion of this course: a) To acquire programming skills in core Python. b) To acquire Object Oriented Skills in Python c) To develop the skill of designing Graphical user Interfaces in Python d) To develop the ability to write database applications in Python
SIXTH SEMESTER	
HC-6016 System Administration LINUX	Upon completion of this course: a) Demonstrate an understanding of the principles, practices and goals of system administration.

	b) Demonstrate an understanding of system components, the advantages of Unix-like and Windows-like OS c) Major networking models, network addressing and naming systems, network services. Demonstrate an understanding of the major approaches to computer management in the network environment. d) Demonstrate an understanding of the features of the Windows 2003 Server Operating System. 5 e) Perform the installation of Windows 2003 OS and configure the server environment. f) Demonstrate an understanding of Active Directory and its key features. g) Perform user accounts management and implement security groups. h) Perform configuration, management, and troubleshooting of folders, files, and printing resources. i) Perform network services installation and management. j) Use server and network monitoring software tools. k) Describe the elements of an effective troubleshooting methodology and use a variety of software and hardware tools to diagnose problems. l) Demonstrate an understanding of network backup and recovery strategies and how to protect a network from viruses.
HC-6026 Computer Networks	Upon Completion of the course: a) Understanding network models. b) Understand different network technologies. c) Understand the effects of using different networking topologies. d) Be updated with different advanced network technologies that can be used t connect different networks. e) Be familiar with various hardware and software that can help protect the network, layers of OSI model and their functionality.
HE-6016 Automata Theory and Languages	Upon completion of the course: a) The primary objective of this course is to introduce students to the foundations of computability theory. b) Other objectives include the application of mathematical techniques and logical reasoning to important problems, and to develop a strong background in reasoning about finite state automata and formal languages. c) Define the notions of countable and uncountable sets. d) Define the various categories of languages and grammars in the Chomsky hierarchy Define various categories of automata (deterministic and nondeterministic finite state automata, and variants of Turing machines) e) Define the notions of computability and decidability.
HE-6056 Microprocessor and Assembly Language programming	Upon completion of the course: a) Assess and solve basic binary math operations using the microprocessor and explain the microprocessor's and Microcontroller's internal architecture and its operation within the area of manufacturing and performance. b) Apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor and microcontroller.

	c) Compare accepted standards and guidelines to select appropriate Microprocessor (8085 & 8086) and Microcontroller to meet specified performance requirements. d) Analyze assembly language programs; select appropriate assemble into machine a cross assembler utility of a microprocessor and microcontroller. e) Design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices. Evaluate assembly language programs and download the machine code that will provide solutions real-world control problems.



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