
		<b>Tulsiramji Gaikwad – Patil College of Engineering and Technology</b> Wardha Road, Nagpur-441108 <b>NAAC Accredited (A+ Grade)</b> <b>An Autonomous Institute affiliated to RTMNU Nagpur</b>			
<b>Semester</b>		<b>Course Code</b>		<b>Name of Course</b>	
III		BDS3232		Introduction to Machine Learning	
<b>Teaching Scheme</b>				<b>Examination Scheme</b>	
<b>Lectures</b>	3Hrs/week			<b>CT-1</b>	15
<b>Tutorial</b>	0			<b>CT-2</b>	15
<b>Total Credit</b>	3			<b>TA</b>	10
				<b>ESE</b>	60
				<b>Total</b>	100
				Duration of ESE:03 Hrs 00 Min.	
<b>Course Objective:</b>					
1	To understand the need for machine learning for various problem solving.				
2	To study the various supervised, semi – supervised and unsupervised learning algorithms in machine learning.				
3	To understand the latest trend in machine learning.				
4	To learn and implement clustering techniques in unsupervised learning.				
5	To understand and apply association rule mining and recommendation systems.				
<b>Course Contents</b>					
<b>Unit I</b>	<b>Introduction:</b> Machine Learning (ML), role of Machine Learning, types of Machine Learning, applications of Machine Learning <b>Data for ML:</b> Data types, sources and collection method, data preprocessing techniques, cleaning and handling missing data, feature selection and engineering				
<b>Unit II</b>	<b>Supervised Learning:</b> Introduction to Supervised Learning, Linear Regression, Logistic Regression, basic model classifier, Naïve Bayes Classifier, Likelihood, SVM, Hyperplane, Margin, Hyperparameter Optimization, Hyperparameter search and model building				
<b>Unit III</b>	<b>Unsupervised Learning:</b> Introduction to unsupervised learning, applications of unsupervised learning, clustering, K-means Clustering, Euclidean Distance, centroid, Fuzzy C-means Clustering, Hierarchical Clustering, Dendrogram				
<b>Unit IV</b>	<b>Evaluation and interpretation:</b> Confusion Matrix, Evaluation Matrices – Accuracy, Precision, Recall, F1-Score, Specificity, Cross validation <b>Dimensionality reduction:</b> Principle Component Analysis (PCA), Linear Discriminant Analysis (LDA)				
<b>Unit V</b>	<b>Association Rules:</b> Association Rules Parameters, Association Rule Mining, Apriori Algorithm, Market Basket Analysis, Recommendation Engine, types of Recommendation Engine, User Based Collaborative Filtering, Content Based Filtering				
<b>Text Books</b>					
T.1	Tom M Mitchell, Machine Learning, McGraw – Hill Education (India) Private Limited, 2013.				
T.2	Machine Learning: An Algorithmic Perspective, CRC Press, 2009, by Stephen Marsland				
T.3	Chris Bishop, Pattern Recognition and Machine Learning				
T.4	Dr. Nilesh Shelke, Dr. Gopal Sakarkar, Dr N V Choudhari, Introduction to Machine Learning, Ganu Prakashan				

<b>Reference Books</b>				
R.1	Ethem Adpaydin, Introduction to Machine Learning ( Adaptive Computation and Machine Learning), The MIT Press 2004			
R.2	Fundamentals of Machine Learning for Predictive Data Analytics: Algorithms, Worked Examples, and Case Studies by John D. Kelleher, Brian Mac Namee, and Aoife D'Arcy			
R.3	Machine Learning for Beginners, by Chris Sebastian, Kindle Edition			
<b>Useful Links</b>				
1	<a href="https://nptel.ac.in/courses/106106139">https://nptel.ac.in/courses/106106139</a>			
2	<a href="https://onlinecourses.nptel.ac.in/noc23_cs18/preview">https://onlinecourses.nptel.ac.in/noc23_cs18/preview</a>			
<b>Course Outcomes</b>			<b>CL</b>	<b>ClassS ession</b>
After the completion of this course, students will be able to-				
<b>BDS3603.1</b>	Differentiate between supervised, unsupervised, semi supervised machine learning approaches		2	9
<b>BDS3603.2</b>	Discuss the decision tree algorithm and identity and overcome the problems.		5	9
<b>BDS3603.3</b>	Discuss and apply the back propagation algorithm and genetic algorithms to various problems.		6	9
<b>BDS3603.4</b>	Apply the Bayesian concepts to machine learning		3	9
<b>BDS3603.5</b>	Analyzes and suggest appropriate machine learning approaches for various types of problems.		4	9