ITEC-314
Machine Learning

General Information

Course Code	**ITEC 314**	Level/ Year	6th	Required (R)/ Selected Elective (SE)			SE
Credit Hours	Theory		2	Lab	1	Total	3
Prerequisites	-						
Course Coordinator	Dr. John Martin						

Course Description

This course is intended to introduce some of the basic concepts of machine learning from an algorithmic perspective, familiarize students with a broad cross-section of models and algorithms for machine learning, and prepare students for the application of machine learning techniques.

Course Objectives

- Understand various types of learning algorithms.
- Select appropriate machine learning models for different data problems.
- Apply algorithms to solve real-world problems.

Course Contents

List of Topics	Weeks
UNIT 1: Machine Learning Basics	1, 2, 3
UNIT 2: Supervised Learning	4, 5, 6
UNIT 3:Unsupervised Learning	7, 8
UNIT 4: Deep and Reinforcement Learning	9, 10
UNIT 5: Design and Analysis of ML Experiments	11, 12, 13
UNIT 6: Popular Machine Learning Algorithms	14, 15

Textbook

- Ethem Alpaydin, Introduction to Machine Learning
- Stephen Marsland, Machine Learning – An Algorithmic Perspective‖

Reference Materials

- Peter Flach, Machine Learning: The Art and Science of Algorithms that Make Sense of Data‖
- Chris Bishop, Pattern Recognition and Machine Learning
- Tom M Mitchell, Machine Learning
- Jason Bell, ―Machine learning – Hands on for Developers and Technical Professionals

Course Learning Outcomes

CLO	Description	Level of Learning (LOL)	Mapped PI
CLO#01	**Gain** a solid understanding of core machine learning principles.	Knowledge	PI 1.3
CLO#02	**Understand** and **relate** the principles of Bayes decision theory, parametric methods, and multivariate methods, with machine learning based decision scenarios.	Comprehension	PI 1.4
CLO#03	**Examine** the process of learning a class, critically evaluating the factors that contribute to effective class learning in supervised machine learning.	Comprehension	PI 2.1
CLO#04	**Apply** dimensionality reduction, clustering, deep learning, and reinforcement learning techniques in various scenarios, demonstrating a hands-on understanding of these algorithms and methodologies.	Applying	PI 2.3
CLO#05	**Evaluate** various performance measures used in machine learning, comparing their suitability for different tasks and understanding the implications of selecting specific metrics.	Evaluating	PI 2.4
CLO#06	**Implement** real world machine learning problems and **interpret** their results.	Creating	PI 3.3

CLO-SO-PI Mapping

	SOs					
CLOs	**SO1**	**SO2**	**SO3**	**SO4**	**SO5**	**SO6**
CLO#01	PI1.3	-	-	-	-	-
CLO#02	PI1.4	-	-	-	-	-
CLO#03	-	PI2.1	-	-	-	-
CLO#04	-	PI2.3	-	-	-	-
CLO#05	-	PI2.4	-	-	-	-
CLO#06	-	-	PI3.3	-	-	-

Approvals

Prepared by Course Coordinator	Dr. John Martin		
Approved by Track Leader	Dr. John Martin	**TL Signature**	
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