



**CVM**  
**UNIVERSITY**

Aegis: Charutar Vidya Mandal (Estd.1945)

## FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

**Programme:** Bachelor of Technology (Mechanical Engineering)

**Semester:** VI

**Course Code:** 202040621

**Course Title:** Introduction to Machine Learning

**Course Group :** Open Elective Course - II

**Course Objectives:** To learn principles, algorithms, and applications of machine learning from the point of view of modeling and prediction and to impart the knowledge of performing classification and reinforcement.

### Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
2	0	2	3	50 / 18	50 / 17	25/09	25/09	150/52

\* J: Jury; V: Viva; P: Practical

### Detailed Syllabus:

Sr.	Contents	Hours
1	<b>Introduction to Machine learning:</b> Introduction to Machine learning, Types of Machine Learning, AI vs. ML vs. DL, Applications of Machine Learning,	2
2	<b>Classification:</b> Overview of classification, K-Nearest neighbor, Bayesian classification, Decision tree based classification Neural Networks: Overview, Architectures, Perceptron and backpropagation, Introduction to Support Vector machine, Applications of classification	12
3	<b>Regression Analysis:</b> Introduction to regression, Correlation, Linear regression, Multiple linear regression, Applications of regression	6
4	<b>Clustering:</b> Introduction to clustering, Types of clustering methods, K-means, Issues with clustering, Applications of clustering), Model Representation and Interpretability, Evaluating Performance of a Model	6



5	Evaluation Measures, Ensemble methods, Introduction to Reinforcement learning: Overview and Applications	6
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### List of Practicals / Tutorials:

1	To study any one of the Machine learning applications.
2	Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Plot confusion matrix.
3	Perform the Bayesian classification for a suitable dataset.
4	Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets.
5	Write a program to classify given data using decision tree.
6	Classify iris dataset using SVM. Try different kernel functions and parameters.
7	Write a program to classify given data using Random Forest.
8	Write a program to implement Linear Regression. Test for given data set.
9	Write a program to implement multiple Linear Regression. Test for given data set.
10	Write a Program to implement K-Means clustering Algorithm
11	Case study/Project: Implementation of any real time application using suitable machine learning technique.

### Reference Books:

1	Saikat Dull, S. Chjandramouli, Das, "Machine Learning", Pearson
2	Vinod Chandra S.S. and Anand Harindran S., "Artificial Intelligence and Machine learning", PHI
3	Mark Fenner, "Machine Learning with Python for Everyone", Pearson
4	Anuradha Srinivasaraghavan, Vincy Joseph, "Machine Learning", Wiley
5	U Dinesh Kumar and Manaranjan Pradhan, "Machine Learning with Python", Wiley
6	Saikat Dull, S. Chjandramouli, Das, "Machine Learning", Pearson

### Supplementary learning Material:

1	NPTEL - Swayam Courses: <a href="https://onlinecourses.nptel.ac.in/noc20_cs29/preview">https://onlinecourses.nptel.ac.in/noc20_cs29/preview</a> <a href="https://nptel.ac.in/courses/106105152">https://nptel.ac.in/courses/106105152</a>
2	Coursera courses: Machine Learning by Andrew Ng (Stanford), Machine Learning with Python (IBM)



3 <https://analyticsvidhya.com> , <https://machinelearningmastery.com>

### Pedagogy:

- Direct classroom teaching
- Assignments/Quiz
- Continuous assessment
- Seminar/Poster Presentation
- Course Projects

### Internal Evaluation:

The internal evaluation comprised of written exam (40% weightage) along with combination of various components such as Certification courses, Assignments, Mini Project, Seminar, Unit test, Quiz, Class Participation etc. where individual component weightage should not exceed 20%.

### Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
15%	25%	20%	20%	15%	5%	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

### Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Understand and use heuristic search techniques for problem solving	25
CO-2	Learn and use various knowledge representation methods	20
CO-3	Implement machine learning techniques to solve problems in applicable Domains	15
CO-4	Evaluate and compare algorithms based on different metrics and parameters.	10
CO-5	Understand Regression, classification, and clustering methods for prediction	30

### Curriculum Revision:

Version:	2
Drafted on (Month-Year):	June-2022
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	June-2025