

## Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2024-25

### Course Information

<b>Programme</b>	B.Tech. (Information Technology)
<b>Class, Semester</b>	Final Year B. Tech., Sem VII
<b>Course Code</b>	6IT403
<b>Course Name</b>	Machine Learning
<b>Desired Requisites:</b>	Linear Algebra, Probability, Calculus

Teaching Scheme		Examination Scheme (Marks)			
<b>Lecture</b>	3 Hrs/week	<b>ISE</b>	<b>MSE</b>	<b>ESE</b>	<b>Total</b>
<b>Tutorial</b>	-	20	30	50	100
<b>Credits: 3</b>					

### Course Objectives

<b>1</b>	To elaborate basic concepts of machine learning and understand its applicability
<b>2</b>	To use different methods of regression and classification
<b>3</b>	To interpret the different supervised classification methods

### Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

<b>CO</b>	<b>Course Outcome Statement/s</b>	<b>Bloom's Taxonomy Level</b>	<b>Bloom's Taxonomy Description</b>
<b>CO1</b>	Recognize the characteristics of machine learning algorithms for real-world problems.	II	Understanding
<b>CO2</b>	Apply the different supervised learning methods for real-world problems	III	Applying
<b>CO3</b>	Use different unsupervised algorithms of machine learning	IV	Analyzing
<b>CO4</b>	Explain Bayesian classification in machine learning	IV	Analyzing

<b>Module</b>	<b>Module Contents</b>	<b>Hours</b>
I	<b>Introduction to ML:</b> History of ML, Examples of Machine Learning Applications, Learning Types, ML Life cycle, AI & ML, dataset for ML, Data Pre-processing, Training versus Testing, Positive and Negative Class, Cross-validation.	6
II	<b>Basic Machine Learning</b> Major Types of Learning Supervised parametric learning: Regression and Classification. Statistical Relationship between Two variables and scatter plots,	7

III	<b>Decision Tree:</b> Introduction to Classification and Decision Tree(DT), Problem solving using Decision Tree, Basic DT Learning algorithm, classification and DT, Issues in DT, Rule based classification	6
IV	<b>Artificial Neural Networks:</b> Introduction, Early Models, Perceptron Learning, Backpropagation, Initialization, Training & Validation, Overfit and Underfit models and remedies to tackle the issue.	7
V	<b>Unsupervised Learning</b> Clustering, Types of clustering, K-means algorithm, Principal Component Analysis (PCA), PCA for image compression.	6
VI	<b>Bayesian Classification:</b> Introduction to Bayesian classification, Naive Bayes classifiers, Bayesian Belief Network, KNN , Measuring classifier Accuracy	7
<b>Textbooks</b>		
1	Tom M. Mitchell, “Machine Learning”, India Edition 2013, McGraw Hill Education.	
<b>References</b>		
1	Trevor Hastie, Robert Tibshirani, Jerome Friedman, h The Elements of Statistical Learning, 2nd edition, springer series in statistics.	
2	J. Gabriel, Artificial Intelligence: Artificial Intelligence for Humans (Artificial Intelligence, Machine Learning), Create Space Independent Publishing Platform, First edition , 2016	
<b>Useful Links</b>		
1	<a href="https://onlinecourses.nptel.ac.in/noc23_cs18/unit?unit=22&amp;lesson=23">https://onlinecourses.nptel.ac.in/noc23_cs18/unit?unit=22&amp;lesson=23</a>	
2	<a href="https://onlinecourses.nptel.ac.in/noc23_cs87/preview">https://onlinecourses.nptel.ac.in/noc23_cs87/preview</a>	

<b>CO-PO Mapping</b>														
	<b>Programme Outcomes (PO)</b>												<b>PSO</b>	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
<b>CO1</b>	2				1								1	
<b>CO2</b>		3											2	
<b>CO3</b>	2	1			2									2
<b>CO4</b>	3												3	
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.														

<b>Assessment</b>
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The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)