## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

## NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

| COURSE PLAN – PART I | | | |
|---|---|---|---|
| **Course Title** | **SOFTWARE ENGINEERING** | | |
| **Course Code** | **CSPE41** | **No. of Credits** | **03** |
| **Course Code of Pre-requisite subject(s)** | **_____** | **Semester** | **IV** |
| **Session** | **JAN 2021** | **Section (if, applicable)** | **A & B** |
| **Name of Faculty** | **Dr. A. Santhanavijayan** | **Department** | **CSE** |
| **Email** | **vijayana@nitt.edu** | **Telephone No.** | **0431 - 2503217** |
| **Name of Course Coordinator(s) (if, applicable)** | **_____** | | |
| **E-mail** | **_____** | **Telephone No.** | **_____** |
| **Course Type** | ☐ **Core course** ☑ **Elective course** | | |

**Syllabus (approved in BoS)**
**URL : https://www.nitt.edu/home/academics/curriculum/B.Tech-CSE-2020.pdf**

**UNIT I**

Introduction: Role of Software Engineer-Software Components-Software Characteristics-Software Crisis-Software Engineering Processes-Similarity and Differences from Conventional Engineering Processes-Quality Attributes. Assessment: How Software Engineering Changes? Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary Development Models, Iterative Enhancement Models, Choosing a social relevant problem, Summary Team Report.

**UNIT II**

Requirement Engineering Process: Elicitation-Analysis-Documentation-Review and Management of User Needs-Feasibility Study-Information Modeling-Data Flow Diagrams-Entity Relationship Diagrams-Designing the architecture. Assessment: Impact of Requirement Engineering in their problem, Decision Tables, SRS Document, IEEE Standards for SRS, Architectural design, component level design, user interface design, Web App Design, Submission of SRS Document for Team Project.

**UNIT III**

Quality concepts - Review techniques -Software Quality Assurance (SQA): Verification and Validation-SQA Plans-Software Quality Frameworks. Assessment: Framing SQA

Plan, ISO 9000 Models, SEI-CMM Model and their relevance to project Management, other emerging models like People CMM.

**UNIT IV**

Testing Objectives-Unit Testing-Integration Testing-Acceptance Testing-Regression Testing-Testing for Functionality and Testing for Performance-Top-Down and Bottom-Up Testing-Software Testing Strategies-Strategies: Test Drivers and Test Stubs-Structural Testing (White Box Testing)-Functional Testing (Black Box Testing)-Testing conventional applications-object oriented applications -Web applications -Formal modeling and verification -Software configuration management-Product metrics. Assessment: Team Analysis in Metrics Calculation.

**UNIT V**

Project Management Concepts-Process and Project Metrics-Estimation for Software projects -Project Scheduling-Risk Management-Maintenance and Re-engineering. Assessment: Preparation of Risk mitigation plan.

**Text Books**

1. R. S. Pressman, “Software Engineering: A Practitioners Approach”, Seventh Edition, McGraw Hill, 2010.

2. Rajib Mall, “Fundamentals of Software Engineering”, Third Edition, PHI Publication, 2009.

3.Pankaj Jalote, “Software Project Management in Practice”, Pearson Education, New Delhi,2002.

**COURSE OBJECTIVES**

- To understand the Software Engineering Practice
- To understand the Software Engineering Process Models
- To understand Design Engineering, Web applications
- To gain knowledge of the software testing
- To understand Software Project Management

**COURSE OUTCOMES (CO)**

Upon completion of the course, the students will be able to:

- Assess each module given the overall Software engineering practice
- Enhance the software project management skills
- Comprehend the systematic methodologies involved in SE
- Design and develop a software product in accordance with SE principles

| Course Outcomes | Aligned Programme Outcomes (PO) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | PO-8 | PO-9 | PO-10 | PO-11 | PO-12 |
| CO - 1 | | √ | | | √ | | | √ | | √ | √ | |
| CO - 2 | | | | | √ | | | √ | √ | √ | √ | |
| CO - 3 | | √ | | | √ | | | √ | √ | √ | √ | |
| CO - 4 | √ | | √ | √ | √ | √ | | √ | | √ | √ | |

| COURSE PLAN – PART II | | | |
|---|---|---|---|
| **COURSE OVERVIEW** | | | |
| This course mainly describes about various software development models, design engineering, software testing and software project management. | | | |
| **COURSE TEACHING AND LEARNING ACTIVITIES** | | | |
| **S.No.** | **Week/Contact Hours** | **Topic** | **Mode of Delivery (Online)** |
| 1 | 1/3 | Introduction: Role of Software Engineer-Software Components-Software Characteristics-Software Crisis-Software Engineering Processes-Similarity and Differences from Conventional Engineering Processes-Quality Attributes. Assessment: How Software Engineering Changes? | PPT |
| 2 | 2/3 | Software Development Life Cycle (SDLC) Models: Water Fall Model, Prototype Model, Spiral Model, Evolutionary | PPT |

| | | | |
|---|---|---|---|
| | | Development Models, Iterative Enhancement Models, Choosing a social relevant problem, Summary Team Report. | |
| 3 | 3/3 | Requirement Engineering Process: Elicitation-Analysis-Documentation-Review and Management of User Needs-Feasibility Study | PPT |
| 4 | 4/3 | Information Modeling-Data Flow Diagrams-Entity Relationship Diagrams-Designing the architecture. Assessment: Impact of Requirement Engineering in their problem, Decision Tables, SRS Document | PPT |
| 5 | 5/3 | IEEE Standards for SRS, Architectural design, component level design, user interface design, Web App Design, Submission of SRS Document for Team Project. | PPT |
| 6 | 6/3 | Quality concepts-Review techniques-Software Quality Assurance (SQA): Verification and Validation-SQA Plans-Software Quality Frameworks | PPT |
| 7 | 7/3 | Assessment: Framing SQA Plan, ISO 9000 Models, SEI-CMM Model and their relevance to project Management, other emerging models like People CMM. | PPT |
| 8 | 8/3 | Testing Objectives-Unit Testing-Integration Testing-Acceptance Testing-Regression Testing-Testing for Functionality and Testing for Performance-Top-Down and Bottom-Up Testing-Software Testing Strategies | PPT |

| | | | |
|---|---|---|---|
| 9 | 9/3 | Strategies: Test Drivers and Test Stubs-Structural Testing (White Box Testing)-Functional Testing (Black Box Testing)-Testing conventional applications-object oriented applications-Web applications-Formal modeling and verification | PPT |
| 10 | 10/3 | Software configuration management -Product metrics. Assessment: Team Analysis in Metrics Calculation. | PPT |
| 11 | 11/3 | Project Management Concepts-Process and Project Metrics-Estimation for Software projects-Project Scheduling | PPT |
| 12 | 12/3 | Risk Management-Maintenance and Re-engineering. Assessment: Preparation of Risk mitigation plan. | PPT |

**COURSE ASSESSMENT METHODS**

| S.No. | Mode of Assessment | Week/Date | Duration | % Weightage |
|---|---|---|---|---|
| 1 | Assessment 1 (written Test) | FEB'21 4th week | 1 hour | 20 |
| 2 | Assessment 2 (written Test) | MAR'21 4th week | 1 hour | 20 |
| 3 | Assignment 1 | FEB'21 1st week | ___ | 15 |
| 4 | Assignment 2 | MAR'21 1st week | ___ | 15 |
| CPA | Compensation Assessment | MAY'21 1st week | 1 hour | 20 |
| 5 | Final Assessment (written Test) | MAY'21 2nd week | 3 hours | 30 |
| | | | TOTAL | 100 |

**COURSE EXIT SURVEY**

- Feed backs are collected after the end semester exam in the feedback forms.
- Suggestions from the students are incorporated for making the course more sympathetic and motivating.
- Students may give their feedback at any time, through their class representatives to the concerned faculty and also in the class committee meetings.

## COURSE POLICY

**MODE OF CORRESPONDENCE (email/ phone etc)**

- Both email and phone

**COMPENSATION ASSESSMENT**

Compensation assessment (Retest) will be conducted for absentees in assessment 1 or assessment 2 only after the submission of medical or On-Duty certificates signed by competent authority. The portions for compensation assessment will be the portions of assessment 1 and assessment 2.

**ATTENDANCE POLICY**

- **At least 75% attendance in each course is mandatory.**
- **A maximum of 10% shall be allowed under On Duty (OD) category.**
- Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade.**

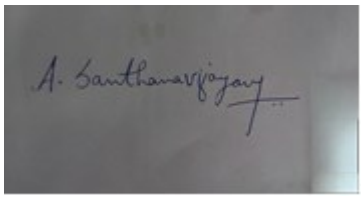
**ACADEMIC DISHONESTY & PLAGIARISM**

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

## ADDITIONAL INFORMATION

The students can clarify their doubts at any time during working hours from the faculty with prior appointment.

## FOR APPROVAL

| Course Faculty | CC-Chairperson | HOD |
|---|---|---|
|  |  |  |
| **(Dr. A. SANTHANAVIJAYAN)** | **(Dr. C. MALA)** | **(Dr. RAJESWARI SRIDHAR)** |