Year 4 Term 1

Course Code	Course Title	Credit	Theory	Lab
SE 4100	Internship	18	0	18

Outline:
The student will work full-time as an intern to particular company for a period of six months.S/he will be evaluated based on the marks provided by the company along with the marks of at least two presentations given at IIT.

Year 4 Term 2

Course Code	Course Title	Credit	Theory	Lab
SE 4202	Project	6	0	6

Course Outline: Each student can perform a software development or research project. For a research project astudent has to submit a thesis. For software development project, a student should submit documents having the following: Project proposal, Software Requirements Specification, Software Design Specification, Software Test Plan and User Manual. Besides, each of the students has to give multiple intermediate presentations to report their project progress.

Course Code	Course Title	Credit	Theory	Lab
SE 4203	Software Maintenance	2	2	0

Course Outline: Lifecycle roadmap is presented and different types of evolution and maintenanceactivities are placed on it. Status within industry and research is mapped out. Evolution laws are discussed and analyses in different contexts (the traditional, component-based, and open-source). Pre delivery and transition maintenance models are studied and criteria for their success are identified. Impact analysis is studied. Different ways to manage customer problems are surveyed, both the critical (emergency) and non-critical ones. Retirement process model is considered. Finally, the quality attribute "maintainability" is discussed and compared to "bad smells". Techniques for evolutionary design in the small: refactoring. Techniques for large-scale evolutionary design, especially evolution of legacy systems. Architectural patterns for isolation/exposure of change.

References:
1. Effective Software Maintenance and Evolution: A Reuse-Based Approach by Stanislaw Jarzabek; Publisher Taylor & Francis
2. Software Maintenance: Concepts and Practice By Penny Grubb, Armstrong A. Takang 2nd edition World Scientific USA.

Course Code	Course Title	Credit	Theory	Lab
SE 4204	Software Maintenance Lab	1	0	1

Course Outline: Lifecycle roadmap is presented and different types of evolution and maintenance activities are placed on it. Status within industry and research is mapped out. Evolution laws are discussed and analyses in different contexts (the traditional, component-based, and open-source). Pre delivery and transition maintenance models are studied and criteria for their success are identified. Impact analysis is studied. Different ways to manage customer problems are surveyed, both the critical

(emergency) and non-critical ones. Retirement process model is considered. Finally, the quality attribute "maintainability" is discussed and compared to "bad smells". Techniques for evolutionary design in the small: refactoring. Techniques for large-scale evolutionary design, especially evolution of legacy systems. Architectural patterns for isolation/exposure of change.

References:

1. Effective Software Maintenance and Evolution: A Reuse-Based Approach by Stanislaw Jarzabek; Publisher Taylor & Francis
2. Software Maintenance: Concepts and Practice By Penny Grubb, Armstrong A. Takang 2nd edition World Scientific USA.

Course Code	Course Title	Credit	Theory	Lab
SE 4205	Software Project Management	2	2	0

Course Outline: Introduction to Project management: Historical background and evolution,Terminologies, Software project management objectives, Scope, focus and basic rules Principles of software project management: Basic PM Skills, SPM framework, elements, stakeholders, boundaries, challenges of SPM Software Project planning: Planning objective, project plan, variations, structure of SPM plan, project estimation, estimation methods, models and decision process. PM organization and scheduling: WBS, types of WBS, functions, activities, tasks, life cycles, phasing and purpose of phasing, building project schedule, network diagrams: PERT, CPM, Bar charts, Gantt charts Software project management techniques: Use of methodologies, Managing risks and issues, Managing Quality, Configuration, Change, Crisis, Documentation, Release. Project monitoring and control: Dimensions of monitoring and control, earned value indicators (BCWS, CV, SV, CPI, SPI), backlog management, dispute and error tracking, RMMM charts Industry scenarios: Domain analysis, Business case analysis, Dynamicity, Success and failure factors, case studies

References:

1. Stellman, Andrew, and Jennifer Greene. *Applied software project management.* " O'Reilly Media, Inc.", 2005.
2. Phillips, Joseph. *IT project management: on track from start to finish.* McGraw-Hill, Inc., 2002.
3. Rubin, Kenneth S. *Essential Scrum: A practical guide to the most popular Agile process.* Addison-Wesley, 2012.

Course Code	Course Title	Credit	Theory	Lab
SE 4206	Software Project Management Lab	1	0	1

Course Outline: Introduction to Project management: Historical background and evolution,Terminologies, Software project management objectives, Scope, focus and basic rules Principles of software project management: Basic PM Skills, SPM framework, elements, stakeholders,

boundaries, challenges of SPM Software Project planning: Planning objective, project plan, variations, structure of SPM plan, project estimation, estimation methods, models and decision process. PM organization and scheduling: WBS, types of WBS, functions, activities, tasks, life cycles, phasing and purpose of phasing, building project schedule, network diagrams: PERT, CPM, Bar charts, Gantt charts Software project management techniques: Use of methodologies, Managing risks and issues, Managing Quality, Configuration, Change, Crisis, Documentation, Release. Project monitoring and control: Dimensions of monitoring and control, earned value indicators (BCWS, CV, SV, CPI, SPI), backlog management, dispute and error tracking, RMMM charts Industry scenarios: Domain analysis, Business case analysis, Dynamicity, Success and failure factors, case studies

References:

1. Stellman, Andrew, and Jennifer Greene. *Applied software project management*. " O'Reilly Media, Inc.", 2005.
2. Phillips, Joseph. *IT project management: on track from start to finish*. McGraw-Hill, Inc., 2002.
3. Rubin, Kenneth S. *Essential Scrum: A practical guide to the most popular Agile process*. Addison-Wesley, 2012.