

CSPC3005 SOFTWARE ENGINEERING (3-0-0)

Course Objectives

1. To introduce the essential Software Engineering concepts.
2. To impart concepts and skills for performing analysis, design, develop, test and evolve efficient software systems of various disciplines and applications
3. To make familiar about engineering practices, standards and metrics for developing software components and products.

Course Outcomes

On completion of this course, student should be able to:

1. Apply and assess the principles of various process models for the software development.
2. Demonstrate various software project management activities that include planning, estimations, Risk assessment and Configuration Management
3. Perform Requirements modelling and apply appropriate design and testing heuristics to produce quality software systems.
4. Demonstrate the complete Software life cycle activities from requirements analysis to maintenance using the modern tools and techniques.
5. Escalate the use of various standards and metrics in evaluating the process and product.

Module - I: (06 Hours)

Overview Of Software Engineering

Nature of Software, Software Engineering, Software process, project, product, Process Models, Classical Evolutionary models, Introduction to Agility - Agile Process-Extreme programming - XP Process – Principles of Agile Software Development framework - Overview of System Engineering

Module - II: (08 Hours)

Introduction To Software Project Management

Planning, Scope, Work break-down structure, Milestones, Deliverables, Cost and Estimates - (Human Resources, Time-scale, Costs), Risk Management, RMMM Plan, CASE TOOLS, Agile Project Management, Managing team dynamics and communication, Metrics and Measurement

Module - III: (08 Hours)

Modelling Requirements

Software requirements and its types, Requirements Engineering process, Requirement Elicitation, System Modeling – Requirements Specification and Requirement Validation, Requirements Elicitation techniques, Requirements management in Agile.

Module - IV: (09 Hours)

Software Design

Design concepts and principles - Abstraction - Refinement - Modularity Cohesion coupling, Architectural design, Detailed Design Transaction Transformation, Refactoring of designs, Object oriented Design User-Interface Design

Module - V: (09 Hours)

Validation And Verification

Strategic Approach to Software Testing, Testing Fundamentals Test Plan, Test Design, Test Execution, Reviews, Inspection and Auditing – Regression Testing – Mutation Testing - Object oriented testing - Testing Web based System - Mobile App testing – Mobile test Automation and tools – DevOps Testing – Cloud and Big Data Testing, Software Maintenance, Types of Maintenance, - Software Configuration Management – Overview – SCM Tools. Re-Engineering, Reverse Engineering, Software Reuse

Text Book:

1. Ian Somerville, Software Engineering, 10th Edition, Addison-Wesley, 2015

Reference Books:

1. Roger S. Pressman and Bruce R. Maxim, Software Engineering: A Practitioner's Approach, 10th edition, McGraw Hill Education, 2019
2. William E. Lewis , Software Testing and Continuous Quality Improvement, Third Edition, Auerbach Publications, 2017