FUZZY SET THEORY AND ITS APPLICATIONS

MATH 8370

Course Description:

The course is focused on the fundamental theory of fuzzy sets and its applications to data mining and decision making. **3 credits**

Prerequisites:

MATH 2030, MATH 2230, MATH 3230/8235, or permission of instructor.

Overview of Content and Purpose of the Course:

This course provides the fundamentals of classical set theory and fuzzy set theory. The decomposition theorems of fuzzy sets and the extension principle will be introduced, as well as the use of nonlinear integrals as aggregation tools to deal with fuzzy data. As an indispensable tool in fuzzy decision making, ranking and ordering fuzzy quantities will be discussed.

Anticipated Audience/Demand:

This course is intended for Mathematics students and students from other technical areas who want to expand their knowledge of modeling techniques for real world problems.

Major Topics:

1) Fuzzy Sets

2) Constructing Fuzzy Sets

3) Operations on Fuzzy Sets

4) Decomposition Theorem

5) Extension Principle

6) Fuzzy Numbers

7) Fuzzy Arithmetic

8) Possibility Theory

9) Fuzzification in Integrations

10) Applications in Operations Research and/or Data/Mining

<u>Methods</u>:

This class will be presented in a lecture/discussion format.

<u>Student Role</u>:

Students must attend all class meetings, participate in class discussions, and submit homework on time.

<u>Textbook</u>:

Wang, Zhenyuan, Rong Yang, and Kwong-Sak Leung. *Nonlinear Integrals And Their Applications In Data Mining*. Singapore: World Scientific Publishing Company, 2010.

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