Course Outline

1. Document Information

Degree Program	Computer Science
Course Number	CS 586
Course Title	Pattern Recognition and Image Processing
Semester Hours	3
Course Coordinator	Xiaolan Huang
Revision Term	Fall 2020
Latest Revision	Spring 2021

2. Catalog Description

An introduction to the area of pattern recognition and data science. This course will cover basic and advanced theories, algorithms, and practical solutions of statistical pattern recognition. It covers Bayesian learning, parametric and non-parametric learning, data clustering, component analysis, boosting techniques, sequential data, reinforcement learning, and deep learning with neural networks.

3. Textbooks

- Gonzales, X. & Woods, X. Digital Image Processing. Prentice Hall, 3rd Edition. ISBN9780131687288.

4. References

5. Course Learning Outcomes

6. Assessment of the Contribution to Student Outcomes

Outcome	1	2	3	4	5	6	7
Assessed	X	X	X	X	X		X

7. Prerequisites by Topic

8. Major Topics Covered in the Course

1. Computer Representation and Display of Picture Data {3 classes}
2. Image Transforms {7 classes}
3. Image Enhancement {3 classes}
4. Image Encoding {3 classes}
5. Descriptive Methods in Scene Analysis {2 classes}
6. Restoration {4 classes}
7. Non Parametric Decision Theory {4 classes}
8. Linear Discriminant Functions {3 classes}
9. Statistical Discriminant Functions {6 classes}
10. Clustering and Non Supervised Learning {5 classes}

9. Major Lab Assignments and Projects

10. Assessment Plan for the Course

Tool 1. **Assignments:**

Assignments 1: O-1, O-2

Assignments 3: O-1, O-3

Assignments 6: O-1, O-4

Tool 2. **Machine Problem**:

Machine Problem: O-3, O-5, O-7

Tool 3. **Exams:**

Exam 1: O-1

Exam 2: O-2, O-4