GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for Integrated MSc, 7th Semester
Branch: Computer Science
Subject Name: Operating System Security
Subject Code: 1370306

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE(E)	PA (M)	PA (I)	ESE (V)	
3	0	2	4	70	30	20	30	150

Content:

Sr. No.	Content	Teaching Hours	Module Weightage (%)
1.	**Introduction** Secure Operating Systems, Security Goals, Trust Model, Threat Model, Lampson's Access Matrix, Mandatory Protection Systems, Reference Monitor, Secure Operating System Definition, Assessment Criteria	5	10
2.	**Security in Multics, UNIX & Windows** The Multics System, Multics Security Fundamentals, Multics Protection System Models, Multics Protection System, Multics Reference Monitor, Multics Security, Multics Vulnerability Analysis, UNIX History, Windows History, UNIX Protection System, UNIX Authorization, UNIX Security Analysis, UNIX Vulnerabilities Windows Protection System, Windows Authorization, Windows Security Analysis, Windows Vulnerabilities	13	30
3.	**Verifiable Security Goals and Security Kernels** Denning's Lattice Information Flow Secrecy Model, Bell-LaPadula Information Flow Secrecy Model, Biba Integrity Model, Low-Water Mark Integrity, Clark-Wilson Integrity, The Challenge of Trusted Processes, Covert Channels, The Security Kernel, Secure Communications Processor, Scomp Architecture, Scomp Hardware, Scomp Trusted Operating Program, Scomp Kernel Interface Package, Scomp Applications, Scomp Evaluation, Gemini Secure Operating System	12	30
4.	**Building a Secure Operating System for Linux** Linux Security Modules Implementation, Security-Enhanced Linux: Reference Monitor, Protection State, Labeling State, Transition State, Administration, Trusted Programs, Security Evaluation	8	15

5.	**Secure Capability Systems and Virtual Machine Systems** Capability System Fundamentals, Capability Security, Challenges in Secure Capability Systems, Separation Kernels, VAX VMM Security Kernel design-evaluation-result	4	15

Reference Books:

1. Operating System Security by Trent Jaeger
Morgan & Claypool Publishers, Latest Edition
ISBN-10 : 1598292129
ISBN-13 : 978-1598292121
2. Operating Systems: Internals & Design Principles by William Stallings
Pearson Education India, Latest Edition
3. Modern Operating Systems by Andrew S. Tanenbaum
Pearson Education India, Latest Edition

Course Outcome:

After learning the course, the students should be able to:

No.	CO statement
CO-1	Understand the security mechanism in the context of operating system.
CO-2	Apply security mechanisms in Multics, Unix & Windows operating system.
CO-3	Apply security mechanisms in virtual machine systems.
CO-4	Analyze the Behaviour of security model in operating systems.