



ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY

Course Structure and Syllabus for the First Semester B. Sc. (Computer Science) Programme

FIRST SEMESTER

Sl. No.	Sub Code	Subject	Hrs / Week			Credits
			L	T	P	C
Theory						
1	BCS161103	Introduction to computing	3	2	0	4
2	MA161101	Mathematics-I	3	2	0	4
3	PH161102	Physics-I	3	2	0	4
4	HS161104	English communication and technical writing	2	2	0	3
5	BCS161105	ICT Hardware	3	2	0	4
Practical						
6	BCS161115	Computer Lab-I in ICT	0	0	4	2
7	BCS161113	Computer Lab- II in Computing	0	0	4	2
8	PH161112	Physics- I Lab	0	0	2	1
Total			14	10	10	24
Total Contact Hours = 34						
Total Credits = 24						

Subject Code: BCS161103
Subject: Introduction to Computing

L-T-P: 3-2-0

Credit: 4

Modules	Topics	Course Content	Hours
1	Number System and codes	Decimal, Binary, Hexadecimal, Octal, BCD, conversion of one code to another, complement's (one's and two's), Signed and Unsigned numbers, Addition, Subtraction, Multiplication, Gray and Hamming codes.	8
2	Introduction to Programming	Concept of algorithms, Flow Charts, Data Flow diagrams etc, variables, data types and sizes, constants, declarations, operators in c, type conversion, conditional expressions, precedence and order of evaluation, C assignment statements, extension of assignment of the operations. C primitive input output functions, C Statements.	6
3	Control Flow	Statements and blocks, if-else, nested if – else, looping (for, while, do-while), nesting of loops, break and continue statement, goto and labels.	4
4	Functions and Program Structure	Basics of functions, defining a function, function declarations, calling a function, function arguments, scope rules, header files, static variables, register variables, recursion.	6
5	Pointers and Arrays	Pointers, data vs address, indirect access of values, passing pointers to functions, arrays, declaring arrays, character string as arrays, passing arrays to functions, pointer arithmetic, pointers: increment and decrement. Character pointers and functions, pointer arrays, pointers to pointers, initialization of pointer arrays, multi- dimensional arrays, command-line arguments,	10
6	Structures and Unions	Basics of structures, structures and functions, arrays of structures, pointers to structures, type def, unions.	6
7	Input and Output	Standard Input and Output, formatted output-printf, variable length argument lists, formatted input-scanf, file access, error handling, line input and output, miscellaneous functions.	8
Total			48

Text Books/Reference Books:

1. Computer Programming in C by Godfried.
2. C Programming Language by Kernighan & Ritchie, The(Ansi C Version), PHI.
3. Let us C by Yashavant Kanetkar, BPB Publications.

Subject Code: MA161101
Subject: Mathematics-I

L-T-P: 3-2-0

Credit: 4

Modules	Topics	Course Content	Hours
1	First order differential equation	Exact linear and Bernoulli's form, second order differential equation with constant coefficient, equations in Clairaut's form.	8
2	Vector algebra and calculus	Vector algebra- Scalar and vector triple products and related problems. Equations of straight lines. Vector calculus Vector function of a scalar variable Differentiation of a vector function Scalar vector point function Gradient of a scalar point function Directional derivatives and related problems Divergence and curl of a vector point function Idea of line, surface and volume integrals Green's theorems Gauss' divergence theorems and Stokes theorems (Statements and applications).	12
3	Binomial, Exponential and logarithm series	Approximation using Binomial theorem- Summation of series based on the above elementary properties of a group- Centre of the group- cyclic groups- Cosets normal and conjugate subgroups- Homomorphism of groups- Kernel- Lagrange's theorem.	10
4	Logarithmic differentiation	Differentiation in parametric form- Implicit function- Successive differentiation- Leibnitz theorem (statement only)- Problems using above theorem- Derivatives and radius of curvature- Partial differentiation- Higher order partial derivatives maxima and minima.	9
5	Preliminary concepts of straight lines	Straight lines, coplanar lines, conditions for two lines to be coplanar- Equation of the plane containing two lines- To find the shortest.	9
Total			48

Text Books/Reference Books:

1. Text Book of Calculus by N. Seshadri,
2. "Ancillary Mathematics" by T.K. Manikavasagam Pillai, S. Viswanathan.
3. Ordinary and Partial differential equation, B.S. Grewal.
4. Vector Analysis (Schaum's Outline Series).

Subject code: PH161102

Subject: Physics-I

L-T-P: 3-2-0

Credit: 4

Module	Topics	Course Content	Hours
1	General Physics	Conservative and non-conservative forces, force as gradient of potential, Rotational motion, torque, angular momentum, conservation of angular momentum, work and power in rotational motion, KE of rotation, moment of inertia, Gravitation: Kepler's law of planetary motion, Newton's law of gravitation from Kepler's law, artificial satellites, geostationary satellite, eccentricity of orbit of a satellite, escape velocity. Elasticity: Hook's law, different kinds of elastic constants, work done in deforming a body, Relation among the elastic constants. Surface tension, excess pressure inside soap bubble and liquid drop, rise of liquid in a capillary tube, Streamline and turbulent flow, critical velocity, viscosity of fluids, Poiseuille's equation. Bernoulli's equation.	15
2	Geometrical and wave Optics	Spherical and Chromatic aberrations, Expression for longitudinal chromatic aberration, Achromatism of thin lens, Interference: Interference of light, Types of Interference (division of wavefront and division of amplitude), Diffraction: Fresnel and Fraunhofer Diffraction, Fraunhofer diffraction at a single slit, Intensity distribution in the diffraction pattern due to single slit.	10
3	Electrostatics and current electricity	Gauss's theorem and its applications, potential due to dipole, Capacity of parallel plate capacitor, effect of dielectric on capacity of capacitor, mechanical force on charged conductor, energy stored in a charged capacitor. Electric current density, Applications of Kirchoff's law to solve electrical network problem, Electromagnetic induction: Self and mutual induction, Alternating current: Generation of alternating current, current and potential across resistive, inductive and capacitive elements and their phase relationships, power factor.	10
4	Dielectrics	Polar and non-Polar materials, Dielectric constant and Dielectric Susceptibility of a material, Polarizability and polarization, Different types of polarization, expression for local field inside a dielectric, effect of temperature and frequency on polarization, Dielectric loss.	6
5	Magnetic Materials	Classification of magnetic materials, Diamagnetism, paramagnetism, ferromagnetism, Domain theory of ferromagnetism, Hysteresis Loss, Expression for Hysteresis loss in B-H loop, soft and hard magnetic materials, Antiferromagnetism and Ferrimagnetism, Application of	7

		magnetic material in different fields.	
		Total	48

Text books/ Reference books

1. Elements of Properties of Matter, D. S Mathur.
2. Fundamentals of Physics, Jearl Walker
3. Electricity and Magnetism - D.Chattopadhyay and P.C.Rakshit.
4. A Text book of Light - B Gosh and K G Mazumdar
5. College Physics, K. N. Sharma & Neerja

Subject code: HS161104
Subject: English Communication and Technical Writing

L-T-P: 2-2-0

Credit: 3

Modules	Topics	Course Content	Hours
1	Basic of Communications	Need of Communication skills; Channels, Forms and dimension of communication, oral and written communication, internal and external communication, verbal and non-verbal communication, barriers to communication, principles of effective communication.	4
2	Writing skills	Letters, reports, notes, memos, Language and format of various types of business letters, language and style of reports, reports writing strategies, analysis of a sample report	8
3	Grammar and vocabulary	Tenses and concepts of time, active and passive constructions, direct-indirect speeches, preposition, conditionals, parallel structure, modifiers, sentence transformation, vocabulary (idioms, confusable, one word substitute, Synonyms-antonyms)	8
4	Career oriental communication	Resume writing, curriculum vitae, statement of purpose, team talks, group discussion and interviews	5
5	Advanced techniques in technical communication	Interview through telephone/video conferencing, power point presentation, structure and format, using email for business communication, standard email practices, language in email, using internet for collecting information, referencing while using internet materials for project reports.	6
6	Language Laboratory	<p>a. Emphasizing Listening and comprehension skill, reading skill, sound structure of English and intonation patterns</p> <p>b. Language laboratory training in speaking skills covering oral presentations, mock interviews and model group discussion through the choice of appropriate programmes.</p>	5
Total			36

Text Books/Reference Books:

- 1) P. Balasubramaniam- Phonetics for English Students
- 2) David Crystal- Cambridge Encyclopedia of English Language
- 3) V. Sasikumar and P.V. Dhamija- Spoken English
- 4) Ludlow And Pantheon- The Essence of Effective Communication

Subject Code: BCS161105
Subject: ICT Hardware

L-T-P: 3-2-0

Credit: 4

Modules	Topics	Course Content	Hours
1	Introduction	Evolution of computer system, Modern computer, Classification of computer, Personal Computer hardware: Monitor, Keyboard, Mouse, Scanner, printer, speaker	9
2	Hard Disk Drive	logical structure and file system, FAT, NTFS. Hard disk tools: Disk cleanup, error checking, de fragmentation, scanning for virus, formatting, installing additional HDD. New trends in HDD. Floppy Disk Drive	8
3	Storage	Optical Media, CDROM, drive speed, buffer, cache, CD-r, CD-RW, DVD ROM, DVD technology, preventive maintenance for DVD and CD drives, New Technologies. Driver installation, Writing and cleaning CD and DVD.	8
4	Processor	Intel processor family. Latest trends in processor, Motherboard, Sockets and slots, power connectors. Peripheral connectors. Bus slots, USB, pin connectors. Different kinds of motherboards. RAM, different kinds of RAM. RAM up gradation. Cache and Virtual Memory (only concept will be given without going into implementation details)	15
5	Networking panel	SMPS. BIOS. Network Interface Card, network cabling, I/O Box, Switches, RJ 45 connectors, Patch panel, Patch cord, racks, IP address.	8
Total			48

Text Books/Reference Books:

1. Comdex Hardware and Networking Course Kit by Vikas Gupta, DreamTech press.
2. PC hardware: A beginners Guide by Ron Gilster, Tata McGraw Hill. First edition
3. ICT in Education: A Critical Literature Review and its Implications by Fu, Jo Shan.

Subject Code: BCS161115
Subject: Computer Lab – I in ICT

L-T-P: 0-0-4

Credit: 2

Experiment No.	Aim of the Experiment	Hours
1	Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.	2
2	Every student should individually install MS windows on the personal computer. They should learn how to format and partition a hard disk. Lab instructor should verify the installation and follow it up with a Viva.	4
3	Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva	3
4	Basic commands in Linux	3
5	Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva	4
6	Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.	4
7	The test consists of various systems with Hardware / Software related troubles, Formatted disks without operating systems. Installation of antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.	4
	Total	24

Subject Code: BCS161113
Subject: Computer Lab – II in Computing

L-T-P: 0-0-4

Credit: 2

Experiment No.	Topics	Aim of the Experiment	Hours
1	Basics	1. Program to produce ASCII equivalent of given number 2. Program to find divisor or factorial of a given number.	2
2	String	Implement different string functions - strcat(), strcpy(), strlen(), strcmp()	6
3	Arrays and Pointers	<ol style="list-style-type: none"> 1. C program to calculate average using arrays. 2. C program to find largest element of an array. 3. C program to calculate standard deviation. 4. C program to add two matrices. 5. C program to sort elements of an array. 6. C program to access elements of an array using pointer. 7. C program to multiply two matrices. 	8
4	Functions	<ol style="list-style-type: none"> 1. C program to display prime numbers. 2. C program to check prime numbers. 3. C program to find sum of n natural numbers. 4. C program to find H.C.F. 5. C program to convert binary number to decimal. 6. C program to convert decimal number to binary. 	8
Total			24

Text Books/Reference Books:

1. Computer Programming in C by Godfried.
2. C Programming Language by Kernighan & Ritchie, The (Ansi C Version), PHI.
3. Let us C by Yashavant Kanetkar, BPB Publications.

Subject code: PH161112

Subject: Physics-I Lab

L-T-P: 0-0-2

Credit 1

Experiment No.	Aim of the Experiment	Hours
1	Determination of Rigidity modulus of a material of a given rod by Statistical method	1
2	Determination of moment of inertia of given solid about its own axis by using M. I. Table	1
3	Determination of resistance of galvanometer using post office box.	1
4	Determination of ratio of EMF of two cells using potentiometer	1
5	Determination of Young's modulus using Searl's apparatus	1
6	Determination of powers of lenses using an optical bench i) Concave lens II) Convex lens	2
7	Determination of Horizontal components of Earth's magnetic field using magnetometer	1
8	Determination of a) angle of incidence and deviation curve of a prism using spectrometer b) angle of minimum deviation and refractive index of a material of the prism	2
9	Determination of coefficient of Viscosity of water by capillary flow method	1
10	Revision of experiments and internal viva	1
	Total	12
