

	Create									
	Total	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %

CLA – 4 can be from any combination of these: Assignments, Seminars, Short 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. S. Karthik, IT Analyst, Tata Consultancy Services	Dr. Neelanarayanan,, Professor, School of Computer Science and Engineering, VIT Chennai	1.Mrs. E.Aarthi 2.Dr.P.Muthulakshmi

Course Code	UCS20D07J	Course Name	MACHINE LEARNING	Course Category	E	Discipline Specific Elective	L	T	P	C
							4	0	4	6

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

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning			Program Learning Outcomes (PLO)														
CLR-1 :	To provide basic concepts of machine learning	1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	To provide deeper understanding of various tools and techniques for Machine learning Algorithms and outputs	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO – 3
CLR-3 :	Understand and Implement the major classification techniques																		
CLR-4 :	Understand and Implement the various Clustering Methods																		
CLR-5 :	Learn and Understand the Tree based machine Learning Algorithms																		

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO – 3
CLO-1 :	Understand the concepts of machine learning	2	80	85	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CLO-2 :	Learn and understand machine tools and libraries of machine learning	2	75	80	H	H	H	-	H	-	-	-	-	-	-	-	-	-	-
CLO-3 :	Learn and understand the linear learning models and classification in machine learning	2	85	80	H	H	-	-	H	-	-	-	-	-	-	-	-	-	-
CLO-4 :	Understand the clustering techniques and their utilization in machine learning	2	80	75	H	H	-	-	H	-	-	-	-	-	-	-	-	-	-
CLO-5 :	Study the tree based machine learning techniques and to appreciate their capability	2	75	85	H	H	-	H	H	-	-	-	-	-	-	-	-	-	-

Duration (hour)		24	24	24	24	24
S-1	SLO-1 SLO-2	Machine Learning: What and Why?	Principal Component Analysis(PCA)	Linear Regression with multiple variables	Multi class classification	Decision tree representation
S-2	SLO-1 SLO-2	Types of Machine Learning Supervised Learning	Regularization	Logistic Regression	Unsupervised Vs. Supervised Machine learning	Basic decision tree learning algorithm
S-3	SLO-1 SLO-2	Unsupervised Learning Reinforcement learning	Kernel smoothing methods	spam filtering with logistic regression		Decision tree construction
S-4	SLO-1 SLO-2	Platform for machine learning The Curse of dimensionality	Machine learning python libraries training data – testing data – validation data	Evaluation Matrix	Case study on Multi class classification problem	Classification and regression trees (CART)
S-6 to S-8	SLO-1 SLO-2	Laboratory 1 : Practice elementary mathematical operations and control statements	Laboratory 4 : Creating Various types of plots /charts from various data source	Laboratory 7 : Implementation of Linear regression with multiple regression	Laboratory 10: Implementation of classifier problem	Laboratory 13 : Implementation of decision tree
S-9	SLO-1 SLO-2	Over fitting and under fitting	Ensemble learning:-Bagging, Boosting Maximum likelihood estimation (least squares)	Data Preprocessing methods – tokenization, Regular expressions	Introduction to clustering	Example for CART
S-10	SLO-1 SLO-2	Bias and Variance tradeoff Plotting of Data, Vectorization	Kernel density estimation cross validation Features	Data Preprocessing methods - stemming Lemmatization	K nearest neighbor	Issues in decision tree
S-11	SLO-1 SLO-2	Matrices and Vectors Linear Algebra for machine learning	k-fold cross validation Statistical methods for machine learning	Feature scaling , Feature Selection,	K nearest neighbor classification	Random Forest Random Forest with scikit-learn
S-12	SLO-1 SLO-2	Linear Algebra for machine learning	Probability for machine learning	Correlation matrix Introduction to classifiers	Case Study on K nearest neighbor Classification	Multivariate adaptive regression trees (MART)
S-13 to S-16	SLO-1 SLO-2	Laboratory 2 : Operations on Matrices and Vectors	Laboratory 5 : Create subplots and color plots	Laboratory 8 : Implementation of Data preprocessing methods , Correlation matrix	Laboratory 11 : Implementation of K-Mean Clustering	Example 14 : Implementation of Random Forest
S-17	SLO-1	Gradient Descent - Batch	Performance metrics	Naïve Baiyes Method	Introduction to Clustering Bi-clustering	Introduction to Artificial Neural Networks
S-18	SLO-2	Resampling methods	MSE, accuracy	Baiysean Classifier	Multi-view clustering	Perceptron learning
S-19	SLO-1	Boot Strapping	confusion matrix	Support Vector Machine	K-Means clustering	Gradient Descent Vs Perceptron

	SLO-2	Linear Discriminant Analysis	Precision, Recall	Classifier using support vector machine		Learning
S-20	SLO-1 SLO-2	Parametric vs. non-parametric models	Linear regression with one variable	Spam and Not spam classification	Case study for K-Mean Clustering	Backpropagation Algorithm
S-21 to S-24	SLO-1 SLO-2	Laboratory 3 : Vectorized operation on simple matrix operations	Laboratory 6 : Implement Linear regression problem	Laboratory 9 : Implementation of spam and non-spam classification problem.	Laboratory 12 : Implementation of K-Mean Clustering	Laboratory 15 : Implementation of CART

Learning Resources	.Kevin P. Murphy, "Machine Learning: A Probabilistic Perspective", MIT Press, 2012. .Ethem Alpaydin, "Introduction to Machine Learning", Prentice Hall of India, 2005 .Tom Mitchell, "Machine Learning", McGraw-Hill, 1997.	4. Sebastian Raschka, Vahid Mirjalili, "Python Machine Learning and deep learning", 2 nd edition, kindle book, 2018 5. Carol Quadros, "Machine Learning with python, scikit-learn and Tensorflow", Packet Publishing, 2018. 6. Gavin Hackling, "Machine Learning with scikit-learn", Packet publishing, O'Reilly, 2018.
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Learning Assessment											
Bloom's Level of Thinking		Continous 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	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
	Total	100 %		100 %		100 %		100 %		100%	

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		2.Dr.P.Muthulakshmi

Course Code	UCS20D08J	Course Name	CLOUD COMPUTING	Course Category	E	Discipline Specific Elective	L	T	P	C
							4	0	4	6

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

Course Learning Rationale (CLR):		The purpose of learning this course is to:			Learning			Program Learning Outcomes (PLO)														
CLR-1 :		understand the evolution of parallel and distributed computing			1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :		understand the architecture of cloud			Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Fundamental Knowledge	Application of Concepts	Link with Related Disciplines	Procedural Knowledge	Skills in Specialization	Ability to Utilize Knowledge	Skills in Modeling	Analyze, Interpret Data	Investigative Skills	Problem Solving Skills	Communication Skills	Analytical Skills	ICT Skills	Professional Behavior	Life Long Learning
CLR-3 :		understand the need for virtualization																				
CLR-4 :		the concepts behind scheduling and load balancing that is happening across heterogeneous resources in the environment																				
CLR-5 :		justify the need for improved hardware and software infrastructures (servers, protocols, security algorithms)																				
CLR-6 :		know the commercial functioning of cloud computing																				
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:			3																	
CLO-1 :		defend the need for cloud computing to run an online business																				