



Kot Bhalwal, Jammu



Model Institute of Engineering
& Technology (Autonomous)
Course Handout

COURSE HANDOUT

INTRODUCTION TO AI WITH MACHINE LEARNING (ECE-702A)

BE-7th SEMESTER

ACADEMIC YEAR (2024-25)

Ms. Gurpreet Kaur

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Department of Electronics and Communication Engineering



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Dr. Arun K. Gupta Teaching-Learning Centre

Version 1.1



Please Do Not Print Unless Necessary



Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
ECE-702A	Introduction to AI with Machine Learning	PEC	3	2	1	0	50	100	150

COURSE OUTCOMES

At the end of the course the student will be able to:	
CO1	Explain basic concepts of artificial Intelligence and machine learning techniques.
CO2	Demonstrate proficiency in applying supervised learning models for specific use cases.
CO3	Implement unsupervised learning methods using various datasets.
CO4	Apply different machine learning models on application specific datasets.
CO5	Develop splitting criteria for Decision Trees and be able to define its parameters

Unit-I

Introduction to Artificial Intelligence and Machine Learning: history of AI, Basics of AI, Artificial Neural Network Terminology, Model of a Neuron, Perceptron Model, Feature set, Dataset division, Introduction to Machine Learning Techniques and its applications, bias-variance trade-off, overfitting-under fitting. Recent advancement in AI.

(10 Hours)

Unit-II

Supervised learning: Classification and Regression- K-Nearest neighbors, Linear Regression, Logistic Regression, gradient descent algorithm, Support Vector Machine (SVM), Evaluation Measures: SSE, MME, R2, confusion matrix, precision, recall, F-Score, ROC-Curve.

(12Hours)

Unit-III

Unsupervised learning: Introduction to clustering, Hierarchical clustering, K-means clustering, Density-based clustering, Association rules, and applications of Association Rule learning.

(6 Hours)

Unit-IV

Reinforcement learning and ensemble methods: Reinforcement learning through feedback network, function approximation, bagging, boosting, stacking and learning with ensembles, Random Forest.

(8 Hours)

Unit-V

Decision trees: Representing concepts as decision trees, Recursive induction of decision trees, best splitting attribute: entropy and information gain, Overfitting, noisy data, and pruning.

(8 Hours)

Textbooks

S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Machine Learning	Tom. M. Mitchell	McGraw-Hill	1st (2014)
2.	Introduction to Machine Learning	Ethem Alpaydin	Eastern Economy Edition, Prentice Hall of India	4 th (2016)

Reference Books





S.No	Name of the Books	Name of the Author	Publisher Name	Edition (Pub.Yr.)
1	Pattern Classification	Richard O. Duda, Peter E. Hart, David G. Stork	Wiley India	2nd (2012)
2	Artificial Intelligence- A modern Approach	Stuart Russell & Peter Norvig	Prentice Hall	3rd (2016)

COURSE PLAN

Unit-I Introduction to AI and Machine Learning

S.No	Topics	Recommended Books
1	Introduction to Artificial Intelligence	Book 1, Ch.1
2	History of AI	Book 1, Ch.1
3	Introduction to Machine Learning	Book 2, Ch.1
4	Machine Learning Methods	Book 2, Ch.2
5	Bias and Variance	Book 1, Ch.3
6	Introduction to ANN	Book 2, Ch.2
7	Recent Trends in AI	Book 2, Ch.2

Unit-II Supervised Learning

8	Classification and Regression	Book 2, Ch.2
9	K Nearest Mean	Book 2, Ch.2
10	Linear and Logistic Regression	Book 2, Ch.3
11	Gradient Descent Algorithm	Book 2, Ch.2
12	Support Vector Machine	Book 2, Ch.3
13	Evaluation Measures	Book 2, Ch.5

Unit-III Unsupervised Learning

14	Introduction to Clustering	Book 2, Ch.4
15	K-mean Clustering	Book 2, Ch.4
16	Hierarchical Clustering	Book 2, Ch.4
17	Density based clustering	Book 2, Ch.4
18	Association Rules, Applications of Association Rule learning	Book 2, Ch.6

Unit-IV Reinforcement learning and ensembled methods

19	Reinforcement learning through feedback network	Book 1, Ch.7
20	Function approximation	Book 1, Ch.7
21	Bagging, boosting, stacking and learning with ensembles	Book 1, Ch.7
22	Random Forest	Book 1, Ch.7

Unit-V Decision Trees

23	Representing concepts as decision trees	Book 1, Ch.6
24	Recursive induction of decision trees	Book 1, Ch.6
25	Best splitting attribute: entropy and information gain	Book 2, Ch.5
26	Overfitting, noisy data, and pruning	Book 2, Ch.5

ADDITIONAL WEB RESOURCES

1.	MOOC: Supervised Machine Learning: Regression and Classification https://www.coursera.org/learn/machine-learning
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| 2. | NPTEL: Introduction to Machine Learning
https://onlinecourses.nptel.ac.in/noc23_cs18/preview |
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GRADING AND ASSESSMENT

- **Sessional Test:** 20 marks
- **Assignment:** 20 marks
- **Attendance:** 10 marks
- **Final Examination:** 100 marks

COURSE POLICIES

- **Attendance:** Minimum 75% attendance is mandatory to appear in the final examination of the course.
- **Academic Integrity:** MIET's academic integrity policies apply. Plagiarism will not be tolerated.
- **Late Submissions:** Assignments and projects must be submitted by the specified timelines.

FACULTY INFORMATION

- **Office Hours**
Tuesday (12:05 PM - 12:55 PM)
Friday (12:05 PM - 12:55 PM)
- **Contact Information**
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