Course Code	PAD21302T	Course Name	Enterprise Machine Learning	Course Category	C	Professional Core Course	L	T	P	C
							4	0	0	4

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Computer Applications		Data Book / Codes/Standards	Nil	

Course Learning Rationale (CLR):	The purpose of learning this course is to,	Learning

CLR-1 :	Understand the basic concepts and techniques of Machine Learning
CLR-2 :	Develop skills of using recent machine learning software for solving practical problems
CLR-3 :	Understand and implement machine learning AWS, Azure and GCP platform
CLR-4 :	Understand and Apply Machine Learning in Gaming development
CLR-5 :	Understand the Decision tree, Random Forest and Naïve Bayes Algorithm
CLR-6 :	Gain knowledge about Knowledge representations and Predicate logic

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	1 Level of Thinking (Bloom)	2 Expected Proficiency (%)	3 Expected Attainment (%)	Program Learning Outcomes (PLO)														
					1 Disciplinary Knowledge	2 Critical Thinking	3 Problem Solving	4 Analytical Reasoning	5 Research Skills	6 Team Work	7 Scientific Reasoning	8 Reflective Thinking	9 Self-Directed Learning	10 Multicultural Competence	11 Ethical Reasoning	12 Community Engagement	13 ICT Skills	14 Leadership Skills	15 Life Long Learning
CLO-1 :	Understand and implement machine learning AWS, Azure and GCP platform	2	85	80	*L*	*H*	*H*	*H*	*H*	*M*	-	*H*	*M*	*H*	-	*H*	-	-	-
CLO-2 :	Develop knowledge on machine learning in enterprise, and data compliance strategies	3	85	80	*L*	*H*	*H*	*H*	*H*	-	-	*M*	*M*	*L*	-	*H*	-	-	-
CLO-3 :	Gain experience of doing independent study and research	3	85	80	*L*	*H*	*H*	*H*	*H*	-	-	*M*	*M*	*L*	-	*H*	-	-	-
CLO-4 :	Understand and Apply real time problem using Machine Learning	3	85	80	*L*	*H*	*H*	*H*	*H*	-	-	*M*	*M*	*L*	-	*H*	-	-	-
CLO-5 :	Understand the Decision tree and Random Forest and Naïve Bayes Algorithm	3	85	80	*L*	*H*	*H*	*H*	*H*	-	-	*M*	*M*	*L*	-	*H*	-	-	-
CLO-6 :	Gain knowledge about Knowledge representations and Predicate logic	3	85	80	*L*	*H*	*H*	*H*	*H*	-	-	*M*	*M*	*L*	-	*H*	-	-	-

Duration (hour)		12	12	12	12	12
S-1	SLO-1	Infrastructure for data and process, Machine learning and Data pipeline	Cloud and Machine Learning, Machine Learning Workflow Comparison	Azure machine Learning tools And capabilities, Comparing Azure ML Studio and AZURE ML Service	GCP machine learning tools and capabilities, Google Cloud Platform ML capabilities	Role of refactoring, Technical debts, Refactoring techniques, PyCharm for refactoring

S-2	SLO-1	Machine learning models	AWS Machine	Creating & Configuring Azure ML Service workspace	Training and job execution with Google Cloud and Console, BigQuery	Code analysis and refactoring Design principles, Refactoring Principles and Challenges
S-3	SLO-1	Machine learning visualization	Learning Tools and Capabilities	Creating & Configuring Azure ML Service workspace	Training and job execution with Google Cloud and Console, BigQuery	Code analysis and refactoring Design principles, Refactoring Principles and Challenges
S-4	SLO-1	Machine learning frameworks and tools, Metadata and Governance	Cloud Machine Learning Implementation and Comparison	Building ML pipelines with AZURE ML Service, Working With Azure ML Studio	ML features, Implementing models with BigQuery ML	Principles of good code, Refactoring python code
S-5	SLO-1	Risk mitigation, Data compliance issues, Data regulations	Generating Machine Learning based Object detection	Using Azure ML Service Visual Interface, Working With Azure Open Datasets	ML workflow challenges and Serverless approach	Code optimization, Using rope to refactor, Anti-patterns in code
S-6	SLO-1	The importance of global standards	Amazon Machine Learning Console	AZURE MLOps, AZURE ML Notebooks	ML implementation with cloud Datalab , Google AI platform	Machine Learning types
S-7	SLO-1	Risk and Company standards	Amazon SageMaker Architecture	AZURE MLOps, AZURE ML Notebooks	ML implementation with cloud Datalab , Google AI platform	Machine Learning algorithm design
S-8	SLO-1	Myths and Facts of data compliance	Using Amazon SageMaker, Lex , Polly And Transcribe	Pipelines with AZURE data Lake And Azure ML	Features and Components	Impact of refactoring on Machine Learning, Algorithm design
S-9	SLO-1	Compliance training for users	Using Amazon SageMaker, Lex , Polly And Transcribe	Pipelines with AZURE data Lake And Azure ML	Google Cloud AutoML features	Machine Learning algorithm comparison
S-10	SLO-1	Compliance training for management	Amazon SageMaker Neo	CI /CD For Machine Learning with AZURE Pipeline	Managing dataset	Refactor machine, Learning code,
S-11	SLO-1	The benefits of a data compliance program	Augmented Manifest in SageMaker	CI /CD For Machine Learning with AZURE Pipeline	Using AutoML tables	Managing technical debt in machine learning
S-12	SLO-1	Elements of a good compliance strategy, Building a compliance strategy, Reporting and Response procedures	Amazon SageMaker Model Tuning , Amazon SageMaker	Using Microsoft Devlabs Extension	Training models and predicting with AutoML tables, Google cloud AutoML natural language	SonarQube and code coverage, Automatic clone refactoring

Learning Resources	1. *Mastering Azure Machine Learning, By Christoph Korner and Kaijisse Waaijer, April 2020.*	*1. Learning Path: AWS Certified Machine Learning-Specialty ML, By Noah Gift, April 2019.*

	2. *Hands-On Machine Learning on Google Cloud Platform,By Giuseppe Ciaburro, V Kishore Ayyadevara and Alexis Perrier, April 2018.*	

Learning Assessment											
Level	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (10%)		CLA – 3 (20%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	40%	-	40%	-	40%	-	40%	-	40%	-
	Understand										
Level 2	Apply	40%	-	40%	-	40%	-	40%	-	40%	-
	Analyze										
Level 3	Evaluate	20%	-	20%	-	20%	-	20%	-	20%	-
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Mr.G.Muruganandam, Group Project Manager, HCL Technologies, Chennai	Dr.Muthu, Professor, Loyola College, Chennai	*Dr.S.Albert Antony Raj*
Mr.M. Hemachandar, Tech Lead, Wipro Limited, Chennai	Dr.Vincent, Associate Professor, VIT	