ARTIFICIALINTELLIGENCE&MACHINE LEARNING

Course Code	**23ME3602**	**Year**	III	**Semester**	II
Course Category	Professional Core	**Branch**	ME	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	nil
Continuous Internal Evaluation:	30	**Semester End Evaluation:**	70	**Total Marks:**	100

Course outcomes: At the end of the course, the student will be able to:

CO	**Statement**	**BTL**	**Units**
CO1	Explain the basic concepts of artificial intelligence	L2	1
CO2	Learn about the principles of supervised learning methods	L2	2
CO3	Gain knowledge in unsupervised learning method and Bayesian algorithms	L3	3
CO4	Get knowledge about neural networks and genetic algorithms	L3	4
CO5	Understand the machine learning analytics and apply deep learning techniques	L3	5

Contribution of Course outcomes towards achievement of programme outcomes &Strength of correlations(High:3, Medium: 2, Low:1)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO 1	3	2	1		2						1	3	2
CO 2	3	2	1		2						1	3	2
CO 3	3	2	1		2						1	3	2
CO 4	3	2	1		2						1	3	2
CO 5	3	2	1		2						1	3	2

Syllabus		
Unit	**Contents**	**Mapped CO**
I	**Introduction:** Definition of Artificial Intelligence, Evolution, Need, and applications in real world. Intelligent Agents, Agents and Environments; Good Behaviour - concept of rationality, the nature of environments, structure of agents. **Knowledge–Representation and Reasoning:** Logical Agents: Knowledge-based agents, the Wumpus world, logic. Patterns in Propositional Logic, Inference in First-Order Logic-Propositional vs first order inference,	**CO1**

	unification.	
II	**Introduction to Machine Learning (ML):** Definition, Evolution, Need, applications of ML in industry and real-world, regression and classification problems, performance metrics, differences between supervised and unsupervised learning paradigms, bias, variance, overfitting and under fitting. **Supervised Learning:** Linear regression, logistic regression, Distance-based methods, Nearest-Neighbours, Decision Trees, Support Vector Machines, Nonlinearity and Kernel Methods.	**CO2**
III	**Unsupervised Learning:** Clustering**,** K-means, Dimensionality Reduction, PCA and Kernel. **Bayesian and Computational Learning:** Bayes theorem, concept learning, maximum likelihood of normal, binomial, exponential, and Poisson distributions, minimum description length principle, Naïve Bayes Classifier, Instance-based Learning- K-Nearest neighbour learning.	**CO3**
IV	**Neural Networks and Genetic Algorithms:** Neural network representation, problems, perception, multilayer networks and backpropagation, steepest descent method, Convolutional neural networks and their applications Recurrent Neural Networks and applications, Local vs Global optima, Genetic algorithms- binary coded GA, operators, convergence criteria.	**CO4**
V	**Deep Learning:** Deep generative models, Deep Boltzmann Machines, Deep auto-encoders, Applications of Deep Networks. **Machine Learning Algorithm Analytics:** Evaluating Machine Learning algorithms, Model, Selection, Ensemble Methods - Boosting, Bagging, and Random Forests.	**CO5**

Learning Resources
Textbook(s): 1) Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 2/e, Pearson Education, 2010. 2) Tom M. Mitchell, Machine Learning, McGraw Hill, 2013. 3) Ethem Alpaydin, Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press, 2004.
References: 1) Elaine Rich, Kevin Knight and Shivashankar B. Nair, Artificial Intelligence, 3/e, McGraw Hill Education, 2008. 2) Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, PHI Learning, 2012.
Online Learning Resources: • **https://www.tpointtech.com/artificial-intelligence-ai** • **https://www.geeksforgeeks.org/**

Course coordinator HOD