Course Syllabus
ECE/ENGRD 2720. Data Science for Engineers
Fall 2022.

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1. Course Information

Lectures:	Monday and Wednesday 2-45 to 4:00 pm
Tutorials:	Friday (problem solving sessions with TAs)
Pre/Co-requisites:	MATH 1920 and either CS 1110 or CS 1112
	Students need to install Jupyter notebook on their laptop to run Python.
Instructor:	Prof. Vikram Krishnamurthy vikramk@cornell.edu
Course Material:	Detailed slides are provided along with problem sets and assignments.
	No single textbook covers the material.

NO auditors are allowed for ECE/ENGRD 2720

2. Course Description and Objectives

This sophomore course covers fundamental concepts (mathematics, algorithms) in data science for engineers. Topics covered include system models for data, least squares estimation, classification, change-point detection, optimization, probabilistic models and statistical inference, data visualization and human-factors. Algorithms will be implemented in Python. *This course focuses on deeper mathematical and conceptual fundamentals for engineering; students will need to implement only simple Python programs for scientific computing.*

By the end of the course, students should be able to: (i) understand the data science workflow and basic time series models for data generation; (ii) understand the underlying mathematics, formulate and design algorithms for exploratory data analysis and least squares inference (iii) able to formulate and solve unconstrained optimization and linear programming using Matlab or Python optimization solvers, (iv) Understand and formulate elementary probabilistic models and statistical inference for data.

3. Course Organization

The course includes lectures, tutorial problem solving sessions, homework assignments, quizzes and exams. All course material is on canvas.

1. **Weekly Homework** (30%) There will be 10 assignments (each worth 3%). The assignments should be uploaded to Canvas as pdf files and Jupyter notebooks. **Late homework will not be accepted.** Students are expected to complete all problems of each homework. But only a subset of the problems on each assignment may be graded. Which problems will be graded will NOT be announced in advance.

Students are encouraged to type their solutions using LaTeX; alternatively, they can scan their handwritten version into a legible PDF. Unreadable submissions will not be graded. All code must sufficiently well commented and understandable. Students are allowed, even encouraged, to work on the homework in small groups, but each student must write up their own homework and computer code.

2. **Quizzes** (30%). There will be 20 short quizzes held during the classes. Typically, these will be held during the first 10 minutes of each class. Each quiz is worth 1.5%.

3. **Final exam** (40%). This will be held in December (date specified later).

4. Academic Integrity

Cornell University's Code of Academic Integrity is available at `http://cuinfo.cornell.edu/aic.cfm`

5. Accommodations for Students with Disabilities

In compliance with the Cornell University policy and equal access laws, the instructor is available to discuss appropriate academic accommodations that may be required for students with disabilities. Students are encouraged to register with Student Disability Services to verify their eligibility for appropriate accommodations.