NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	BTech All (Other than CSE)
Course Code:	4CS510IE25
Course Title:	Secured Software Engineering
Course Type:	Interdisciplinary Minor -Elective
Year of Introduction:	2025-26

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Course Learning Outcomes (CLO):

At the end of the course, the students will be able to –

1. explain the significance of incorporating security during the development of software systems (BL2)
2. apply the security measures to various stages of the software development process (BL3)
3. analyse approaches for identifying security defects and vulnerabilities in software systems (BL4)
4. compare the security testing tools for secure software systems. (BL4)

Unit	Contents	Teaching Hours (Total 45)
Unit-I	**Fundamentals of Secure Software:** Introduction to the software security issue, threats to software security, sources of software insecurity, advantages of making software secure, properties of secure software, software vulnerabilities, Building security into the software development lifecycle	07
Unit-II	**Requirement Engineering for Secure Software:** Introduction to requirement engineering for secure software, the SQUARE process model, requirement elicitation, requirement prioritization for secure software.	10
Unit-III	**Secure Software Architecture and Design:** Introduction to practices for architecture and design of secure software - threat analysis and architectural vulnerability assessment, security principles and guidelines, attack patterns	12
Unit-IV	**Secure Software Construction and Testing:** Code analysis, coding practices, and security testing consideration for various phases of SDLC	10
Unit-V	**Security and Complexity:** Security failures, System security drivers and complexity, analysis for some real case studies	06

Self-Study:

The self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study content.

Suggested Readings/ References:

1. Julia H. Allen, Sean Barnum, Robert J. Ellison, Gary McGraw, Nancy R. Mead, Software Security Engineering: A Guide for Project Managers, Pearson
2. Gary McGraw, Software Security: Building Security In, Addison-Wesley
3. C. P. Pfleeger, S. L. Pfleeger, Security in Computing, Prentice Hall
4. Viega, J. and McGraw, G. Building Secure Software: How to Avoid Security Problems the Right Way, Addison-Wesley
5. J. D. Meier and Alex Mackman, Security Engineering Explained – Pattern and Practices, Microsoft
6. Gasser, M. Building a Secure Computer System, Van Nostrand Reinhold

Suggested List of Experiments: -NA-