

Institute/Department	UNIVERSITY INSTITUTE OF ENGINEERING (UIE)	Program	Bachelor of Engineering (Artificial Intelligence and Data Science) (AI201)
Master Subject Coordinator Name:	Geeta Rani	Master Subject Coordinator E-Code:	E15227
Course Name	SOFTWARE ENGINEERING	Course Code	23CSH-374

Lecture	Tutorial	Practical	Self Study	Skilling	TC	TGT	TGP	Studio	Credit	Subject Type
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Course Type	Course Category	Mode of Assessment	Mode of Delivery
Major Core	Graded (GR)	Hybrid	Hybrid (HYB)

Mission of the Department	<p>M1: To provide relevant, rigorous and contemporary curriculum and aligned assessment system to ensure effective learning outcomes for engineering technologies.</p> <p>M2: To provide platform for industry engagement aimed at providing hands-on training on advanced technological and business skills to our students.</p> <p>M3: To provide opportunities for collaborative, interdisciplinary and cutting-edge research aimed at developing solutions to real life problems.</p> <p>M4: To imbibe quest for innovation, continuous learning and zeal to pursue excellence through hard work and problem-solving approach.</p> <p>M5: To foster skills of leadership, management, communication, team spirit and strong professional ethics in all academic and societal endeavours of our students.</p>
Vision of the Department	To be recognized as a centre of excellence for Computer Science & Engineering education and research, through effective teaching practices, hands-on training on cutting edge computing technologies and excellence in innovation, for creating globally aware competent professionals with strong work ethics whom would be proficient in implementing modern technology solutions and shall have entrepreneurial zeal to solve problems of organizations and society at large.

Program Educational Objectives(PEOs)	
PEO1	To be able to explore areas of research, technology application & innovation and make a positive impact in different types of institutional settings such as corporate entities, government bodies, NGOs, inter-government organizations, & start-ups.
PEO2	To be able to design, and implement technology and computing solutions to organizational problems, effectively deploy knowledge of engineering principles, demonstrate critical thinking skills & make the intellectual connections between quantitative and qualitative tools, theories, and context to solve the organizational problems
PEO3	To be able to work with, lead & engage big and small teams comprising diverse people in terms of gender, nationality, region, language, culture & beliefs. To understand stated and unstated differences of views, beliefs & customs in diverse & interdisciplinary team settings
PEO4	To be able to continuously learn and update one's knowledge, engage in lifelong learning habits and acquire latest knowledge to perform in current work settings
PEO5	To continuously strive for justice, ethics, equality, honesty, and integrity both in personal and professional pursuits. Able to understand and conduct in a way that is responsible and respectful.

Program Specific Outcomes(PSOs)	
PSO1	PSO1: Graduates will be able to analyze, design, and develop intelligent systems and applications by applying core concepts of Artificial Intelligence and Machine Learning across diverse domains.
PSO2	PSO2: Graduates will demonstrate proficiency in utilizing advanced AI/ML tools, frameworks, and technologies to innovate, implement, and manage projects in the rapidly evolving field of Artificial Intelligence and its allied application areas.
PSO3	PSO3: Graduates will apply AI, Machine Learning, and Data Analytics techniques to address real-world challenges, delivering effective and ethical solutions for industry, research, and societal needs.

Program Outcomes(POs)	
PO1	Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

PO2	Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO3	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal, and environmental considerations.
PO4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.
PO5	Create, select, and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations PO4 Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.
PO6	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO7	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context to technological change.
PO13	Demonstrate the capability to apply analytic thought to a body of knowledge, including the analysis and evaluation of policies, and practices. Identify relevant assumptions or implications, logical flaws and loopholes in the presented arguments
PO14	Demonstrate to create, perform, or think in different and diverse ways about the given scenario. Innovate and perform tasks in a better manner, view a problem or a situation from multiple perspectives, think 'out of the box' and generate solutions to complex problems in unfamiliar contexts
PO15	Demonstrate the ability to identify with or understand the perspective, experiences, or points of view of another individual or group, and to identify and understand other people's emotions
PO16	Demonstrate the ability to participate in community-engaged services/ activities for promoting the well-being of society
PO17	Demonstrate the acquisition of knowledge of the values and beliefs of multiple cultures, capability to effectively engage in a multicultural group/society and interact respectfully with diverse groups and gender sensitivity and adopting a gender-neutral approach, as also empathy for the less advantaged and the differently-abled including those with learning disabilities.

Text Books

Sr No	Title of the Book	Author Name	Volume/Edition	Publish Hours	Years
1	Software Engineering	Ian Sommerville	10	Pearson Education	2017
2	Software Engineering: A Practitioner's Approach	Roger S. Pressman, Bruce Maxim	9	McGraw Hill	2023

Reference Books

Sr No	Title of the Book	Author Name	Volume/Edition	Publish Hours	Years
1	An Integrated Approach to Software Engineering	Pankaj Jalote	3	Narosa	2005
2	Fundamentals of Software Engineering	Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli	5	PHI	2018

Course OutCome

SrNo	OutCome
CO1	Explain SDLC models, requirement principles, testing strategies, and project management concepts.
CO2	Construct UML diagrams and apply design patterns to solve software design problems
CO3	Compare SDLC models and testing strategies for different scenarios.

CO4	Assess testing strategies, maintenance approaches, and project metrics to ensure software quality.					
CO5	Develop complete requirement specifications, design models, test plans, and project management documents (including Jira-based defect tracking) for real-world case studies					

Lecture Plan Preview-Theory

Unit No	LectureNo	ChapterName	Topic	Text/ Reference Books	Pedagogical Tool**	Mapped with CO Number(s)	BT Level
1	1	Introduction to Software Engineering	Introduction to Software and its types	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO1	BT1,BT2
1	2	Introduction to Software Engineering	Need of Software Engineering	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO1	BT1,BT2
1	3	Introduction to Software Engineering	Software Engineering Principles	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO1	BT1,BT2
1	4	Introduction to Software Engineering	Software crisis	,T-Software Engineering: A Practi,R-Fundamentals of Software Engin	PPT	CO1	BT1,BT2
1	5	Introduction to Software Engineering	Software Myths	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO1	BT1,BT2
1	6	Software Development Life Cycle	Phases of SDLC	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO1	BT1,BT2
1	7	Software Development Life Cycle	Software Requirements and Design	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO1	BT1,BT2
1	8	Software Development Life Cycle	Coding and Testing	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO1	BT1,BT2
1	9	Software Development Life Cycle	Deployment and Maintenance	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO1	BT1,BT2
1	10	Software Development Life Cycle	Documentaion in SDLC	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO1	BT1,BT2
1	11	SDLC Models	Waterfall model	,T-Software Engineering,R-Fundamentals of Software Engin	PPT	CO1	BT1,BT2
1	12	SDLC Models	Iterative, Prototyping models	,T-Software Engineering,R-Fundamentals of Software Engin	PPT	CO3	BT1,BT2
1	13	SDLC Models	Spiral model, V-model	,T-Software Engineering,R-Fundamentals of Software Engin	PPT	CO3	BT1,BT2
1	14	SDLC Models	Agile model and its Comparison with traditional models	,T-Software Engineering,R-Fundamentals of Software Engin	PPT	CO3	BT1,BT2
1	15	SDLC Models	Case Studies: Requirements in online payment systems.	,T-Software Engineering,R-Fundamentals of Software Engin	Case Study,PPT	CO5	BT1,BT2
2	16	Software Design	Introduction to Software Design	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO1	BT1,BT2
2	17	Software Design	Design Concepts – Abstraction	,T-Software Engineering,R-Fundamentals of Software Engin	Activity,PPT	CO1	BT1,BT2
2	18	Software Design	Modularity	,T-Software Engineering,R-Fundamentals of Software Engin	Activity,PPT	CO1	BT1,BT2
2	19	Software Design	Cohesion	,T-Software Engineering,R-Fundamentals of Software Engin	PPT	CO1	BT1,BT2
2	20	Software Design	Coupling	,T-Software Engineering,R-Fundamentals of Software Engin	Activity,PPT	CO1	BT1,BT2
2	21	UML Diagram	Introduction to UML	,T-Software Engineering,R-Fundamentals of Software Engin	PPT	CO2	BT1,BT2

2	22	UML Diagram	Use Case Diagram	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,PPT	CO2	BT2,BT3
2	23	UML Diagram	Activity Diagrams	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,PPT	CO2	BT2,BT3
2	24	UML Diagram	Class Diagrams	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,PPT	CO2	BT2,BT3
2	25	UML Diagram	Sequence Diagrams	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,PPT	CO2	BT2,BT3
2	26	Design Pattrans	Introduction to Design Patterns	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO2	BT2,BT3
2	27	Design Pattrans	Creational & Structural Patterns	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO2	BT2
2	28	Design Pattrans	Behavioral Patterns	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO2	BT2
2	29	Design Pattrans	Applications of design pattrans	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO2	BT2
2	30	UML Diagram	UML modeling of a library management system	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,Case Study,PPT	CO2	BT2,BT3
3	31	Software Testing	Introduction to Software Testing	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO1	BT1,BT2
3	32	Software Testing	Black-Box Testing Concepts	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,PPT	CO4	BT1,BT2
3	33	Software Testing	White-Box Testing Concepts	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,PPT	CO4	BT1,BT2
3	34	Software Testing	Unit Testing	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,PPT	CO4	BT1,BT2
3	35	Software Testing	Integration Testing	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,PPT	CO4	BT2,BT4
3	36	Software Testing	System, Regression & Acceptance Testing	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,PPT	CO4	BT2,BT4
3	37	MAINTENANCE & RE-ENGINEERING	Software Maintenance	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO4	BT2,BT4
3	38	MAINTENANCE & RE-ENGINEERING	Legacy Systems	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO4	BT2,BT4
3	39	MAINTENANCE & RE-ENGINEERING	Software Re-engineering	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO4	BT2,BT4
3	40	MAINTENANCE & RE-ENGINEERING	Maintenance Tools & Automation	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO5	BT2,BT3
3	41	Software Project Management	Software Project Management Fundamentals	,T-Software Engineering,R-Fundamentals of Software Engin	PPT	CO1	BT1,BT2

3	42	Software Project Management	Software Metrics	,T-Software Engineering,R-Fundamentals of Software Engin	PPT	CO4	BT2,BT3
3	43	Software Project Management	Software Metrics continued	,T-Software Engineering,R-Fundamentals of Software Engin	PPT	CO4	BT2,BT3
3	44	Software Project Management	Defect Tracking Concepts	,T-Software Engineering,R-Fundamentals of Software Engin	PPT	CO4	BT2
3	45	Software Project Management	Practical Study of Jira for Defect Tracking	,T-Software Engineering,R-Fundamentals of Software Engin	Activity,Case Study,PPT	CO5	BT3,BT5

Lecture Plan Preview-Practical

Unit No	ExperimentNo	Experiment Name	Text/ Reference Books	Pedagogical Tool**	Mapped with CO Number(s)	BT Level
1	1	Develop SRS for a Library Management System.	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO3,CO5	BT2,BT3
1	2	To model the functional requirements of a software system using Use Case Diagram as per UML standards	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	PPT	CO1,CO2	BT2,BT3, BT6
1	3	Create Class and Sequence diagrams for a case study.	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,PPT	CO2	BT2,BT3, BT6
2	4	Design DFD and ER diagrams for an e-commerce system.	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,PPT	CO3,CO5	BT2,BT3, BT6
2	5	Apply design patterns in a mini-project.	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,PPT	CO2	BT2,BT3, BT6
2	6	Write test cases for a login module and execute them.	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Video Lecture	CO1,CO4	BT2,BT3, BT6
3	7	Perform unit testing on small programs using JUnit.	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,PPT	CO4	BT2,BT3, BT6
3	8	Generate software metrics using CASE tools.	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,PPT	CO4	BT2,BT3, BT5
3	9	Project management using Gantt charts in MS Project/Trello.	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,PPT	CO5	BT2,BT3, BT6
3	10	Issue tracking using Jira for a mini-project.	,T-Software Engineering: A Practi,R-An Integrated Approach to Soft	Activity,PPT	CO5	BT2,BT3, BT6

Assessment Model

Sr No	Exam Name	Max Marks	Weighted Marks
1	Practical Evaluations	40	20
2	End Term Hybrid Theory	60	30
3	Attendance Marks	2	2
4	Surprise Test	12	4
5	Practical MST	10	4
6	Practical Worksheet/Projects 1	30	2

7	Practical Worksheet/Projects 2	30	2
8	Practical Worksheet/Projects 3	30	2
9	Practical Worksheet/Projects 4	30	2
10	Practical Worksheet/Projects 5	30	2
11	Practical Worksheet/Projects 6	30	2
12	Practical Worksheet/Projects 7	30	2
13	Practical Worksheet/Projects 8	30	2
14	Practical Worksheet/Projects 9	30	2
15	Practical Worksheet/Projects 10	30	2
16	Quiz	4	4
17	Assignment/PBL	10	6
18	MST-1 Hybrid	20	5
19	MST-2 Hybrid	20	5

