

# CIVE 6356: Introduction to Data Science (Fall 2022)

Meetings: Thursdays 15:30-18:00

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**Course Description:** This course is developed with the aim of preparing graduate students to obtain fundamental understanding on the data science concepts and practical skills in Python programming for analyzing databases in disciplines such as civil, mechanical, electrical, computer, and manufacturing engineering. The course covers the topics listed below. The main assessment is a final term paper where the students are asked to pick any dataset (preferably from their own research) and apply one or multiple techniques covered in the course.

- Applied mathematics (linear algebra)
- Probability and information theory
- Machine learning basics
- Introduction to Python programming
- Regression analysis
- Classification algorithms
  - Clustering analysis
  - K-nearest neighbor
  - Decision tree & ensemble learning
  - Principal component analysis
  - Support vector machine
- Neural networks & deep learning

**Textbook:** Mohri, M., Rostamizadeh, A., Talwalkar, A., 2018, "[Foundations of Machine Learning](#)", MIT Press, Cambridge, MA.

