Note: This is a placeholder syllabus; students should refer to https://docs.google.com/spreadsheets/d/1oTqmXI3J0fi0HA-KD5A73VMd9RbXa86T7IsAP1Jd0VI/edit?usp=sharing to obtain the current syllabus							
Date	**Day of Week**	**Class Sequence**	**Subject**	**Topic**	Panels		
8/20/2024	Tuesday	1	Introduction	Survey; Skills; Hopes and Fears; Python; Wolfram Language	None		
8/22/2024	Thursday	2	Databases	Flat databases; operations and ordering; relational databases;	None		
8/27/2024	Tuesday	3	Databases	normalization; brief mention of graph databases; Application: Affordable Care Act Health Plans	TBA		
8/29/2024	Thursday	4	Game Theory	Non-cooperative game theory; extensive and normal form; Nash Equilibrium	TBA		
9/3/2024	Tuesday	5	Game Theory	Iterated game theory; Applications to tort law and the purpose of the law	TBA		
9/5/2024	Thursday	6	Network Theory	Definition of a network; centrality measures; communities	TBA		
9/10/2024	Tuesday	7	Network Theory	Applications: terrorist networis; citation networks; implicit networks	TBA		
9/12/2024	Thursday	8	Statistics	Frequentist statistics; Maximum Likelihood Estimation and Cost Minimization	TBA		
9/17/2024	Tuesday	9	Statistics	Statistics power; sampling distribution of statistics; p-values	TBA		
9/19/2024	Thursday	10	Statistics	Application: P Hacking	TBA		
9/24/2024	Tuesday	11	Statistics	Bayes Law; Bayesian statistics; modification of MLE	TBA		
9/26/2024	Thursday	12	Statistics	Bayesian regression	TBA		
10/1/2024	Tuesday	13	Statistics	Application: Equal protection tiering as a Bayesian metaphor	TBA		
10/3/2024	Thursday	14	Formative Assessment	Start actuarial finance: time value of money; discount rates	None		
10/8/2024	Tuesday	15	Actuarial Finance	Contingency tables	TBA		
10/10/2024	Thursday	16	Actuarial Finance	Application: Life insurance premium regulation; cash value regulation	TBA		
10/15/2024	Tuesday	17	AI	Supervised learning: overfitting; Decision Trees	TBA		
10/17/2024	Thursday	18	AI	Training, Validation and Testing; Random Forests; Gradient Boosting	TBA		
10/22/2024	Tuesday	19	AI	Application	TBA		
10/24/2024	Thursday	20	AI	Neural networks; structure; loss functions; stochastic gradient descent; back propagation	TBA		
10/29/2024	Tuesday	21	AI	Multilayer perceptrons; Softmax Layers; Autoencoders	TBA		
10/31/2024	Thursday	22	AI	Large Language Models (Embeddings, Attention layers and Transformers)	TBA		
11/5/2024	Tuesday	23	Formative Assessment	Application and Formative Assessment	None		
11/7/2024	Thursday	24	Causal Inference	Association v. causation; Do-Calculus; Difference in Differences	TBA		
11/12/2024	Tuesday	25	Causal Inference	Application: Kidney Stones; Causal Discovery	TBA		
11/14/2024	Thursday	26	Privacy Science	Encryption; Identifiers, Quasi-Identifiers and Suspect variables; Begin privacy metrics: K-Anonymity	TBA		
11/19/2024	Tuesday	27	Privacy Science	Continue Privacy metrics:; L-diversity; Entropy L-diversity; T-closeness; differential privacy; Application: compute privacy -utility tradeoff for HIPAA data	TBA		
11/21/2024	Thursday	28	Projects	Students present their projects	None		

Item	Course Objectives
1	Develop confidence when dealing with computational matters
2	See opportunities for computation in the study and practice of law
3	Understand ideas of programming in general and in Python and Wolfram Language specifically
4	Ability to perform basic operations on flat and relational databases
5	Be able to communicate with experts in statistics, privacy, finance
6	Understand ideas of supervised learning and differences between statistics and machine learning
7	Be able to understand ideas of neural networks, including architectures, cost functions, collateral tasks and back propagation
8	Appreciate future of AI and technology behind large language models
9	Ability to perform causal inference and ability to sniff out bad causal inference
10	Have fun

Policy	Content
Modality	This course will primarily be taught in person; the instructor may need to teach some classes via Zoom
Attendance	Students must be physically present for 80% of class sessions (if class held by Zoom then virtually present)
Attendance on exam days	Students must be physically present for formative assessments and final exam
Attendance on project days	Students must be virtually present on the day they are presenting their project; this day will be assigned by week 3 of the course
Other attendance matters	Please note that you are responsible for managing your absences from class and ensuring that your total number of absences does not exceed the threshold for the class. If you are unable to attend a class, or you need to arrive late or leave early, I prefer that you notify me in advance by email if your group is on call for that class. I request this notification primarily because I call on students and it is useful to know in advance that a student will not be available. Even if you have notified me that you will be absent, that absence still uses one of your available absences. If your situation is such that you are close to the limit, you are required to consult with me to determine precisely the number of absences available. Do not exclusively rely on your own calculation as to the limit. Also, I advise you to use caution in taking absences early in the semester. Early semester absences reduce your “margin for error” for the remainder of the semester and can create a difficult situation if sicknesses or other life events arise. When you notify me that you will miss a class, you need not provide a reason. I am not putting myself in the position where I am evaluating the reasons for student absences. Exceeding the absences threshold has consequences. On the other hand, there is no loss of goodwill on my part toward any student if he or she takes most or all of their absences.
Being called on	I use a panel system; I will announce the panels once course enrollment stabilizes
Honor Code	All graded items are subject to the Honor Code; I will advise on the degree of collaboration permitted with respect to projects
AI generated text	Use of AI to generate text or other materials is encouraged except where I tell you it is not
Syllabus changes	Please note that the instructor may need to make modifications to the course syllabus. Notice of such changes will be announced as quickly as possible through (specify how students will be notified of changes).

All welcome	In this course, all students are welcome regardless of socio-economic status, age, race, ethnicity, disability, religion, national origin, veteran's status, sex, sexual orientation, gender identity, gender expression, political affiliation, marital status and other diverse components of our identities that we each bring to class.
Chosen name and pronouns	I go by Professor Chandler. I use he/him. I generally call students by their first name as indicated on the syllabus. If you would prefer I call you something else, let me know. If you would prefer I use a particular pronoun to refer to you, please let me know. I'll make an effort to do so.
Resources for online learning	The University of Houston provides information to optimize the online learning experience through our Power-On website (https://uh.edu/power-on/learning/). Please visit this website for a comprehensive set of resources, tools, and tips including: obtaining access to the internet, AccessUH, Blackboard, and Canvas; using your smartphone as a webcam; and downloading Microsoft Office 365 at no cost. For questions or assistance contact UHOnline@uh.edu.
UH email	Please check and use your Cougarnet email for communications related to this course. Faculty use the Cougarnet email to respond to course-related inquiries such as grade queries or progress reports for reasons of FERPA. To access your Cougarnet email, login to your Microsoft 365 account with your Cougarnet credentials. Visit University Information Technology (UIT) for instructions on how to connect your Cougarnet e-mail on a mobile device.
Security escorts	UHPD provides a security escort service is designed for the community members who have safety concerns and would like to have a Security Officer walk with them, for their safety, as they make their way across campus. Based on availability either a UHPD Security Officer or Police Officer will escort students, faculty, and staff to locations beginning and ending on campus. If you feel that you need a Security Officer to walk with you for your safety, please call 713-743-3333. Arrangements may be made for special needs. Parking and Transportation Services also offers a late-night, on-demand shuttle service called "Cougar Ride" that provides rides to and from all on-campus shuttle stops, as well as the MD Anderson Library, Cougar Village/Moody Towers and the UH Technology Bridge. Rides can be requested through the UH Go app. Days and hours of operation can be found at https://uh.edu/af-university-services/parking/cougar-ride/.

I will have in person office hours for students on Mondays from 1 p.m. -2 p.m. and virtual office hours Tuesday evenings from 7:30 - 8:30 p.m. Students who can not make these times in a particular week are encouraged to email me with 3 1/2 hour blocks when they are available. **If I am on Zoom for 15 minutes without a student joining me, I may well sign out. So, if you don't see me during office hours, send me an email and I will get back on.**

Mental Health	The University of Houston has a number of resources to support students' mental health and overall wellness, including CoogsCARE and the UH Go App. UH Counseling and Psychological Services (CAPS) offers 24/7 mental health support for all students, addressing various concerns like stress, college adjustment and sadness. CAPS provides individual and couples counseling, group therapy, workshops and connections to other support services on and off-campus. For assistance visit uh.edu/caps, call 713-743-5454, or visit a Let's Talk location in-person or virtually. Let's Talk are daily, informal confidential consultations with CAPS therapists where no appointment or paperwork is needed. The Student Health Center offers a Psychiatry Clinic for enrolled UH students. Call 713-743-5149 during clinic hours, Monday through Friday 8 a.m. - 4:30 p.m. to schedule an appointment. The A.D. Bruce Religion Center offers spiritual support and a variety of programs centered on well-being. Need Support Now? - If you or someone you know is struggling or in crisis, help is available. Call CAPS crisis support 24/7 at 713-743-5454, or the National Suicide and Crisis Lifeline: call or text 988, or chat 988lifeline.org.
Title IX - Sexual misconduct	Per the UHS Sexual Misconduct Policy, your instructor is a "responsible employee" for reporting purposes under Title IX regulations and state law and must report incidents of sexual misconduct (sexual harassment, non-consensual sexual contact, sexual assault, sexual exploitation, sexual intimidation, intimate partner violence, or stalking) about which they become aware to the Title IX office. Please know there are places on campus where you can make a report in confidence. You can find more information about resources on the Title IX website at https://uh.edu/equal-opportunity/title-ix-sexual-misconduct/resources/.
Reasonable Academic Adjustments/Auxilliary Aids	The University of Houston is committed to providing an academic environment and educational programs that are accessible for its students. Any student with a disability who is experiencing barriers to learning, assessment or participation is encouraged to contact the Justin Dart, Jr. Student Accessibility Center (Dart Center) to learn more about academic accommodations and support that may be available to them. Students seeking academic accommodations will need to register with the Dart Center as soon as possible to ensure timely implementation of approved accommodations. Please contact the Dart Center by visiting the website: https://uh.edu/accessibility/ calling (713) 743-5400, or emailing jdcenter@Central.UH.EDU.
Recording of Class	Students may not record all or part of class, livestream all or part of class, or make/distribute screen captures, without advanced written consent of the instructor. If you have or think you may have a disability such that you need to record class-related activities, please contact the Justin Dart, Jr. Student Accessibility Center. If you have an accommodation to record class-related activities, those recordings may not be shared with any other student, whether in this course or not, or with any other person or on any other platform. Classes may be recorded by the instructor. Students may use instructor's recordings for their own studying and notetaking. Instructor's recordings are not authorized to be shared with anyone without the prior written approval of the instructor. Failure to comply with requirements regarding recordings will result in a disciplinary referral to the Dean of Students Office and may result in disciplinary action.

There is no assigned book for this class that you will need to purchase. I will provide materials periodically.
Students willl likely need to purchase a monthly subscription to a large language model such as ChatGPT or Claude; I will try to make sure that costs are less than $25 per month. I will provide further advice in August as the landscape becomes clear
Students will need a free Google Colab account. They will likewise need to install free Mathematica software, which they can obtain from the University (a/k/a Wolfram Language)
Students will need a Windows/Mac or Linux laptop with at least 16 GB of RAM

Formative Assessment 1	8 points
Formative Assessment 2	10 points
Project	32 points
Final Exam	50 points
The instructor reserves the right to raise or lower grades by one unit for exceptionally good or poor class participation; class participation consists of intelligent commentary when called on or when volunteering. I will also consider submission of current event materials that contribute to the class' understanding of the material, particularly if they have legal application	

You need very little more than high school mathematics in this class. I assume you know how to perform basic calculator operations such as addition, subtraction, multiplication, division and exponentiation. I also assume you know very basic high school algebra. (Try this problem y == 2x -8, solve for x) I do not assume you took or remember much about calculus. I will teach you the two key calculus concepts you need to do: (1) computation of a "derivative" numerically; and (2) gradients of composed functions. I will teach you matrix multiplication and possibly convolution. I will teach you how to do very basic programming in Python using English and large language models to do most of the work. I will teach you how to do very basic programming in Wolfram Language using Chat Notebooks and external large language models to do most of the work. You should, however, have good math intuition and not hate math (or programming).
Programming
One of the points of this course is that you don't need to know how to program anymore, at least in the old fashioned way. English is the new programming language. That said, some programming background may be helpful. It may permit you to do somewhat more advanced projects and it may permit you to understand more fully at times some of the exposition I offer. If you do know programming, the two most valuable languages will be Python and Wolfram Language. But I don't think any student should feel they can't compete in the course due to lack of programming background.
Students wishing to use an alternative language to perform their project should speak with me. I might tolerate R, Visual Basic, Javascript, Julia. Matlab would be tough to swallow. I would not be excited by Java, C, C++, Perl. Rust or Go would be intriguing, but I know nothing about them.

Idea Number	Idea
1	Use a citation extractor and build a network of a federal code such as the tax code
2	Perform causal inference on data relating to law
3	Show equivalents of P-Hacking in machine learning
4	Using neural network architectures to efficiently generate causally related data
5	Causal discovery
6	TBA
7	TBA
8	TBA
9	TBA
10	TBA