**DAIDS-2-01T: Machine Learning**

Total Marks: 100

External Marks: 70

Internal Marks: 30

Credits: 6 Pass Percentage: 40%

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| **Course: Machine Learning** | |
| **Course Code: DAIDS-2-01T** | |
| **Course Outcomes (COs)**  After the completion of this course, the students will be able to: | |
| CO1 | Understand the fundamental concepts and principles of machine learning. |
| CO2 | Apply and evaluate various supervised learning algorithms |
| CO3 | Explore and apply unsupervised learning techniques |
| CO4 | Apply machine learning techniques to solve real-world problems |
| CO5 | Evaluate the strengths and limitations of different machine learning approaches |

**Detailed Contents:**

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| **Module** | **Module Name** | **Module Contents** |
| **Module I** | **Introduction to Machine Learning** | Introduction to ML, Applications of Machine learning, machine learning as a future; Data Pre-processing: Importing the libraries, Importing the dataset, taking care of missing data, encoding categorical data, Splitting the dataset into training set and test set, Feature scaling. |
| **Module II** | **Regression & Clustering** | Simple linear regression, Multiple linear regression, Logistic Regression, K-Nearest Neighbors, Support vector machine, Decision tree classification, Random forest classification, k-means clustering |
| **Module III** | **Introduction to Artificial Neural Networks** | Introduction to ANNs, Biological Neural Networks; Usefulness and Applications of ANNs; Architectures of ANNs: Single layer, Multilayer, Competitive layer; Learning: Supervised and Unsupervised; Activation functions; Linear and Non-linear Separability |
| **Module IV** | **Supervised Models** | **Hebb Net:** introduction, algorithm, application for AND problem;  **Perceptron:** architecture, algorithm, application for OR Problem;  **ADALINE:** architecture, algorithm, application for XOR problem;  **MADALINE:** architecture, algorithm, application for XOR problem;  **Back propagation Neural Network:** architecture, parameters, algorithm, applications, different issues regarding convergence |
| **Module V** | **Unsupervised Models** | **Kohonen Self –Organizing Maps:** architecture, algorithm, application,  **Adaptive Resonance Theory:** introduction, basic architecture, basic operation, ART1 and ART |
| **Module VI** | **Deep Learning** | Introduction, Overview of Neural Networks, History and evolution of Deep Learning, Applications of Deep Learning, Introduction to CNNs |

**Books**

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| 1. Andreas C. Müller, “Introduction to Machine Learning with Python: A Guide for Data Scientists”, Sarah Guido, 2016 2. E. Alpaydin, “Introduction to Machine Learning”, 3rd Edition, PHI Learning, 2015 3. K. P. Murphy, “Machine Learning:A Probabilistic Perspective”, MIT Press, 2012 4. <https://www.udemy.com/course/machinelearning> |