



Course Information

Course Title: Foundations of Data Science for Criminology

Course Number: CCJS 418E

Term: *Fall / 2022*

Course Times: Tue/Thu 11am to 12:30pm EST

Instructor: Zubin Jelveh (zjelveh@umd.edu)

Zubin's Office Hours: TBD and by appointment

Course Description

This course will explore the use of data science in the criminal justice system through the lens of risk assessment instruments (or risk assessment algorithms). These instruments have been around for at least a century, but have come under greater use *and* scrutiny with the advent of big data and machine learning. The course will cover the history of the development of these risk assessments and their role in decision making in contexts such as sentencing, pretrial detention, police enforcement, and social service provision. We will also cover the potential for bias from using data generated by the criminal justice system to develop these tools. A substantial portion of the course will cover the basic technical skills needed to engage with these algorithms. These include:

- Review of basic probability and related concepts like uncertainty
- Basics of standard machine learning algorithms (linear regression, logistic regression, decision trees, and random forest)
- Model selection (e.g. cross-validation)
- Fairness considerations

Classes will alternate between primarily focusing on discussions (of news articles, think-tank publications, and academic papers) and lectures on machine learning. Most classes will start with a quiz that will cover material taught the previous week, or cover questions for the reading due in that week's class. There will be three homework assignments that will primarily involve coding. Each week, we will have a 30 minute or 1-hour lab component intended to get you comfortable with using Python. There will be a mid-term and a final exam.

Required Resources

This course does not stick to particular textbooks. Readings and course materials will be provided on the elms course site. No purchases required.

Laptop – We will do live exercises in class in Python.

Letter Grade Cutoffs

In the table below, g_i is the grade for i-th student

A+	$97 \leq g_i \leq 100^*$	B+	$87 \leq g_i < 90$	C+	$77 \leq g_i < 80$	D+	$67 \leq g_i < 70$	F	$g_i < 60$
A	$93 \leq g_i < 97$	B	$83 \leq g_i < 87$	C	$73 \leq g_i < 77$	D	$63 \leq g_i < 67$		
A-	$90 \leq g_i < 93$	B-	$80 \leq g_i < 83$	C-	$70 \leq g_i < 73$	D-	$60 \leq g_i < 63$		

* Note: To receive an A+ you must have demonstrated significant contributions to the class in addition to achieving this numeric grade.

Communications:

ELMS - Official course site for materials, assignments, announcements, gradings, etc. Make sure that your email & announcement notifications (including changes in assignments and/or due dates) are enabled in ELMS so you do not miss any messages.

Emails - Administrative requests, quick clarifications, etc. Please prefix the subject line with [CCJS418E]. If you have not received a reply within 2 days, please email again.

Office Hours - Complex technical questions

Grading Structure

Assignment	Percentage %
3 Homework Assignments (drop lowest)	20%
12 Quizzes (2% each, drop 2 lowest)	20%
Midterm	30%
Final	30%
Total	100%

Course Outline (Subject to Change)

Week #	Topic
1 - (8/29)	Data Science Background / Probability Basics / Getting Started with Python
2 - (9/5)	Probability
3 - (9/12)	Conditional Probability
4 - (9/19)	Weighted Averages / Simpson's Paradox
5 - (9/26)	Naive Bayes
6 - (10/3)	Making Predictions
7 - (10/10)	Linear and Logistic Regression
8 - (10/17)	Decision Trees / Overfitting
9 - (10/24)	Midterm
10 - (10/31)	Random Forest
11 - (11/7)	Performance Metrics / Fairness
12 - (11/14)	Sources of Bias I
13 - (11/21)	Sources of Bias II
14 - (11/28)	Causal inference for data science
15 - (12/5)	Setting thresholds / Predicting shooting victimization

Note: **This is a tentative schedule, and subject to change – monitor the course ELMS page for current deadlines.**

Resources & Accommodations

Accessibility and Disability Services

Students with disabilities should inform me of their needs at the beginning of the semester. Please also contact UMD's Accessibility and Disability Service (<https://counseling.umd.edu/ads/>). ADS will make arrangements with the student and me to determine and implement appropriate academic accommodations. Inclusion is one of the iSchool's core values, and we have attempted to make all materials and assignments accessible to people with varying abilities. However, if there is something else I can do to make the class more accessible please schedule a time to come talk to me. This will benefit not only yourself but also future students!

Getting Help

Taking personal responsibility for your own learning means acknowledging when your performance does not match your goals and doing something about it. I hope you will come talk to me so that I can help you find the right approach to success in this course, and I encourage you to visit [UMD's Student Academic Support Services website](#) to learn more about the wide range of campus resources available to you.

In particular, everyone can use some help sharpening their communication skills (and improving their grade) by visiting [UMD's Writing Center](#) and schedule an appointment with the campus Writing Center.

You should also know there are a wide range of resources to support you with whatever you might need ([UMD's Student Resources and Services website](#) may help). If you feel it would be helpful to have someone to talk to, visit [UMD's Counseling Center](#) or [one of the many other mental health resources on campus](#).

UMD Policies

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please visit www.ugst.umd.edu/courserelatedpolicies.html for the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions.