| Course Name | MACHINE LEARNING | Course Code | ITEC-314 | | |
|---|---|---|---|---|---|
| Credit Hours | 3 | Contact Hours | Lec | Lab | Total |
| | | | 2 | 2 | 4 |
| Offered as | ☐ University Requirement ☐ College Requirement ☒ Program Requirement ☐ Core ☒ Elective<br>☒ ITEC ☐ COMP ☐ CNET | | | | |
| Level | 6 | Prerequisite | ITEC313 | | |

**Course Description:**

With the increased availability of data from varied sources there has been increasing attention paid to the various data driven disciplines such as analytics and machine learning. This course is intended to introduce some of the basic concepts of machine learning in algorithmic perspective. This course will familiarize students with a broad cross-section of models and algorithms for machine learning, and prepare students for the application of machine learning techniques. Topics covered in this course include, Machine learning types, linear and non-linear regression, nonparametric methods, Bayesian methods, support vector machines, kernel methods, Artificial Neural Networks, model selection, learning theory, VC dimension, clustering, EM, dimensionality reduction, PCA, SVD, and reinforcement learning. The course will also facilitate the students to solve real world problems using machine learning techniques.

**On completion of the course, students will be able to:**

- Comprehend the fundamental concepts, types, and challenges of machine learning.
- Select suitable machine learning models, including supervised, unsupervised, and reinforcement learning techniques, for various data-driven problems.
- Implement ML problems to solve real-world challenges.
- Design and analyze ML experiments using cross-validation, bootstrapping, and performance evaluation metrics.
- Integrate theory with practice through hands-on lab experiments, using key ML concepts and methodologies.

| Assessment Methods | ☒ **Assignment-1** | **10%** | ☒ **Mid-term** Exam | **15** | ☒ **Mini-Project** | **15%** |
|---|---|---|---|---|---|---|
| | ☒ **Attendance** | **-** | ☒ **Lab Exam** | **20** | ☒ **Final Exam** | **40%** |

**Text Books:**

- Ethem Alpaydin, Introduction to Machine Learning, Third Edition, MIT Press, 2014
- Stephen Marsland, Machine Learning – An Algorithmic Perspective‖, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.

**References:**

- Peter Flach, Machine Learning: The Art and Science of Algorithms that Make Sense of Data‖, First Edition, Cambridge University Press, 2012.
- Tom M Mitchell, Machine Learning, First Edition, McGraw Hill Education, 2013.
- Jason Bell, ―Machine learning – Hands on for Developers and Technical Professionals‖, First Edition, Wiley, 2014