MATH 390.2/690.2 Spring 2025 (2 credits)
Course Syllabus

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Instructor

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Time / Location

Monday 4:00-5:50PM on Zoom
Course Homepage: `https://github.com/wskennly/QC_Math_390_Spring_2025`
Office Hours: Monday 3:00-4:00PM on Zoom

Course Overview and Schedule

MATH 390.2/690.2 is an introduction to the Data Science/Machine Learning in Python. We will be covering the fundamentals using the Python programming language. After completing this course, you will be well versed in using Python for statistical analysis and building machine learning models. **Tentative schedule by week:**

1. Introduction to Python, Numpy, Scipy, Statsmodels
2. Basic Modeling, Pandas DataFrames, and Binary Classification
3. Scikit-Learn, Perceptron, SVM, KNN
4. Regression via OLS
5. OLS continued
6. Mathplotlib and Seaborn
7. Polynomial Regression and Interaction Regression
8. Model Selection, Hyperparameter Selection, Forward Stepwise Modeling, and Data Wrangling
9. Regression Trees and Classification Trees
10. Random Forest, Missing Data, Assymmetric Cost Modeling, ROC and DET Curves
11. XGBoost and SHAP

Prerequisites/Co-requisites

MATH 342W

Course Materials

- Code snippets, run-books, and a knowledge base will be shared.
- Python - https://www.python.org/doc/

Software: We will use Jupyter Notebook/Google Colab as our IDE and Python as our programming lanugage. Make sure that you have a GitHub account and access to Jupyter Notebook or Google Colab.

Additional Resources

- Tutorials - https://www.geeksforgeeks.org/python-programming-language-tutorial/

Announcements

Course announcements and general communication will be made via email.

Lectures/Labs on Zoom

Classes are 110 minutes and run from Monday, January 27th until Monday, May 12th. We will spend most of this time working on the lab exercises together. This will involve taking turns solving the coding exercises. Any work that is not finished in class will be homework that will be turned in before the start of the following week's class.
Zoom policies: Keep your camera on. Backgrounds are appreciated. Questions can be asked by raising your hand.

Homework

- 11 Labs posted on GitHub.
- Late submissions accepted up to 7 days past the due date, with a 5% daily penalty.
- Lab assignments count for 75% of your grade.

Grading

- Labs: 75%
- Attendance and Class Participation: 25%