



Savitribai Phule Pune University, Pune Second Year Artificial Intelligence & Machine Learning (2020 Course) 218545 : Software Engineering		
Teaching Scheme:	Credit Scheme:	Examination Scheme:
Theory(TH) : 03 hrs/week	03	Mid_Semester: 30 Marks End_Semester: 70 Marks
Prerequisite Courses, if any: Fundamentals of Programming Languages		
Course Objectives: <ol style="list-style-type: none"> 1. To learn the principles of Software Engineering. 2. To learn and understand methods of capturing, specifying, visualizing and analyzing software requirements. 3. To know design principles to software project development. 4. To learn basics of IT project management. 5. To understand software quality attributes and testing principles. 6. To introduce formal methods and recent trends in Software Engineering. 		
Course Outcomes: On completion of the course, students will be able to -- CO1: Classify various software application domains. CO2: Analyze software requirements by using various modeling techniques. CO3: Translate the requirement models into design models. CO4: Apply planning and estimation to any project. CO5: Use quality attributes and testing principles in software development life cycle. CO6: Discuss recent trends in Software engineering by using CASE and agile tools.		
COURSE CONTENTS		
Unit I	Introduction To Software Engineering	06 hrs
Software Engineering Fundamentals: Nature of Software, Software Engineering Practice, Software Process, Software Myths. Process Models : A Generic Process Model, Linear Sequential Development Model, Iterative Development Model, The incremental Development Model Agile software development: Agile manifesto, agility principles, Agile methods, myth of planned development, Introduction to Extreme programming and Scrum. Agile Practices: test driven development, pair programming, continuous integration in DevOps , Refactoring		
Case Study	An information system – Library Management system	
Mapping of Course Outcomes for Unit I	CO1	
Unit II	Requirements Engineering & Analysis	06 hrs
Requirements Engineering: User and system requirements, Functional and non-functional requirements, requirements engineering (elicitation, specification, validation, negotiation) prioritizing requirements (Kano diagram), requirement traceability matrix(RTM)		

Software Requirements Specification (SRS): software requirements Specification document, structure of SRS, writing a SRS, structured SRS for online shopping, Requirements Analysis: Analysis Model, data modeling, scenario based modeling, class based modeling, Flow oriented modeling, behavioral modeling-Introduction to UML diagrams		
Case Study : Library Management system		
Mapping of Course Outcomes for Unit II	CO2	
Unit III	Design Engineering	06 hrs
Design Engineering : Design Process & quality, Design Concepts, design Model, Pattern-based Software Design. Architectural Design :Design Decisions, Views, Patterns, Application Architectures Component level Design: component, Designing class based components, conducting component-level design, User Interface Design: The golden rules, Interface Design steps& Analysis, Design Evaluation		
Case Study : Web App Design / Library Management System		
Mapping of Course Outcomes for Unit III	CO3	
Unit IV	Project Planning, Management And Estimation	6 hrs
Project Planning: Project initiation, Planning Scope Management, Creating the Work Breakdown Structure, scheduling: Importance of Project Schedules, Developing the Schedule using Gantt Charts, PERT/ CPM Project Management: The Management Spectrum, People, Product, Process, Project, The W5HH Principle, Metrics in the Process and Project Domains, Software Measurement: size &function-oriented metrics(FP & LOC), Metrics for Project Project Estimation: Software Project Estimation, Decomposition Techniques, Cost Estimation Tools and Techniques, Typical Problems with IT Cost Estimates.		
Case Study: Project Management tool like OpenProj or MS Project		
Mapping of Course Outcomes for Unit IV	CO4	
Unit V	Software Quality And Testing	06 hrs
Quality Concepts: Quality, software quality, Quality Metrics, software quality dilemma, achieving software quality Software Testing: Introduction to Software Testing, Principles of Testing, Test plan, Test case, Types of Testing, Verification & Validation, Testing strategies, Defect Management, Defect Life Cycle, Bug Reporting, debugging.		
Case Study : Software testing tool like selenium		
Mapping of Course Outcomes for Unit V	CO5	
Unit VI	Formal Methods Recent Trends In Software Engineering	06 hrs
Recent Trends in SE : SCM, Risk Management, Technology evolution, process trends, collaborative development, software reuse, test-driven development, global software development challenges, CASE – taxonomy, tool-kits, workbenches, environments, components		

of CASE, categories (upper, lower and integrated CASE tools), Introduction to agile tools Jira, Kanban	
Case Study : CASE software/ HP Quality Center (QC) / Jira	
Mapping of Course Outcomes for Unit VI	CO6
Text Books:	
<ol style="list-style-type: none"> 1. Roger Pressman, "Software Engineering:A Practitioner's Approach", McGraw Hill,ISBN 0-07-337597-7 2. Ian Sommerville, "Software Engineering",Addison and Wesley, ISBN 0-13-703515-2 	
Reference Books:	
<ol style="list-style-type: none"> 1. Joseph Phillips, "IT Project Management-On Track From start to Finish", Tata Mc Graw-Hill,ISBN13:978-0-07106727-0,ISBN-10:0-07-106727-2 2. Pankaj Jalote, "Software Engineering: A Precise Approach", Wiley India, ISBN: 9788-1265-2311-5 3. Marchewka, "Information Technology Project Management", Willey India, ISBN: 9788-1265-4394-6 4. Rajib Mall, "Fundamentals of Software Engineering", Prentice Hall India, ISBN-13:9788-1203-4898-1 	