

Department of Electronics and Communication Engineering

Course Code	Course Name	L	T	P	C
Value Added Course	MACHINE LEARNING USING PYTHON	20	0	25	2

a. Preamble

The rise of Machine Learning (ML) is revolutionizing industries by enabling systems to learn from data, uncover patterns, and make intelligent decisions. This course, *Machine Learning using Python*, is designed to equip students with the fundamental concepts, techniques, and practical skills required to develop data-driven solutions. With a strong focus on Python-based implementation, learners will gain hands-on experience in supervised, unsupervised, and reinforcement learning methods, along with essential libraries such as NumPy, Pandas, Scikit-learn, and TensorFlow. The course emphasizes practical learning through real-world datasets, projects, and case studies, preparing students to build scalable ML models that address challenges across diverse domains. By bridging theory with practice, students will be empowered to contribute to the evolving landscape of Artificial Intelligence.

b. Course Outcome

Upon successful completion of the course, the students will be able to

Cos	Course Outcome	Knowledge Level
CO1	Understand the fundamental concepts of Machine Learning and its role in Artificial Intelligence.	K2
CO2	Apply Python libraries and frameworks (NumPy, Pandas, Scikit-learn, TensorFlow) for data preprocessing, model building, and evaluation.	K3
CO3	Analyze real-world datasets to identify appropriate ML algorithms and techniques	K3
CO4	Develop supervised, unsupervised, and reinforcement learning models using Python.	K3
CO5	Build and deploy Design and implement end-to-end ML solutions through projects and case studies relevant to industry-based applications.	K3

Introduction to Machine Learning**5 Hours**

Introduction to Machine Learning. Scope of Machine Learning - Real-time applications of Machine Learning in various domains, Machine Learning process and workflow- Categories of Machine Learning: Supervised, Unsupervised, Reinforcement (overview) - Case studies: Supervised learning with examples, unsupervised learning with examples

Python for Machine Learning**5 Hours**

Basics of Python programming for ML-Working with data structures, functions, and file handling-Introduction to data analysis libraries: Pandas and NumPy-Data visualization using Matplotlib - Introduction to Scikit-learn (Sklarn) for ML applications

Supervised Learning Algorithms**5 Hours**

Decision Tree Classifier: concept, construction, and implementation- Support Vector Machine (SVM) Classifier: linear vs. non-linear, kernel tricks- Random Forest Classifier: ensemble method, bagging, and feature importance - Logistic Regression Classifier: basics, interpretation, and practical use cases - Hands-on with Python: Implementing supervised learning algorithms.

Unsupervised Learning Algorithms**5 Hours**

Introduction to working with unlabeled data - Usage of unstructured data for clustering- K-Means Clustering: concept, applications, and Python implementation- optimal cluster selection - Hierarchical Clustering (overview) - Case studies and projects with real datasets.

Applications and projects in ML**25 Hours**

End-to-end Machine Learning project workflow- Model selection, evaluation, and optimization techniques- Cross-validation and hyper parameter tuning- ML applications in finance, healthcare, IoT, and recommendation systems- Ethical issues and challenges in Machine Learning- Mini-project: Designing and implementing a complete ML model using Python.

SDG Mapping

CO's	SDG Mapping		
CO1	SDG – 04 Quality Education	SDG – 09 Industrial Innovation and Infrastructure	-
CO2	SDG – 04 Quality Education	SDG – 09 Industrial Innovation and Infrastructure	SDG -15 Life and Land
CO3	SDG – 04 Quality Education	SDG - 09 Industrial Innovation and Infrastructure	SDG – 03 Good Health and Well Being
CO4	SDG – 04 Quality Education	SDG – 09 Industrial Innovation and Infrastructure	SDG – 06 Clean Water and Sanitation
CO5	SDG – 04 Quality Education	SDG-09 Industrial Innovation and Infrastructure	SDG – 11 Sustainable Cities and Communities

Course outcome mapping

Course Code	CO. No.	POs											PSOs	
		1	2	3	4	5	6	7	8	9	10	11	1	2
	CO1	H	H	H	-	H	-	-	-	L	-	L	H	H
	CO2	H	H	H	-	H	-	-	-	L	-	L	H	H
	CO3	H	H	H	-	H	-	-	-	L	-	L	H	H
	CO4	H	H	H	-	H	-	-	-	L	-	L	H	H
	CO5	H	H	H	-	H	-	-	-	L	-	L	H	H

H (for high), M (for moderate), L (for low) for mapping

C. D. J. w. J.

Course Incharge

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