

SEMESTER 2

Sl.	Course Type	Code	Course Name	Credits			Total Credits
				L	T	P	
1	Major	BSCITCSM201	Introduction to Information Security	3	0	2	5
		BSCITCSM291	Introduction to Information Security Lab				
2	Major	BSCITCSM202	Study of Computer Architecture and organization	4	1	0	5
3	Minor	MIM201	Organization Behavior	3	0	0	3
4	GE		Any one from GE Basket B or E	3	0	0	3
5	AECC	AECC201	Modern Indian Languages and Literature	2	0	0	2
6	SEC	SEC201	IT Skills	2	0	0	2
7	VAC	VAC281A VAC281B VAC281C VAC281D	Critical Thinking NSS Mental Health Environmental Studies	2	0	0	2
Total Credits							22

Course: Introduction to Information Security /Introduction to Information Security lab

Credits: 3L + 2P

Course Code – BSCITCSM201/BSCITCSM291

COURSE OBJECTIVE:

This introductory course is aimed at giving a basic understanding of system security. This entry-level course covers a broad spectrum of security topics and is based on real-life examples to create system security interest in the students. A balanced mix of technical and managerial issues makes this course appealing to attendees who need to understand the salient facets of information security basics and the basics of risk management.

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

(Formerly West Bengal University of Technology)

Syllabus of B.Sc. In IT (Cyber Security)

(Effective from 2023-24 Academic Sessions)

COURSE OUTCOME	
CO1	Develop an understanding of information assurance as practiced in computer operating systems, distributed systems, networks and representative applications.
CO2	Gain familiarity with prevalent network and distributed system attacks, defences against them, and forensics to investigate the aftermath.
CO3	Understand basics of cryptography, how it has evolved, and some key encryption techniques used today.
CO4	Develop an understanding of security policies (such as authentication, integrity and confidentiality), as well as protocols to implement such policies in the form of message exchanges
CO5	Develop an understanding of information assurance as practiced in computer operating systems, distributed systems, networks and representative applications.
CO6	Use file system to store information after solving the security problem related to the real world

Module 1: Information and Network Security fundamentals

Overview of Networking Concepts, Basics of Communication Systems, Transmission Media, Topology and Types of Networks, TCP/IP Protocol, Wireless Networks, The Internet

Information Security Concepts

Information Security Overview: Background and Current Scenario, Types of Attacks, Goals for Security, E-commerce Security

Security Threats and Vulnerabilities: Overview of Security threats, Weak / Strong Passwords and Password Cracking, Insecure Network connections, Malicious Code

Cybercrime and Cyber terrorism

Cryptography: Introduction to Cryptography, Digital Signatures, Public Key infrastructure, Applications of Cryptography, Tools and techniques of Cryptography

Module 2: Security Management

Security Management Practices

Overview of Security Management, Security Policy, Risk Management, Ethics and Best Practices

Security Laws and Standards

Security Assurance, Security Laws, International Standards, Security Audit

Module 3: Information and Network Security

Server Management and Firewalls

User Management, Overview of Firewalls, Types of Firewalls,
DMZ and firewall features

Security for VPN and Next Generation Technologies

VPN Security, Security in Multimedia Networks, Various Computing Platforms: HPC,
Cluster and Computing Grids, Virtualization and Cloud Technology and Security

Module 4: System and Application Security

Security Architectures and Models

Designing Secure Operating Systems, Controls to enforce security services, Information
Security Models

System Security

Desktop Security, Email security, Database Security

Practical:

1. Application of AVISPA Tool
2. Study of Network Security fundamentals - Ethical Hacking, Social
3. Engineering practices.
4. Study of System threat attacks - Denial of Services.
5. Study of Sniffing and Spoofing attacks.
6. Study of Techniques uses for Web Based Password Capturing.
7. Study of Different attacks causes by Virus and Trojans.
8. Study of Anti-Intrusion Technique – Honey pot.
9. Study of Symmetric Encryption Scheme – RC4.
10. Study of IP based Authentication.

Besides above, respective faculty can choose any other programs according to the requirement.

Text Books:

1. B. A. Forouzan, Data Communications and Networking,3rd Ed,TMH
2. A. S. Tanenbaum,Computer Networks,4th Ed,Pearson Education/PHI

Reference Books:

1. W. Stallings,Data and Computer Communications,5th Ed,PHI/ Pearson Education
2. Atul Kahate,Cryptography & Network Security,TMH

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Course: Study of Computer Architecture and organization

Credits: 4L + 1T

Course Code: BSCITCSM202

COURSE OBJECTIVE:

- To understand the structure, function and characteristics of computer systems.
- To understand the design of the various functional units and components of computers.
- To identify the elements of modern instructions sets and their impact on processor design.
- To explain the function of each element of a memory hierarchy,
- To identify and compare different methods for computer I/O.

COURSE OUTCOME	
CO1	Understand basic structure of digital computer, instruction set, number system, and arithmetic operations.
CO2	Understand basic structure of stored program concept and different arithmetic and control unit operations.
CO3	Become skilled at about memory hierarchy and mapping techniques.
CO4	Study the techniques that computer use to communicate with peripheral devices.
CO5	Understand parallel architecture, pipelines, and interconnection network.
CO6	Design the non Von-Neumann architectures.

Module 1:

Data Representation: Number Systems – decimal, binary, octal, hexadecimal, alphanumeric representation, 2. Complements – 1’s complement, 2’ complement, 9’s complement, 10’ complement, [r-1]’s complement, r’s complement, 3. Fixed point representation – Integer representation, arithmetic addition, arithmetic subtraction, overflow, decimal fixed point representation, 4. Floating point representation, 5. IEEE 754 floating point representation

Module 2:

Computer arithmetic: Addition algorithm of sign magnitude numbers, Subtraction algorithm of sign magnitude numbers, Addition algorithm of signed 2’s complement data, Subtraction algorithm of signed 2’s complement data, Multiplication algorithm, Booth’s algorithm, Division algorithm

Module 3:

Register transfer and micro-operations: Register transfer language, Register transfer, Bus system for registers, Memory transfers – memory read, memory write, Micro operations – register transfer micro operations, arithmetic micro operations, logic micro operations, shift micro operations, Binary adder, binary adder subtractor, binary incrementer, arithmetic circuit for arithmetic micro operations, One stage logic circuit, Selective set, Selective complement, Selective clear, Mask, Insert, Clear.

Module 4:

Basic Computer organization and design: Instruction codes, Direct address, Indirect address & Effective address, List of basic computer registers, Computer instructions: memory reference, register reference & input – output instructions, Block diagram & brief idea of control unit of basic computer, 6. Instruction cycle.

Module 5:

Micro programmed control: Control memory, Address sequencing, Micro program examples.

Module 6:

Central processing unit: General register organization, Stack organization, Register stack, Memory stack, Stack operations – push & pop, Evaluation of arithmetic expression using stack, Instruction format, Types of CPU organization [single accumulator, general register & stack organization] & example of their instructions, Three, two, one & zero address instruction, Definition and example of data transfer, data manipulation & program control instructions, Basic idea of different types of interrupts [external, internal & software interrupts], Difference between RISC & CISC.

Module 7:

Pipeline and vector processing: Parallel processing, Flynn's classification, Pipelining, Example of pipeline, space time diagram, speedup, Basic idea of arithmetic pipeline, example of floating point addition/ subtraction using pipeline.

Module 8:

Input – output organization: Peripheral devices, Input – output interface, Isolated I/O, Memory mapped I/O, Asynchronous data transfer: strobe & handshaking, Programmed I/O, Interrupt initiated I/O, Basic idea of DMA & DMAC, Input – output processor.

Module 9:

Memory organization: Memory hierarchy, Main memory definition, types of main memory, types of RAM, ROM, difference between SRAM & DRAM, Cache memory, Cache memory mapping – Direct, Associative, Set Associative, CAM, hardware organization of CAM, Virtual memory, mapping using pages, page fault, mapping using segments, TLB, Auxiliary memory, diagrammatic representation of magnetic disk & hard disk drive, Definitions of seek time, rotational delay, access time, transfer time, latency.

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Assignments:

Based on the curriculum as covered by subject teacher

Text/Reference Books

1. Computer System Architecture, M. Morris Mano, PEARSON
2. Computer Organization & Architecture – Designing For Performance, William Stallings, PEARSON
3. Computer Architecture & Organisation, J.P. Hayes, TATA MCGRAW HILL
4. Computer Organization and Architecture, T. K. Ghosh, TATA MCGRAW-HILL
5. Computer Architecture, Behrooz Parhami, OXFORD UNIVERSITY PRESS
6. Programming with Java, E Balagurusamy, TMH
7. The Complete Reference Java, Herbert Schildt, McGraw Hill