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|---|---|
| **Course Code** | |
| **Department** | CSE |
| **Course Name** | Software Production, Evolution and Maintenance (SPEM) |
| **Credits** | 4 |
| **Course Offered to** | PG / UG |
| **Whether the course is to be counted towards M.Tech specialization. If yes, please select the specialization towards which it is to be counted** | |
| **If the course is to be counted towards other B.Tech programs(For Ex if a course with CSE no. satisfies the requirement of 32 credits of B.Tech ECE program that students have to do in last 4 semesters, then the drop down answer should be ECE)** | |
| **Course Description** | Most of the software products developed today are a collection of closely coupled software applications that fulfills multiple user needs at once. Software product line paradigm is a useful approach while developing multiple software products that share common functional and quality requirements. It facilitates efficient development, production, and mass customization of software-intensive systems and software products by using a set of software subsystems and interfaces that form a common structure. However, the development and the delivery of software product is only a part of the story. Software teams should work hard to continuously improve the software applications based on the changing requirements as well as preserve them from failure of decline. While the former is called software evolution, the latter is called software maintenance. This course will guide students to develop and maintain large scale software products by providing theoretical and practical aspects of software product line paradigm as well as software evolution and maintenance. |

**Pre-requisites**

| Pre-requisite (Mandatory) | Pre-requisite (Desirable) | Pre-requisite(other) |
|---|---|---|
| | Basic understanding of software engineering concepts and techniques | |

*Please insert more rows if required

**Post Conditions**

| CO1 | CO2 | CO3 | CO4 |
|---|---|---|---|
| Can develop the framework of product line engineering in large scale software production | Can implement the software maintenance processes and techniques during software production. | Can distinguish between existing software system artifacts and be able to develop the functionality and quality attributes through software re-engineering | Can construct common and variable domain specific requirements by analysing the challenges of domain-specific RE |

**Weekly Lecture Plan**

| Week Number | Lecture Topic | COs Met | Assignment/Labs/Tutorial |
|---|---|---|---|
| Week 1 | Software Evolution Vs Maintenance | CO2 | Exercise |
| Week 2 | Software Evolution and Maintenance Models | CO2 | Quiz |
| Week 3 | Software Product Line Engineering - A Motivation | CO1 | Exercise / Presentation |
| Week 4 | Software Framework and Variability | CO1 | Quiz |
| Week 5 | Orthogonal Variability Model | CO1, CO2 | Exercise / Presentation |
| Week 6 | Domain-Specific Requirements Engineering | CO4 | Quiz |
| Week 7 | Software Re-engineeirng | CO3 | Exercise / Presentation |
| Week 8 | Continued from Week 6 and 7 | CO3 | Quiz |
| Week 9 | Introduction to DevOps and Containers | CO1, CO4 | Exercise / Presentation |
| Week 10 | Microservice Architecture | CO1 | Quiz |
| Week 11 | Continued from week 10 | CO1 | Exercise / Presentation |
| Week 12 | Legacy Information Systems | CO2 | Quiz |
| Week 13 | Student Presentations / Project Report discussions | | Report submission |

**Assessment Plan**

| Type of Evaluation | % Contribution in Grade |
|---|---|
| (Weekly) Homework Exercises | 20 |
| (based on weekly exercises) | 10 |
| Weekly Quiz | 10 |
| Mid-Sem | 20 |
| End-Sem | 20 |
| Term Project / Paper Report | 20 |

| Resource Material | |
|---|---|
| **Type** | **Title** |
| Latest research publications. | Would be conveyed to the students when required. |
| Book | Foundations, Principles, and Techniques". Springer-Verlag, 2005 |
| Book | engineering |
| Book | Maintenance - A Practitioner's Approach", 2014 |