**BCSE 0450 : MACHINE LEARNING USING PYTHON**

**Objective:**To introduce students to the basic concepts and techniques of Machine Learning. To developskills of using recent machine learning software for solving practical problems. To gain experience of doingindependent study and research.

**L–T–P-J: 3–0–0-0**

**Credits: 03**



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| **Module No.** | **Content** | **Theory Hours** |
| **I** | **Introduction:** Machine Learning basics, Applications, Type of Learning  Algorithm  **Machine Learning :** Training, Testing, Evaluation: Cross-validation,  Confusion Matrix, Precision, Recall, F1-score, ROC curve, Over fitting, Bias Variance Trade off  **Supervised Learning:** Regression- Linear regression, Polynomial regression, Gradient Descent Algorithm  **Data Preprocessing:** Imputation, Outlier management, One hot encoding, Feature selection, Filter and Wrapper approach  **Dimensionality Reduction: Feature selection vs feature extraction**  **Supervised Learning:** Classification- Logistic regression, k-nearest neighbor classifier, Decision tree classifier, Naïve Bayes classifier | 20 |
| **II** | **Supervised Learning:** Support vector machine classifier  **Feature Extraction:** Principal Component Analysis (PCA)  **Unsupervised Learning:** k-means clustering, Hierarchical clustering  **Ensemble methods:** Bagging, Boosting, Improving classification with  Random forest, Ada-Boost algorithm.  **Artificial Neural Network :** - Introduction, Model Representation, Gradient Descent, Stochastic Gradient Descent, Multilayer Perceptron, Multiclass Representation, Back propagation Algorithm.  **Deep Learning:** Introduction of Convolutional neural network. | 20 |

**Text Book:**

* Puneet Singh Bhatia**,** Fundamentals of Digital Marketing First Edition, Publication Pearson.

**Reference Books:**

* Ian Dodson, The Art of Digital Marketing: The Definitive Guide to Creating Strategic, Targeted and Measurable Online Campaigns, Publication Wiley India Pvt Ltd.
* Philip Kotler, Hermawan Kartajaya, Iwan Setiawan, Marketing 4.0: Moving from Traditional to Digital, , Publication Wiley India Pvt Ltd.
* Vandana Ahuja, Digital Marketing 1st Edition, Publication Oxford.
* Rohan Yamagishi, Digital Marketing in Asia : A Start-Up Guide for Search Engine Marketing in APAC, Publication R. R. Bowker

**Outcome:** *After this course the students should be able to:*

* *CO1: Learn how to use new media such as mobile, search and social networking.*
* *CO2: Learn the measurement techniques used in evaluating digital marketing efforts.*
* *CO3: Understand how and why to use digital marketing for multiple goals within a larger marketing and/or media strategy.*
* *CO4: Understand the major digital marketing channels - online advertising: Digital display, video, mobile, search engine, and social media.*
* *CO5: Learn to develop, evaluate, and execute a comprehensive digital marketing strategy and plan*
* *CO6: Explore the latest digital ad technologies.*