Semester: V						
ARTIFICIAL INTELLIGENCE INTEGRATED SOFTWARE ENGINEERING **Category: Professional Core Elective** **(Theory)**						
Course Code	**:**	**AI255TBA**		**CIE**	**:**	**100 Marks**
Credits: L: T: P	**:**	**3:0:0**		**SEE**	**:**	**100 Marks**
Total Hours	**:**	**45L**		**SEE Duration**	**:**	**3.00 Hours**

Unit-I	**9 Hrs.**
Introduction: Professional Software Development, Software Engineering Ethics, Case studies. Software Processes: Models, Process activities, Coping with Change, Process improvement. The Rational Unified Process. Computer Aided Software Engineering. Agile Software Development: Introduction to agile methods, Agile development techniques, Agile project management and scaling agile methods.	
Unit – II	**9 Hrs.**
Requirements Engineering and System Modeling: Software Requirements: Functional and Non-functional requirements. Requirements Elicitation, Specification, Validation and Change. System Modeling: Context models, Interaction models, Structural models, Behavioral models, Model driven architecture. Architectural Design: Design decisions, Architectural views, Architectural patterns and architectures.	
Unit –III	**9 Hrs.**
Development and Testing: Design and implementation: Object oriented design using UML, Design patterns, Implementation issues, Open-source development. Software Testing: Development testing, Test-driven development, Release testing, User testing. Software Evolution: Evolution processes. Legacy system evolution, Software maintenance	
Unit –IV	**9 Hrs.**
Machine Learning to Support Code Reviews in Continuous Integration Introduction, Code review in CI, Code analysis tool chain, Code extraction, Feature extraction, Model development, Making a recommendation, Visualization of the results, Full example **Using Artificial Intelligence for Auto-Generating Software for Cyber-Physical Applications** Introduction, Model-Based Methods, Learning-Based Methods, Fault Trees, Model-Based Software Engineering, Running Example, AI-Based Framework for MBSE Task, AI-based MBSE Model Construction Methods, MBSE Trade-Off Framework, Empirical Modelling Cost Comparison	
Unit –V	**9 Hrs.**
Application of Machine Learning in Software Testing Introduction, Applications of Machine Learning in software testing-Machine Learning for software fault prediction, Machine Learning for test oracles automation, Machine learning for test cases generation, Machine learning for test suite reduction, prioritization and evaluation, other tasks **Creating Test Oracles Using Machine Learning Techniques** Introduction, Background on Test Oracles, Test Oracles Based on Machine Learning Techniques	

Course Outcomes: After completing the course, the students will be able to:-	
CO1	Summarize the activities in Software Engineering and the use of artificial Intelligence in Software Engineering
CO2	Competence in software requirements analysis and software design
CO3	Demonstrate the use of modern tools for software design by exhibiting teamwork through oral presentations and reports
CO4	Apply AI techniques to automate software engineering tasks such as testing, debugging, and code analysis
CO5	Conduct case studies to appraise the benefits of integrating AI in software engineering

Reference Books	
1	Software Engineering ,Ian Sommerville, 10th Edition, Pearson Education, 2013, ISBN: 9788131762165.
2	Artificial Intelligence Methods for Software Engineering ,Meir Kalech, Rui Abreu, Mark Last, World Scientific Publishing Co. Pte. Ltd, 1st Edition, 2021, ISBN 978-981-123-992-2, ISBN 978-981-123-993-9.
3	Software Engineering-A Practitioners Approach ,Roger.S.Pressman,7th Edition, Tata McGraw Hill, 2007, ISBN: 9780071267823
4	Fundamentals of Software Engineering ,Rajib Mall, 3rd Edition, Prentice-hall Of India Pvt Ltd., 2012, ISBN: 9788120348981.

RUBRIC FOR THE CONTINUOUS INTERNAL EVALUATION (THEORY)		
#	**COMPONENTS**	**MARKS**
1.	**QUIZZES:** Quizzes will be conducted in online/offline mode. TWO QUIZZES will be conducted & Each Quiz will be evaluated for 10 Marks. **THE SUM OF TWO QUIZZES WILL BE THE FINAL QUIZ MARKS.**	**20**
2.	**TESTS:** Students will be evaluated in test, descriptive questions with different complexity levels (Revised Bloom's Taxonomy Levels: Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating). **TWO tests will be conducted**. Each test will be evaluated for **50 Marks**, adding upto 100 Marks. **FINAL TEST MARKS WILL BE REDUCED TO 40 MARKS.**	**40**
3.	**EXPERIENTIAL LEARNING:** Students will be evaluated for their creativity and practical implementation of the problem. Case study based teaching learning (10), Program specific requirements (10), Video based seminar/presentation/demonstration (10) Designing & Modeling (10) **Phase 2 will be done in the exhibition mode (Demo/Prototype/any outcome). ADDING UPTO 40 MARKS**.	**40**
	MAXIMUM MARKS FOR THE CIE THEORY	**100**

RUBRIC FOR SEMESTER END EXAMINATION (THEORY)		
Q. NO.	**CONTENTS**	**MARKS**
	PART A	
1	Objective type questions covering entire syllabus	20
	PART B (Maximum of TWO Sub-divisions only)	
2	Unit 1 : (Compulsory)	16
3 & 4	Unit 2 : Question 3 or 4	16
5 & 6	Unit 3 : Question 5 or 6	16
7 & 8	Unit 4 : Question 7 or 8	16
9 & 10	Unit 5: Question 9 or 10	16
	TOTAL	**100**