



Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous Institute Affiliated to University of Mumbai)

Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
CE913	Information and System Security(ISS)	4	--	--	4	--	--	4
		Examination Scheme						
		ISE		MSE		ESE		
		10	30	100 (60% Weightage)				

Pre-requisite Course Codes	CE43 CE52	
At the end of successful completion of the course, students will be able to		
Course Outcomes	CO1	Provide the basic results of computer security and its limitations.
	CO2	Contrast the different types of security policies, standards and practices.
	CO3	Describe the major types of cryptographic algorithms and typical applications.
	CO4	Understand the role of management in enforcing security policies, standards and practices.

Module No.	Unit No.	Topics	Ref.	Hrs.
1	1.1	Introduction - Basic Components, Threats, Policy and Mechanism, Assumptions and Trust, Assurance, Operational and Human Issues, Access Control Matrix, Protection State, Access Control Matrix Model, Protection State Transitions, Copying, Owning, and the Attenuation of Privilege,	1,2	4
	1.2	Foundation Results - The General Question of Security, Take-Grant Protection Model, Expressive Power and the Models	1,2	4
	1.3	Security Policies - Types, The Role of Trust, Types of Access Control, Policy Languages.	1,2	2
2	2.1	Confidentiality Policies - Goals of Confidentiality Policies, The Bell-LaPadula Model, Tranquility, The Controversy over the Bell-LaPadula Model.	1,2	4
	2.2	Integrity Policies – Goals, Biba Integrity Model, Lipner's Integrity Matrix Model, Clark-Wilson Integrity Model	1,2	4
	2.3	Hybrid Policies - Chinese Wall Model, Clinical Information Systems Security Policy, Originator Controlled Access Control, Role-Based Access Control	1,2	4
3	3.1	Noninterference and Policy Composition - The Problem, Deterministic Noninterference, Non-deducibility, Generalized Noninterference, Restrictiveness.	1,2	5



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	3.2	Cryptography - Classical Cryptosystems, Public Key Cryptography, Cryptographic Checksums.	1,2	2
	3.3	Key Management - Session and Interchange Keys, Key Exchange, Key Generation, Cryptographic Key Infrastructures, Storing and Revoking Keys, Digital Signatures	1,2	4
4	4.1	Cipher Techniques – Basics, Problems, Stream and Block Ciphers, Networks and Cryptography, Example Protocols	1,2	3
	4.2	Authentication - Basics, Passwords, Challenge-Response, Biometrics, Location, Multiple Methods	1,2	3
	4.3	Security Systems - Design Principles, Identity - Files and Objects, Users, Groups and Roles, Naming and Certificates, Identity on the Web.	1,2	3
5	5.1	Access Control Mechanisms - Access Control Lists, Capabilities, Locks and Keys, Ring-Based Access Control, Propagated Access Control Lists.	1,2	3
	5.2	Information Flow - Basics and Background, Non-lattice Information Flow Policies, Compiler-Based Mechanisms, Execution-Based Mechanisms, Example Information Flow Controls.	1,2	4
	5.3	Confinement Problem - The Confinement Problem, Isolation, Covert Channels, Assurance - Introduction to Assurance, Assurance and Trust, Building Secure and Trusted Systems.	1,2	3
			Total	52

In-Semester Examination (ISE): The assessment includes the submission of a term paper by each student on the contemporary work related to Information and System Security.

References:

- [1] Matt Bishop, “*Computer Security: Art and Science*”, Addison-Wesley Professional, FIRST Edition, 2002.
- [2] Matt Bishop, “*Introduction to Computer Security*”, Addison-Wesley Professional, FIRST Edition, 2005.