



ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY

Guwahati

Course Structure and Syllabus

Bachelor of Computer Applications (BCA)

5th Semester



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5th Semester: Course Structure

Sl.No.	Subject Code	Subject Name	L	T	P	C	Marks	
Theory							CE	ESE
1	BCA171501	Operating System	3	2	0	4	30	70
2	BCA171502	Network Security and Cryptography	3	2	0	4	30	70
3	BCA171503	System Software	3	2	0	4	30	70
4	BCA171504E*	Elective – I	4	0	0	4	30	70
Practical								
1	BCA171521	Minor Project	0	0	10	5	30	70
TOTAL			13	6	10	21	150	350
Total Contact Hrs: 29; Total Credit: 21								

Elective-I Subjects (Any One)		
Sl. No.	Subject Code	Subjects
1	BCA171504E1	Microprocessor and Assembly Language
2	BCA171504E2	Design and Analysis of Algorithm
3	BCA171504E3	Graph Theory
4	BCA171504E*	Any Other Subject offered from time to time with the approval of the University

Paper Code : BCA171501
Paper Name : Operating System
L-T-P-C : 3-2-0-4

UNIT		Content	Weeks
1		Introduction Operating System (OS) and its evolution, definition of different types of OS, OS services, Linux vs Unix Kernel	1
2		Process concepts and IPC Program vs process, process descriptor, context switching, process state Process creation and termination	2
3		Scheduling and techniques Concept of scheduling, CPU scheduler, Scheduling types, scheduling queues and criteria Scheduling algorithms: FCFS, SJF, Round Robin.	2
4		Process synchronization Race condition, Critical section, Mutual exclusion. Semaphores: Binary, counting, weak, strong. Readers-Writers problem and Dining philosopher's problem.	2
5		Memory Management Address binding, logical vs physical address space, swapping, Memory allocation types and issues, fragmentation. Segmentation, Paging and demand paging Page replacement algorithms: FIFO and LRU	2
Books:	1	Tanenbaum Andrew S, Modern Operating Systems, Eastern Economy	
	2	Silberschatz A, Galvin P: Operating system concepts, 4th ed. Addison Willy Publication	
	3	Linux Kernel Development, Robert Love, 3rd ed. , Pearson	
	4	Operating System- Design and Implementation, PHI (EEE)	
	5	Milenkovic M.: Operating System- Concepts and Design, MGH Tanenbaum	

Paper Code : BCA171502
Paper Name : Network Security and Cryptography
L-T-P-C : 3-2-0-4

Unit		Content	Weeks
1		Overview of basic concepts of network security, goals and principles of network security. Types of attacks. Security services and security mechanisms.	2
2		Cryptography: symmetric key and asymmetric key encipherment. Cryptanalysis and various cryptanalysis attack	3
3		Symmetric-key ciphers: Monoalphabetic cipher: additive, shift, multiplicative, affine Polyalphabetic cipher: Autokey, Playfair, Vigenere, Hill	4
4		Symmetric-Key algorithms : Data Encryption Standard (DES) and Advanced Encryption Standard (AES)	3
5		Asymmetric-Key algorithms: RSA	2
6		Concept of Digital Signature, MD5, SHA-1	2
Books:	1	William Stallings, "Cryptography & Network Security", Pearson Education, 4th edition, 2010.	
	2	Network Security Essentials: Applications and Standards, by William Stallings, Prentice Hall	

Paper Code : BCA171503
Paper Name : System Software
L-T-P-C : 3-2-0-4

UNIT		Content	Weeks
1		Introduction: Introduction and classification of system software, Fundamentals of language processing and specification	2
2		Assemblers: Introduction to assembler, assembly process, assembler directives, forward reference, data structures of assembler, one pass assembler, two pass assembler, introduction to macros processors, Macro Definition and Call, Macro Expansion,	3
3		Loading and linking: Introduction to Linker and loaders, functions of linker and loader, Static and dynamic linking	2
4		Overview of compiler, difference between compiler and interpreter, Phases of a compiler Parsing: Top-down and Bottom-up parsers, shift reduce parser, recursive descent parser, Operator-precedence parsing, LL(1), Introduction to LR parsers, Lex and Yacc	3
5		An Introduction to system software tools, types of editors, user interface, Editor Structure, Software Tools for Program Development, Interactive Debugging System, Debugging Functions and Capabilities	3
Books	1	Aho,A.V., Sethi, and Ullman J.d: complier design.	
	2	Dhamdhare, System programming and operating systems, Tata McGrawHill.	
	3	Leland.L.Beck, System software, An introduction to System Programming, Pearson Education	

Paper Code : BCA171504E1
Paper Name : Microprocessor and Assembly Language
L-T-P-C : 4-0-0-4

UNIT		Content	Weeks
1		Introduction to Micro Computers, Microprocessors and Assembly Languages - Microprocessor architecture and its operations - 8085 MPU - 8085 Instruction set and classifications..	4
2		Writing assembly levels programs - Programming techniques such as looping, counting and indexing addressing nodes - Data transfer instructions - Arithmetic and logic operations - Dynamic debugging.	4
3		Counters and Time delays - Hexadecimal counter - Modulol 0 counter - Pulse Timings for flashing lights - Debugging counter and time delay program - stack - subroutine - conditional call and return instructions	4
4		Interrupt - Implementing interrupts - Multiple interrupt - 8085 - trap - Problems on implementing 8085 interrupt - DMA - Memory interfaces - Ram & Rom - I/O interface - Direct I/O - Memory mapped I/O.	3
Books	1	1. R. S. Gaonkar, 'Microprocessor Architecture, Programming and Applications with 8085/8080A', Wiley East em limited, 1990.	
	2	A. Mathur, 'Introduction to Microprocessor', Third Edition, Tata McGraw-Hill Publishing Co. Ltd., 1993.	
	3	Fundamentals of Microprocessors and Microcontrollers By B Ram,Dhanpat Rai Publication	

Paper Code : BCA171504E2
Paper Name : Design and Analysis of Algorithm
L-T-P-C : 4-0-0-4

UNIT		Content	Weeks
1		Introduction: Role of Algorithms in computing, Time and Space complexity, Best case ,Average case and worst case analysis of algorithms.	1
2		Growth of functions: Asymptotic notation, Big Oh, Big Omega, Theta, Small Oh, Small Omega	2
3		Recurrences Basic concept of Recurrence, Recursion tree method, Master method	2
4		Divide and Conquer Algorithms Merge sort, Quick sort	2
5		Greedy Algorithms 0-1 Knapsack problem, Huffman codes, Activity selection problem	2
6		Introduction to NP completeness P, NP and NPC problems	1
Books	1	Rajib Mall; Software Engineering	
	2	Sommerville, Software Engineering, Pearson education	
	3	Pressman. R.S..Software Engineering: A practitioner's Approach. Mc GrawHill	

Paper Code : BCA171504E3
Paper Name : Graph Theory
L-T-P-C : 4-0-0-4

Unit		Content	Weeks
1		Basic of Graph Theory: Types Graphs, Incident, Adjacency, Degree, Degree Sequence, Walk, Path, Circuit, Regular Graph, Complete Graph, Bipartite graph, Hand Shaking Theorem, Components and Connectedness, Euler graph, Fiery's algorithms, Konigsberg's Bridge Problem, Hamiltonian graph. Operations on graphs, Graph isomorphism.	2
2		Tree And Its Properties, Eccentricity, Radius, Centres, Diameters, Binary Tree ,Rooted Tree, Height of a binary tree , Spanning Tree, Tournaments and Binary Relations, Arborescence, Polish Notations	2
3		Connectivity of Graphs, Cut set , Network flow, Max Flow Min Cut Theorem	2
4		Spanning Tree Algorithm, Kruskal & Primes Algorithm, Dijkstra Algorithms.	2
5		Matrix Representation of graph : Incident Matrix, Adjacency Matrix	1
6		Colouring Of Graphs, Chromatic Numbers, Independent Set, Chromatic Polynomial, Five colour Theorem, Four Colour Theorem.	3
7		Planar Graphs, Euler Theorem on Planer Graphs, Detection of planarity, Dual of Planar Graphs, Crossing Thickness, Dual of Isomorphic Graphs.	3
Books	1	Narsing Deo: Graph Theory with Applications to Engineering and Computer Science, PHI(EEE)	
	2	Agnarsson: Graph Theory: Modeling, Applications and Algorithms, Pearson Education India	

Paper Code : BCA171521
Paper Name : Minor Project
L-T-P-C : 0-0-10-5

UNIT	Content	Weeks
1	System Development Project.(Windows, Web Based, Mobile Application Development)	15
