**Course Abstract**

***If you need accommodations due to a disability, contact Disability Services in***

***Edison Hall Room 100, 732.906.2546.***

***To foster a productive learning environment, the College requires that all students adhere to the Code of Student Conduct which is published in the college catalog and website.***

**Course ID and Name: DSA 240 – Introduction to Machine Learning**

**Department: Business and Computer Science**

Chairperson or Course Coordinator: Dr. Aslihan Cakmak

Office Location: ED123

E-mail Address: [ACakmak@Middlesexcc.edu](mailto:ACakmak@Middlesexcc.edu)

Telephone: 732-906-2526

**Prerequisites:** DSA 210 and MAT 285

**Co-requisites:** None

**Course Description:**

Providing students with an introduction to machine learning concepts, techniques, and procedures, this course focuses on how machine learning is used in data analytics to help develop data driven decisions and how computers gain the ability to learn on their own without being explicitly programmed. Common algorithms used in machine learning to detect patterns and predict outcomes will be explored and implemented through commonly used software tools.

**General Education Status:** N/A

**Credits: 3 Lecture Hours: 2 Lab Hours: 2**

**Learning Outcomes:**

1. Analyze and implement commonly known learning algorithms
2. Explain well-studied methods for classification, regression, structured prediction, clustering, and representation learning
3. Integrate multiple components of practical machine learning into a single system including data preprocessing, learning, regularization, and model selection
4. Describe the formal properties of learning models and algorithms
5. Explain the practical implications of the results generated from models and algorithms
6. Compare different machine learning techniques on common problems
7. Develop new predictive models of learning methods from several components of probability, statistics, calculus, linear algebra, and optimization

**Upon successful completion of this course, a student will be able to:**

1. Analyze and implement commonly known learning algorithms
2. Explain well-studied methods for classification, regression, structured prediction, clustering, and representation learning
3. Integrate multiple components of practical matching leaning into a single system including data preprocessing, learning, regularization, and model selection
4. Describe the formal properties of learning models and algorithms
5. Explain the practical implications of the results generated from models and algorithms
6. Compare different matching learning techniques on common problems
7. Develop new predictive models of learning methods from several components or probability, statistics, calculus, linear algebras, and optimization

**Course Content Areas:**

1. Machine learning and models
2. Supervised and unsupervised machine learning
3. Sample statistics and model training software
4. Decision trees learning model
5. Geometry and k-Nearest Neighbors
6. Model selection
7. Perception for learning feature weights
8. Linear Regression
9. Optimization for machine learning
10. Neural networks
11. Representation learning
12. Deep learning and reinforcement learning
13. Graphical models
14. Clustering
15. Pattern detection