4/4 B.Tech - FIRST SEMESTER

IT7T5D **SECURE SOFTWARE ENGINEERING** **Credits:3**

Lecture: 3 Periods/week **Internal assessment: 30 marks**

Practice/Interaction: 1Period/week **Semester end examination: 70 marks**

Objectives:

- To introduce the fundamental concepts and properties in security.
- To know various security process models.
- To explain the software security practices.
- To introduce Software Security Knowledge for Architecture and design concepts of Software Security Testing.

Outcomes:

Students will be able to

- Understand security concepts.
- Understand the properties of secure software.
- Analyze various security process models.
- Gain Knowledge on Requirements Elicitation, prioritization and risk management.
- Understand the concepts of software security principles and testing

Prerequisite:

Software Engineering

Syllabus:

UNIT -I

The Problem, System Complexity The Context within Which Software Lives. Software Assurance and Software Security. The Role of Processes and Practices in Software Security. Threats to Software Security .Sources of Software Insecurity. The Benefits of Detecting Software Security Defects Early: Making the Business Case for Software Security Current State.

UNIT -II

Introduction, Defining Properties of Secure Software: Core Properties of Secure Software. Influential Properties of Secure Software. How to Influence the Security Properties of Software: The Defensive Perspective. The Attacker's Perspective. How to Assert and Specify Desired Security Properties: Building a Security Assurance Case.

UNIT -III

Introduction: The Importance of Requirements Engineering, Quality Requirements, Security Requirements Engineering. Misuse and Abuse Cases: Security Is Not a Set of Features, Thinking About What You Can't Do, Creating Useful Misuse Cases, An Abuse Case Example. The SQUARE Process Model: A Brief Description of SQUARE, Tools, Expected results. SQUARE Sample Outputs: Output from SQUARE Steps, SQUARE Final Results.

UNIT- IV

Requirements Elicitation: Overview of Several Elicitation Methods, Elicitation Evaluation Criteria. Requirements Prioritization: Identify Candidate Prioritization Methods, Prioritization Technique Comparison, and Recommendations for Requirements Prioritization.

Software Security Practices for Architecture and Design Architectural Risk Analysis: Characterization, Threat. Assessment, Determination, Risk. Risk Mitigation Planning. Recapping Architectural Risk Analysis.

UNIT -V

Software Security Knowledge for Architecture and Design Security Principles, Security Guidelines, and Attack Patterns: Security Principles, Security Guidelines, Attack Patterns.

Software Security Testing: Contrasting Software Testing and Software Security Testing, Functional Testing, Risk-Based Testing.

Text Book:

1. Software Security Engineering A Guide for Project Managers by Julia H.Allen, ean J. Barnum, Robert J. Ellison and Gary McGraw, May 11, 2008

Reference Book:

1. John Musa D, “Software Reliability Engineering”, 2nd Edition, Tata McGraw-Hill, 2005

e-Learning Resources:

1. http://study.com/articles/List_of_Free_Online_Software_Engineering_Courses.html
2. https://www.coursera.org/course/softwaresec