

**4/4 B.Tech. SECOND SEMESTER**

**IT8T2A**

**SECURE SOFTWARE ENGINEERING**

**Credits: 4**

**Lecture: 4 periods/week**

**Internal assessment: 30 marks**

**Tutorial: 1 period /week**

**Semester end examination: 70 marks**

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**Objectives:**

To provide an insight on

- The fundamental concepts in Security.
- The properties of software and security.
- Various security process models.
- The software security practices.
- Software Security Knowledge for Architecture and Design.
- The concepts of Software Security Testing.
- Software Development Life Cycle.

**Outcomes:**

Students will be able to

- Know the security concepts.
- Design few security process models.
- Run few software testing tools.
- Understand the life cycle of software projects.

**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.

#### **UNIT IV**

**The SQUARE Process Model:** A Brief Description of SQUARE, Tools, Expected results.

**SQUARE Sample Outputs:** Output from SQUARE Steps, SQUARE Final Results.

#### **UNIT V**

**Requirements Elicitation:** Overview of Several Elicitation Methods, Elicitation Evaluation Criteria.

**Requirements Prioritization:** Identify Candidate Prioritization Methods, Prioritization Technique Comparison, Recommendations for Requirements Prioritization.

#### **UNIT VI**

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

#### **UNIT VII**

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

#### **UNIT VIII**

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

**Security Testing Considerations Throughout the SDLC:** Unit Testing. Testing Libraries and Executable Files, Integration Testing, System Testing, Sources of Additional Information on Software Security Testing.

#### **Text books:**

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