NIRMA UNIVERSITY
SCHOOL OF TECHNOLOGY, INSTITUTE OF TECHNOLOGY
B.Tech. Electronics & Communication Engineering
Semester – VI

L	T	P	C
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Course Code	**2EC602**
Course Name	**Machine Learning**

Course Outcomes (COs):
At the end of the course, the students will be able to
1. Apply regression techniques for machine learning examples.
2. Comprehend supervised and unsupervised machine learning techniques.
3. Apply the neural network and dimensionality reduction techniques for machine learning applications.
4. Design and implement machine learning algorithms to solve real-world application problems.

Syllabus: **Teaching Hours:30**

UNIT I: Introduction **02**
Motivation and Applications, Basics of Supervised and Unsupervised Learning.

UNIT II: Regression Techniques **05**
Basic concepts and applications of Regression, Simple Linear & Multiple Regression, Gradient Descent, Hyper-parameters tuning, Evaluation Measures for Regression Techniques.

UNIT III: Classification Techniques **06**
Naïve Bayes Classification, K-Nearest Neighbors, Classification Trees, Support Vector Machines, Evaluation Measures for Classification Techniques.

UNIT IV: Neural Networks **09**
Biological Neurons and Biological Neural Networks, Perceptron Learning, Activation Functions, Multilayer Perceptron, Back-propagation Neural Networks, Convolution Neural Network.

UNIT V: Dimensionality Reduction & Clustering **03**
PCA, k-means Clustering.

UNIT VI: Reinforcement Learning **02**
Basics concepts of reinforcement learning and applications.

UNIT VII: Applications and Case Studies **03**
Case studies on deep learning and RNN.

Self-Study:
The self-study content will be declared at the commencement of the semester. Around 10% of the questions will be asked from self-study content.

Laboratory Work:
Laboratory work will be based on the above syllabus with a minimum of 10 experiments to be incorporated.

Suggested Readings:

1. Tom Mitchell, Machine Learning, TMH
2. C. Bishop, Pattern Recognition and Machine Learning, Springer
3. R. O. Duda, P. E. Hart and D. G. Stork, Pattern Classification and Scene Analysis, Wiley
4. Simon Rogers, Mark Girolami, First Course in Machine Learning, CRC Press
5. Athem Ealpaydin, Introduction to Machine Learning, PHI

L = Lecture, T = Tutorial, P = Practical, C = Credit