



DEPARTMENT OF MECHANICAL ENGINEERING
LESSON PLAN

| Course Code | Course Title | Semester | Branch | Contact Periods /Week | Academic Year | Date of commencement of the semester |
|-------------|--|----------|--------|-----------------------|---------------|--------------------------------------|
| 23ME6T02 | ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING | VI | ME | 5 | 2025-26 | 10-12-2025 |

COURSE OUTCOMES: Students are able to

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| 1 | Summarize the basic concepts of artificial intelligence. [K2] |
| 2 | Learn about the principles of supervised learning methods [K2] |
| 3 | Illustrate unsupervised learning method and Bayesian algorithms. [K3] |
| 4 | Formulate neural networks and genetic algorithms. [K2] |
| 5 | Apply the machine learning analytics and apply deep learning techniques. [K3] |
| 6 | Describe Machine Learning Algorithm Analytics [K3] |

| UNIT | Out Comes / Bloom's Level | Topic s No. | Topics/Activity | Text Book / Reference | Contact Hour | Delivery Method |
|------|--|-------------|--|-----------------------|--------------|-------------------------------------|
| I | CO1: Summarize the basic concepts of artificial intelligence. [K2] | | UNIT I Introduction Artificial Intelligence | | | Chalk, Talk, Active Learning, NPTEL |
| | | 1.1 | Definition of Artificial Intelligence | T1,R1 | 1 | |
| | | 1.2 | Evolution, Need, and applications in the real world | T1,R1 | 1 | |
| | | 1.3 | Intelligent Agents, Agents and Environments | T1,R1 | 1 | |
| | | 1.4 | Good Behaviour - concept of rationality | T1,R1 | 1 | |
| | | 1.5 | the nature of environments, structure of agents. | T1,R1 | 1 | |
| | | 1.6 | Knowledge-Representation and Reasoning: Logical Agents | T1,R1 | 1 | |
| | | 1.7 | Knowledge-based agents, the Wumpus world, logic | T1,R1 | 2 | |
| | | 1.8 | Patterns in Propositional Logic | T1,R1 | 1 | |
| | | 1.9 | Inference in First-Order Logic- Propositional | T1,R1 | 2 | |
| | | 1.10 | vs first order inference, unification. | T1,R1 | 1 | |
| | | | | Total | 12 | |
| II | | | UNIT II Introduction to Machine Learning (ML) | | | |
| | | 2.1 | Definition, Evolution, Need | T2,T3 | 1 | |
| | | 2.2 | applications of ML in industry and real world | T2, T3 | 1 | |



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| CO 2: Learn about the principles of supervised learning methods [K2] | 2.3 | regression and classification problems | T2, T3 | 1 | Chalk, Talk, PPT, Active Learning |
| | 2.4 | performance metrics | T2, T3 | 1 | |
| | 2.5 | differences between supervised and unsupervised learning paradigms | T2, R2 | 1 | |
| | 2.6 | bias, variance, overfitting and underfitting. | T2, T4 | 1 | |
| | 2.7 | Supervised Learning: Linear regression | T2, T3 | 1 | |
| | 2.8 | logistic regression | T2, T3 | 1 | |
| | 2.9 | Distance-based methods, Nearest-Neighbours, | T2, R2 | 1 | |
| | 2.10 | Decision Trees | T2, T3 | 1 | |
| | 2.11 | Support Vector Machines, | T2, T3 | 1 | |
| | 2.12 | Nonlinearity and Kernel Methods. | | 1 | |
| | Total | | | | 12 |
| | UNIT III Unsupervised Learning | | | | |
| CO3: Illustrate unsupervised learning method and Bayesian algorithms. [K3] | 3.1 | Unsupervised Learning: Clustering, K-means, | T2, T3 | 1 | Chalk, Talk, PPT, Active Learning, |
| | 3.2 | Dimensionality Reduction | T2, T3 | 1 | |
| | 3.3 | PCA and Kernel. | T2, T3 | 1 | |
| | 3.4 | Bayesian and Computational Learning | T2, T4 | 1 | |
| | 3.5 | Bayes theorem | T2, T3 | 1 | |
| | 3.6 | concept learning | T2, T3 | 1 | |
| | 3.7 | maximum likelihood of normal | T2, R2 | 1 | |
| | 3.8 | binomial, exponential | T2, T3 | 1 | |
| | 3.9 | and Poisson distributions | T2, T3 | 1 | |
| | 3.10 | minimum description length principle | T2, T3 | 1 | |
| | 3.11 | Naïve Bayes Classifier | T2, T4 | 1 | |
| | 3.12 | Instance-based Learning- K-Nearest Neighbour learning. | T2, T3 | 1 | |
| | Total | | | | 12 |
| IV | CO4: Formulate neural networks and genetic algorithms. [K2] | UNIT IV Neural Networks and Genetic Algorithms | | | |
| | | 4.1 | Neural network representation | T2, T3 | 1 |
| | | 4.2 | problems, perceptron | T2, R2 | 1 |
| | | 4.3 | multilayer networks and backpropagation | T2, T4 | 2 |
| | | Total | | | |
| | | Total | | | |
| | | Total | | | |



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| | | 4.4 | steepest descent method | T2,T3 | 1 | | | | |
| | | 4.5 | Convolutional neural networks and their applications | T2, T3 | 1 | | | | |
| | | 4.6 | Recurrent Neural Networks and their applications | T2, T3 | 1 | | | | |
| | | 4.7 | Local vs Global optima | T2, T3 | 1 | | | | |
| | | 4.8 | Genetic algorithms | T2, T3 | 1 | | | | |
| | | 4.9 | binary coded | T2, T4 | 1 | | | | |
| | | 4.10 | GA, operators | T2, T3 | 1 | | | | |
| | | 4.11 | convergence criteria. | T2, T3 | 1 | | | | |
| Total | | | | | 12 | | | | |
| V | CO5: Apply the machine learning analytics and apply deep learning techniques. [K3] CO6: Describe Machine Learning Algorithm Analytics [K3] | UNIT V Deep Learning | | | | | | | |
| | | 5.1 | Deep generative models | T2, T3 | 1 | Chalk, Talk, PPT, Active Learning | | | |
| | | 5.2 | Deep Boltzmann Machines | T2, T3 | 1 | | | | |
| | | 5.3 | Deep auto-encoders | T2, T3 | 1 | | | | |
| | | 5.4 | Applications of Deep Networks. | T2, T4 | 1 | | | | |
| | | 5.5 | Machine Learning Algorithm Analytics | T2, T3 | 1 | | | | |
| | | 5.6 | Evaluating Machine Learning algorithms, | T2, R2 | 2 | | | | |
| | | 5.7 | Model, Selection | T2, T3 | 1 | | | | |
| | | 5.8 | Ensemble Methods | T2, T3 | 1 | | | | |
| | | 5.9 | Boosting, Bagging | T2, T4 | 1 | | | | |
| | | 5.10 | and Random Forests. | T2, T3 | 1 | | | | |
| Content beyond Syllabus | + | Convolutional Neural Network | | | website | 1 | | | |
| Total | | | | | 12 | | | | |
| CUMULATIVE PROPOSED PERIODS | | | | | | 60 | | | |
| Text Books: | | | | | | | | | |
| S.No. | AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION | | | | | | | | |
| 1 | Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 3rd ed, Pearson Education, 2010. | | | | | | | | |
| 2 | Ethem Alpaydin, Introduction to Machine Learning (Adaptive Computation and Machine Learning), 4th ed, The MIT Press, 2004. | | | | | | | | |
| 3 | Tom M. Mitchell, Machine Learning, 1st ed, McGraw-Hill, 2013. | | | | | | | | |



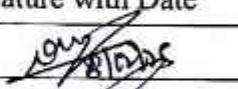
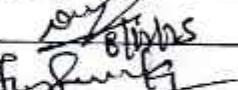
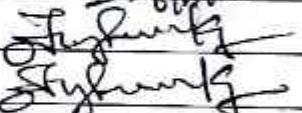
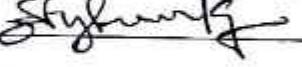
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| 4 | Andriy Burkov, "The Hundred-Page Machine Learning Book", 1 st Edition, Notion Press, 2019. |
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Reference Books:

| S.No. | AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION |
|-------|---|
| 1 | Elaine Rich and Kevin Knight, "Artificial Intelligence", 3 rd Edition, Tata McGraw Hill, 2017, |
| 2 | Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems, 1 st edition PHI Learning, 2015. |

Web Details

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|---|--|
| 1 | An Introduction to Artificial Intelligence - Course |
| 2 | Artificial Intelligence: Concepts and Techniques - Course |
| 3 | nptel.ac.in/courses/106106139 |
| 4 | nptel.ac.in/courses/106105152 |
| 5 | nptel.ac.in/courses/108103192 |

| | Name | Signature with Date |
|---------------------------|---------------------------|---|
| i. Faculty | Mr.N.BulliRaju |  |
| ii. Course Coordinator | Mr.N.Bulli Raju |  |
| iii. Module Coordinator | Dr. Francis Luther King M |  |
| iv. Programme Coordinator | Dr. Francis Luther King M |  |


 Dr.
 Principal