
Department of Artificial intelligence and Machine Learning

Curriculum Booklet – Software Engineering

Class: SE

Name of the Course – Software Engineering 2020 Pattern

(With effect from 2021 -22)

Aboli Deole | ***Dr.Shradhha Pandit***

Course in charges ***Module Coordinator*** ***HOD***

Teaching Plan

Sr. No.	Unit	Topics to be covered	Book Referred	Total Lecture Planned
1	I	**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	Roger Pressman, "Software Engineering:A Practitioner's Approach", McGraw Hill,ISBN 0-07-337597-7	06
2	II	**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.	Roger Pressman, "Software Engineering:A Practitioner's Approach", McGraw Hill,ISBN 0-07-337597-7	06
3	III	**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.	Pankaj Jalote, "Software Engineering: A Precise Approach", Wiley India, ISBN: 9788-1265- 2311-5	06
4	IV	**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 &functionoriented metrics(FP & LOC), Metrics for Project **Project Estimation:** Software Project Estimation, Decomposition Techniques, Cost Estimation Tools and	Ian Sommerville , "Software Engineering", Addison and Wesley, ISBN 0-13-703515-2	06

		Techniques, Typical Problems with IT Cost Estimates.		
5	V	**UNIT V- Software Quality And Testing** **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.	Rajib Mall, "Fundamentals of Software Engineering", Prentice Hall India, ISBN-13:9788-1203-4898-	06
6	VI	**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.	Pankaj Jalote, "Software Engineering: A Precise Approach", Wiley India, ISBN: 9788-1265- 2311-5	06

Text Books:

1. Roger Pressman, "Software Engineering: A Practitioner's Approach", McGraw Hill ,ISBN 0-07- 337597-7 2
2. Ian Sommerville , "Software Engineering", Addison and Wesley, ISBN 0-13-703515-2

Reference Books:

1. Joseph Phillips, "IT Project Management-On Track From start to Finish", Tata Mc GrawHill,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-

Reference Web Links/ Research Paper/ Referred Book other than Mention in Syllabus:

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Unit No.-I- Introduction To Software Engineering

Lecture No.	Details of the Topic to be covered	References
1	Software Engineering Fundamentals: Nature of Software, Software Engineering Practice.	Roger Pressman, "Software Engineering: A Practitioner's Approach"
2	Software Process, Software Myths. Process Models ,A Generic Process Model, Linear Sequential Development Model,	
3	Linear Sequential Development Model, Iterative Development Model, The incremental Development Model Agile	
4	software development**:** Agile manifesto, agility principles, Agile methods	
5	Myth of planned development ,Agile Practices ,Test driven development,	
6	Pair programming, continuous integration in DevOps , Refactoring	

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	What is software process?
Q. 2	Explain software engineering process framework activities.
Q. 3	Write short note on generic process model
Q. 4	What is Agility?
Q. 5	Explain scrum with the help of diagram?

Unit No.-II- Requirements Engineering & Analysis

Lecture No.	Details of the Topic to be covered	References
1	Requirements Engineering, User and system requirements, Functional and non-functional requirements,	Roger Pressman, "Software Engineering: A Practitioner's Approach"
2	Requirements engineering (elicitation, specification, validation, negotiation) prioritizing requirements (Kano diagram)	
3	requirement traceability matrix(RTM),Software Requirements Specification (SRS),software requirements Specification document,	
4	Structure of SRS, writing a SRS, structured SRS for online shopping, Requirements Analysis	
5	Analysis Model, data modeling, scenario based modeling, class based modeling,	
6	Flow oriented modeling, behavioral modeling-Introduction to UML diagrams	

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	What is requirement engineering?
Q. 2	How requirements are validated?
Q. 3	Explain 4 desirable characteristics of a good software specification(SRS)document.
Q. 4	Discuss in short: data objects in data model.
Q. 5	What is use case diagram? Illustrate it with some suitable example.

Unit No.-III- Design Engineering

Lecture No.	Details of the Topic to be covered	References
1	Design Engineering,Design Process & quality, Design Concepts, design Model.	Roger Pressman, "Software Engineering: A Practitioner's Approach"
2	Pattern-based Software Design. Architectural Design,Design Decisions.	
3	Views, Patterns, Application Architectures, Component level Design, component, Designing class based components.	
4	Designing class based components, conducting component-level design, User Interface Design.	
5	Application Architectures Component level Design, component, Designing	
6	The golden rules, Interface Design steps & Analysis, Design Evaluation	

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	Explain quality attributes, considered in software design.
Q. 2	Discuss architectural patterns in detail
Q. 3	Explain the following design concept: refinement
Q. 4	Give importance of refactoring in improving quality of software?
Q. 5	What are component level design steps.

Unit No.-IV- Project Planning, Management And Estimation

Lecture No.	Details of the Topic to be covered	References
1	Project Planning, Project initiation, Planning Scope Management	Roger Pressman, "Software Engineering: A Practitioner's Approach"
2	Creating the Work Breakdown Structure, scheduling: Importance of Project Schedules, Developing the Schedule using Gantt Charts,	
3	PERT/ CPM, Project Management, The Management Spectrum, People, Product, Process	
4	Project, The W5HH Principle, Metrics in the Process and Project Domains, Software Measurement: size &function oriented metrics(FP & LOC),	
5	Project Estimation, Software Project Estimation, Decomposition Techniques,	
6	Metrics for Project, Cost Estimation Tools and Techniques, Typical Problems with IT Cost Estimates.	

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	Explain the role of people, product and process in project management.
Q. 2	Explain the term the project in project management.
Q. 3	Explain size oriented Metrics.
Q. 4	Explain the following quality factors?
Q. 5	Explain ISO 9126 Quality factors.

Unit No.-V- Software Quality And Testing

Lecture No.	Details of the Topic to be covered	References
1	Quality Concepts: Quality, software quality,	Ian Sommerville , "Software Engineering", Addison and Wesley
2	software quality dilemma, achieving ,software quality Software Testing:	
3	Introduction to Software Testing, Principles of Testing, Test plan, Test case	
4	Types of Testing, Verification & Validation, Testing strategies	
5	software quality Software Testing:, Defect Management, Defect Life	
6	Quality Metrics, software quality dilemma, achieving Cycle, Bug Reporting, debugging	

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	What are the software quality factors? Explain any four.
Q. 2	Explain different MC call's quality factors?
Q. 3	What do you understand by white box testing?
Q. 4	Explain graph matrix
Q. 5	Explain between white box and black box testing?

Unit No.-VI- Formal Methods Recent Trends In Software Engineering

Lecture No.	Details of the Topic to be covered	References
1	Recent Trends in SE ,SCM, Risk Management, Technology evolution,	Ian Sommerville , "Software Engineering", Addison and Wesley
2	process trends, collaborative development, software reuse, test-driven development,	
3	global software development challenges, CASE – taxonomy, tool-kits, workbenches	
4	software reuse, test-driven development, process trends, CASE taxonomy, tool-kits, workbenches	
5	environments, components of CASE, categories (upper, lower and integrated CASE tools	
6	Introduction to agile tools Jira, Kanban	

Question Bank: Theory & Numerical
Mapped to Course Outcome:

Q. 1	Compare between Kanban and scrum?
Q. 2	What are types of risks? Explain in brief.
Q. 3	Write short note on technology revolution?
Q. 4	Mention reason for project delay?
Q. 5	Write short note on :Software configuration management?

Execution Record

Class: SE Course: Software Engineering AY: 2022-23 Term: III

**Mode of delivery: PPT, Video, Demonstration, Chalk and Board, Flipped Classroom, Think-Pair Share, etc.*

Lect. No.	Unit No.	Date	Main Topic to be covered	Sub Topic to be covered	Mode of Delivery
1	I	19/08/22	Software Engineering Fundamentals:	The Nature of Software, Defining Software, Characteristics of Software, software application domain.	Board &PPTs
2	I	22/08/22	Software Process	Generic process frameworks activities, elements of S/w process Software engineering practice	Board &PPTs
3	I	25/08/22	Linear Sequential Development Model	The prototyping paradigm, Prescriptive process models, concurrent development model	Board &PPTs
4	I	26/08/22	Agile manifesto	Agility Principles, The Extreme Programming process, Advantages and disadvantages of XP	Board &PPTs
5	I	29/08/22	Myth of planned development	Customer myths, The spiral model Industrial XP,	Board &PPTs
6	I	01//09/22	Pair programming	Extreme Programming(XP) ,Refactoring, Test Driven development	Board &PPTs
7	II	02/09/22	Requirements Engineering, User and system requirements,	Elicitation, Collaborative requirement gathering, Quality function deployment, User scenarios, Elicitation work	Board &PPTs

				product.	
8	II	08/09/22	Functional and non-functional requirements	Requirements engineering (elicitation, specification, validation, negotiation) prioritizing requirements (Kano diagram)	Board &PPTs
9	II	12/09/22	Requirement traceability matrix(RTM),	software requirements Specification document, Software Requirements Specification (SRS),	Board &PPTs
10	II	15/09/22	Structure of SRS, Requirements Analysis	Writing a SRS, structured SRS for online shopping,	Board &PPTs
11	II	16/09/22	Analysis Model	Data modeling, scenario based modeling, class based modeling,	Board &PPTs
12	II	19/09/22	Flow oriented modeling,	Behavioral modeling- Introduction to UML diagrams	Board &PPTs
13	III	22/09/22	Design Engineering	Design Process & quality, Design Concepts, design Model,	Board &PPTs
14	III	23/09/22	Pattern-based Software Design.	Architectural Design ,Design Decisions	Board &PPTs
15	III	26/09/22	Application Architectures	Views, Patterns ,Component level Design, component, Designing class based components	Board & PPTs
16	III	29/09/22	Component-level design	Designing class based components ,User Interface Design.	Board & PPTs
17	III	30/09/22	Application Architectures	Component level Design, component, Designing	Board & PPTs
18	III	03/10/22	Interface Design steps & Analysis	The golden rules, Design Evaluation	Board & PPTs
19	IV	06/10/22	Project Planning	Project initiation, Planning Scope Management	Board &

					PPTs
20	IV	07/10/22	Creating the Work Breakdown Structure	scheduling: Importance of Project Schedules, Developing the Schedule using Gantt Charts	Board & PPTs
21	IV	10/10/22	Project Management	PERT/ CPM, The Management Spectrum, People, Product, Process	Board & PPTs
22	IV	13/10/22	Project Domains	Project, The W5HH Principle, Metrics in the Process and, Software Measurement: size &function oriented metrics(FP & LOC),	Board & PPTs
23	IV	14/10/22	Project Estimation	Software Project Estimation, Decomposition Techniques,	Board & PPTs
24	IV	17/10/22	Metrics for Project	Cost Estimation Tools and Techniques, Typical Problems with IT Cost Estimates.	Board & PPTs
25	V	20/10/22	Quality Concepts	Quality, software quality,	Board & PPTs
26	V	21/10/22	software quality Software Testing	software quality dilemma, achieving ,	Board & PPTs
27	V	24/10/22	Introduction to Software Testing	Principles of Testing, Test plan, Test case	Board & PPTs
28	V	27/10/22	Types of Testing	Verification & Validation, Testing strategies	Board & PPTs
29	V	28/10/22	Defect Management	software quality Software Testing, Defect Life	Board & PPTs
30	V	31/10/22	Bug Reporting	Quality Metrics, software quality dilemma, achieving Cycle, Bug Reporting, debugging	Board & PPTs
31	VI	03/11/22	Recent Trends in SE	SCM, Risk Management, Technology evolution, process trends	Board & PPTs
32	VI	04/11/22	Process trends	collaborative development,	Board &

				software reuse, test-driven development	PPTs
33	VI	07/11/22	Global software Development chanllenges	global software development challenges, CASE – taxonomy, tool-kits,	Board & PPTs
34	VI	10/11/22	CASE - taxonomy	workbenches, environments, components of CASE,	Board & PPTs
35	VI	11/11/22	CASE Tools	categories (upper, lower and integrated CASE tools),	Board & PPTs
36	VI	14/11/22	Introduction to Agile tools	Introduction to agile tools Jira, Kanban	Board & PPTs