# 20CS41O2 - MACHINE LEARNING

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| Course Category: | Open Elective | Credits: | 3 |
| Course Type: | Theory | Lecture-Tutorial-Practical: | 3-0-0 |
| Prerequisite: | To get started with machine learning you must familiar with the mathematical concepts such as Statistics, Linear Algebra, Calculus, and Probability.  You should be good programmer.  Knowledge in data mining and warehousing. | Sessional Evaluation:  Univ. Exam Evaluation:  Total Marks: | 40  60  100 |
| Objectives: | * To discover patterns in the user data and then make predictions based on these and intricate patterns for answering business questions and solving business problems. * Machine learning in business and other fields is effectively a method of data analysis that works by automating the process of building data models. * Machine learning helps in analysing the data as well as identifying trends. * To be able to formulate machine learning problems corresponding to different applications. * To understand a range of machine learning algorithms along with their strengths and weaknesses. * To be able to apply machine learning algorithms to solve problems of moderate complexity. | | |

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| Course Outcomes | Upon successful completion of the course, the students will be able to: | |
| CO1 | Learn Basics of Machine Learning and which Real time applications are Using Machine Learning Techniques, |
| CO2 | Analyze the various Supervised Learning Algorithms- Classification Algorithms, how these algorithms are apply for real time Applications |
| CO3 | Analyze the various Supervised Learning Algorithms- Regression Algorithms, how these algorithms are apply for real time Applications |
| CO4 | Analyze the various Unsupervised Learning Algorithms, how these algorithms are apply for real time Applications. |
| CO5 | Learn the Concept of Reinforcement Learning and working models for applications. |
| CO6 | Understand the fundamental concepts of Genetic Algorithm and Analyze and design the genetic algorithms for optimization engineering problems. |
| Course Content | UNIT-I  **Introduction:** What is Machine Learning? Why you use Learning, Life cycle of machine learning, Main challenges of Machine Learning, Types of Machine Learning Algorithms, Applications of Machine Learning, Python Tools to Implement Machine Learning Algorithms.  UNIT-II  **Supervised Learning-I:** Classification Algorithms-Concept Learning, Decision Tree Learning, Naive Bayes Classifier, K-Nearest Neighbour, Real Time Applications of Classification Algorithms.  UNIT-III  **Supervised Learning-II:** Logistic Regression, Support Vector Machines.  **Regression Algorithms:** Linear Regression, Polynomial Regression, Real Time Applications of Regression Algorithms.  UNIT-IV  **Unsupervised Learning**: Clustering Algorithms- K-Means Clustering, Hierarchical Clustering, Dimensionality Reduction-Principle Component Analysis, Hidden Markov Model. Real Time Applications of Clustering Algorithms.  UNIT-V  **Reinforcement Learning:** What is Reinforcement Learning, How Reinforcement Learning works with Example, Characteristics of Reinforcement Learning, Learning Models of Reinforcement Learning-Markov Decision Process, Q-Learning, and Real Time Applications of Reinforcement Learning.  UNIT-VI  **Genetic Algorithms:** What is Genetic Algorithms, Operators of Genetic Algorithms, How Genetic Algorithm works with illustrative example, Flow Chart for Genetic Programming, Real Time Applications of Genetic Programming. | |
| Text Books &  References  Books | **TEXT BOOKS:**   1. O’Reilly, Hands on Machine Learning with Scikit-Learn and Tensor flow@ 2017. 2. Tom M. Mitchell, Machine Learning@1997.   **REFERENCE BOOKS:**   1. Ethem Alpaydin, Introduction to Machine Learning, MIT Press, Third Edition. 2. Rudolph Russell, Machine Learning Step by step guide to implement Machine Learning Algorithms with Python@2018. 3. Shai Shalev Shwartz, Understanding Machine Learning From Theory to Algorithms, Cambridge University Press, 2014 4. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge University Press. | |
| E-Resources | 1. [www.studytonight.com/post/what-is-concept-learning-in-ml](http://www.studytonight.com/post/what-is-concept-learning-in-ml) 2. [www.guru99.com/reinforcement-learning-tutorial.html](http://www.guru99.com/reinforcement-learning-tutorial.html) 3. [www.javatpoint.com/artificial-neural-network-genetic-algorithm](http://www.javatpoint.com/artificial-neural-network-genetic-algorithm) 4. [www.geeksforgeeks.org/genetic-algorithms/](http://www.geeksforgeeks.org/genetic-algorithms/) 5. [www.nptel.ac.in/courses/108104049/](http://www.nptel.ac.in/courses/108104049/) | |