Year / Semester: III B.Tech VI Semester   **Regulation: R23**

Subject and Code:23CAI361T&Artificial Intelligence in Software Engineering

SYLLABUS

COURSE CONTENT

UNIT–I : BASICS OF SOFTWARE ENGINEERING

Software and Software Engineering – simple definition, need, SDLC Phases: Requirements, Design, Coding, Testing, Deployment, Maintenance Software Myths: few examples of management, customer, developer myths.Very small intro: how AI can help in SDLC

UNIT–II : SOFTWARE PROCESS MODELS

Need of software process model .Waterfall Model – simple diagram, uses, limits.Incremental Model – build in steps.Spiral Model – cycles + risk idea (only concept).Agile – short idea: sprints, customer feedback.One small point: AI tools for planning and estimation.

UNIT – III: Introduction to AI & Software Engineering

Overview of computer software and software systems.Limitations of traditional software engineering.The software crisis: causes and impact.Need for increased software power.Human–computer responsiveness.Software in dynamic environments.Self-maintaining and adaptive software.Need for AI in modern software systems.

UNIT – IV: AI Problems vs Traditional SE Problems

What defines an AI problem."Correct" vs "Good-enough" solutions.Process-focused problem solving (HOW vs WHAT).Handling dynamic and context-dependent problems.Modular approximations in AI.Classical SE methodologies: SAV (Specify & Verify) and SAT (Specify & Test).Prototyping as a bridge between specification and implementation.

UNIT – V: Modern Engineering Approaches for AI Systems

Incremental & exploratory software development (RUDE cycle).Malleable and flexible software structures.AI components over conventional software skeletons.New paradigms: automatic programming, transformational implementation, POLITE methodology.

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Max Marks: 10

S.No.	CO	Questions	BT
		Unit I: BASICS OF SOFTWARE ENGINEERING	
1	1	• Define Software and Software Engineering. Explain the need for Software Engineering.	**L4**
2	1	• Explain Software Development Life Cycle (SDLC) and describe all its phases in detail.	**L3**
3	1	• Discuss the Requirements and Design phases of SDLC with examples.	**L4**
4	1	• Explain Coding, Testing, Deployment, and Maintenance phases clearly.	**L3**
5	1	• What are Software Myths? Explain Management, Customer, and Developer myths with examples.	**L5**
6	1	• Describe the importance of SDLC in software development.	**L4**
7	1	• Explain the need and objectives of Software Engineering.	**L3**
8	1	• Discuss different categories of Software Myths in detail.	**L5**
9	1	Write a short note on how Artificial Intelligence (AI) helps in SDLC	**L4**

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S.No.	CO	Questions	BT
Unit II: SOFTWARE PROCESS MODELS			
1	2	Explain the need for a Software Process Model in software development.	L4
2	2	Describe the Waterfall Model with a neat diagram, its uses, and limitations.	L3
3	2	Explain the Incremental Model and how software is built in steps.	L4
4	2	Discuss the Spiral Model and explain its risk management concept.	L3
5	2	Explain Agile Model with the concepts of sprints and customer feedback.	L5
6	2	Compare Waterfall Model and Incremental Model.	L4
7	2	Compare Spiral Model and Agile Model.	L3
8	2	Discuss advantages and disadvantages of the Waterfall Model.	L5
9	2	Explain different types of Software Process Models with suitable examples.	L4
10	2	Write a short note on how AI tools help in project planning and cost estimation.	L3

Prepared by Mr.V.Ajay

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S.No.	CO	Questions	BT
Unit III: Introduction to AI & Software Engineering			
1	3	• Give an overview of computer software and software systems.	L4
2	3	• Explain the limitations of traditional software engineering.	L3
3	3	• Discuss the Software Crisis, its causes, and impact.	L4
4	3	• Explain the need for increased software power in modern systems.	L3
5	3	What is Human–Computer Responsiveness? Explain its importance.	L5
6	3	Explain software in dynamic environments with examples.	L4
7	3	Describe self-maintaining and adaptive software systems.	L3
8	3	Discuss the need for AI in modern software systems.	L5
9	3	Explain the role of AI in overcoming limitations of traditional software engineering.	L4
10	3	Write short notes on software crisis and adaptive software.	L3
11	3		L3

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S.No.	CO	Questions	BT
		Unit IV: AI Problems vs Traditional SE Problems	
1	4	What defines an AI problem? Explain with examples.	L4
2	4	Differentiate between "Correct" solutions and "Good-enough" solutions.	L3
3	4	Explain process-focused problem solving (HOW vs WHAT).	L4
4	4	Discuss how AI handles dynamic and context-dependent problems.	L3
5	4	What are modular approximations in AI? Explain clearly.	L5
6	4	Explain Classical SE methodologies: SAV (Specify & Verify) and SAT (Specify & Test).	L4
7	4	Compare AI problems with Traditional Software Engineering problems.	L3
8	4	Explain the importance of prototyping in AI system development.	L5
9	4	Discuss differences between deterministic and non-deterministic problem solving.	L4
10	4	Write short notes on prototyping as a bridge between specification and implementation.	L3

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S.No.	CO	Questions	BT
**Unit V: Modern Engineering Approaches for AI Systems**			
1	5	• Explain Incremental and Exploratory Software Development (RUDE cycle).	L4
2	5	• What are malleable and flexible software structures? Explain.	L3
3	5	• Discuss the concept of AI components over conventional software skeletons.	L4
4	5	• Explain automatic programming and transformational implementation.	L3
5	5	• What is POLITE methodology? Explain its features.	L5
6	5	• Compare traditional development approaches with modern AI engineering approaches.	L4
7	5	• Explain the importance of exploratory development in AI systems.	L3
8	5	• Discuss new paradigms in AI-based software engineering.	L5
9	5	• Write short notes on flexible software architectures for AI systems.	L4
10	5	• Explain modern engineering challenges in developing AI systems.	L3
11	5		L3

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Note: L1-Remembering, L2-Understanding, L3-Applying, L4-Analyzing, L5-Evaluating, and L6-Creating

Instruction to Faculty Members:

The Six Levels of Bloom's Taxonomy:

1. **Remembering:** Retrieving, recognizing, and recalling relevant knowledge from long-term memory (e.g., list, define, name, locate).

2. **Understanding:** Constructing meaning, explaining ideas, or concepts (e.g., summarize, interpret, classify, compare).

3. **Applying:** Using information in new situations or implementing procedures to solve problems (e.g., solve, use, demonstrate, implement).

4. **Analyzing:** Breaking material into constituent parts, determining how the parts relate to one another and to an overall structure (e.g., contrast, categorize, distinguish, diagram).

5. **Evaluating:** Making judgments based on criteria and standards through checking and critiquing (e.g., judge, critique, justify, defend, argue).

6. **Creating:** Putting elements together to form a coherent or functional whole; reorganizing elements into a new pattern or structure (e.g., design, construct, develop, formulate).