

## **COURSE-OUTLINE**

**Spring 2021**

**Machine Learning- CSCI 4350**

**(Hybrid Synchronous class)**

**Tuesday-Thursday 2:00-3:20 PM**

**Instructor: Arun Kulkarni, Ph.D. Professor of Computer Science**

**Office: COB 315.07**

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**Course Description:** The course will provide overview of machine learning system and describe algorithms for implementing various stages of a machine learning system. Various stages include preprocessing, classification, clustering, regression analysis, and post processing. These stages can be implemented using statistical methods, non-parametric methods, neural networks, fuzzy inference systems, fuzzy neural systems. Such techniques will be introduced in the course.

### **Course Objectives:**

This course is designed with the following goals:

- Identify methods for data cleaning, replacing missing data, and normalization
- Develop models for supervised classification using discriminant functions, neural networks and fuzzy logic systems.
- Develop clustering models using K-means clustering, neural networks and fuzzy logic systems.
- Develop software to analyze data using decision trees.

### **TEXT BOOK:**

Stephen Marsland (2015). Machine Learning An Algorithmic Perspective. CRC Press, Boca Raton, FL.

### **REFERNCE BOOKS:**

- 1) Kulkarni, A. D. (2001). Computer Vision and Fuzzy Neural Systems. Prentice Hall PTR, Upper Saddle River, NJ.
- 2) Sergios Theodoridis (2015). Machine Learning. Elsevier Academic Press.
- 3) Jiawei Han and Micheline (2011). Data Mining – Concepts and Techniques. Morgan Kaufmann, San Francisco, CA.

**PRE-REQUISITES:** Structured Programming, Linear algebra background

Tentative time allotment for the course will be as follows:

| Topic                       | Hours |
|-----------------------------|-------|
| Introduction                | 3     |
| Machine Learning Overview   | 3     |
| Pre-processing Techniques   | 6     |
| Feature Extraction          | 6     |
| Supervised Classification   | 6     |
| Unsupervised Classification | 6     |
| Neural Networks             | 3     |
| Fuzzy Inference Systems     | 6     |
| Post Processing Techniques  | 3     |

EVALUATION:

|        |   |
|--------|---|
| 90-100 | A |
| 80-89  | B |
| 70-79  | C |
| 60-69  | D |
| 0-59   | F |

SCHEDULE

|                     |                             | Evaluation |
|---------------------|-----------------------------|------------|
| Test 1              | Thursday, February 18, 2021 | 70 %       |
| Test 2              | Thursday, March 18, 2021    |            |
| Final               | Tuesday, April 27, 2021     |            |
| Assignments         |                             | 25%        |
| Class Participation |                             | 5 %        |
| Assignment 1        | Tuesday, February 16, 2021  |            |
| Assignment 2        | Tuesday, March 2, 2021      |            |
| Assignment 3        | Tuesday, March 23, 2021     |            |
| Assignment 4        | Tuesday, April 22, 2021     |            |

**Academic Dishonesty:** You are expected to do your own work. You may assist each other with general concepts, but direct assistance with a particular assignment or any attempts to gain an unfair academic advantage will not be tolerated. Cheating is considered a serious academic offense both by the department and the University. It may result in a failing grade from this course for all

parties involved. The instructor reserves the right to ask you to explain any assignment that you turn in to judge if the work is actually yours.

**Disability/Accessibility Services:** In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Tyler at Texas offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including non-visible a diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit <https://hood.accessiblelearning.com/UTTyler> and fill out the New Student application. The **Student Accessibility and Resources** (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at <http://www.uttyler.edu/disabilityservices>, the SAR office located in the University Center, # 3150 or call 903.566.7079.

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- 1) You are supposed to show a valid ID before logging to the test.
- 2) You are not supposed to talk with anyone or yourself during the test.
- 3) You should be within the camera view all the time. There should be enough light so that they can recognize you.
- 4) You should be dressed properly.
- 5) You can use one or two scratch papers and a calculator during the test.
- 6) You cannot use very big monitors (20 inch or above)
- 7) For help about Proctor U please contact the web site at:  
<https://support.proctoru.com/hc/en-us>