Methods in Empirical Analysis, Course Calendar

CSCE 5310, Spring 2023 at University of North Texas
https://www.biomed-ai.com/class

Important links: SYLLABUS, Academic Calendar

All items are tentative until class time on the indicated day

Dates	Topic	Course expectations	Tutorials / readings
Jan 17	Class intro, Whirlwind tour of stats [slides]	Empirical Analysis class overview: syllabus (link at top), calendar.	Stats "take home" messages [pdf], Example stats test flowchart [pdf].
Jan 19	Finishing the tour. Programming expectations.	Canvas Quiz #1: Stats whirlwind tour [canvas] (optional: AI discord [link])	Seltman chapter 1-2 [pdf]
Jan 24	Statistical test case study: t-test and assumptions [Seltman slides 6]	Canvas Quiz #2: t-test and basic assumptions of stats tests [canvas]	Seltman chapter 6 [pdf]. Skip any SPSS-specific material. (optional: t-test [wiki])
Jan 26	One-way ANOVA [Seltman slides 7]	Canvas Quiz #3: ANOVA basics [canvas]	Seltman chapter 7 [pdf] (optional: one-way ANOVA [wiki])
Jan 31	CLASS CANCELED - university closed due to weather		
Feb 2	CLASS CANCELED - university closed due to weather		
Feb 7	Research Design slides [slides] Exploratory data analysis, univariate methods Data visualization and multivariate methods [slides] Making publication quality figures	Canvas Quiz #4: Exploratory data analysis [canvas] Canvas Quiz #5: Research Design principles [canvas]	Seltman chapter 4: EDA [pdf] [highlights] Seltman chapter 8: Experimental design [pdf] [highlights]
Feb 9		HW #1: Job ad keyword search (past examples: ML [slides1], [slides2], mobile/java/web [slides])	Data Visualization notebook Data Frames notebook Creating publication quality figures [gDoc] 10 rules for better figures [pdf]
Feb 14	Resampling methods [slides 1-54]	Canvas Quiz #6: Resampling methods [canvas]	Resampling [wiki] and Resampling methods chapter [pdf] (optional: Resampling Methods in Comp Methods in Stats [link], and [Berger introduction]))

Feb 16	Cross-validation methods and examples [slides 55-67] and also these [slides]	Canvas Quiz #7: Cross-validation methods [canvas]	Cross-validation [sklearn] [wiki]
Feb 21	Best practices validating ML in medicine. Systematic review of PD models paper discussion.	Canvas Quiz #8: Best Practices applying ML in Medicine [canvas] Exam review (reminder: please bring laptops next class)	Best practices paper [html] [pdf] Systematic review of PD models [draft - do not share widely] (optional Tapia Panel video [mp4] [semi-live session info]
Feb 23	**EXAM 1:** In the classroom, **bring your laptop** as a portion of the exam will be online, but to be taken during class time. (contact Dr. Albert prior to class for alternate accommodations) Here is the exam seating chart.		
Feb 28	Simple linear regression [slides]	Canvas Quiz #9: Linear regression [canvas] HW#2: Project 1 brainstorming assignment [due ~~before next class period on thursday!~~ EXTENDED to Mar 7th]	Seltman chapter 9
Mar 2	Statistical power [slides] Project selection in class (you need to find a group before the end of the week)	Canvas Quiz #10: Statistical power [canvas] HW#3: P1 project proposal assignment	Seltman chapter 12 (12.1 - 12.3 only)
Mar 7	Discrete probability distributions overview - Binomial / Multinomial, Hypergeometric, Geometric, Negative Binomial, Poisson [slides]	Canvas Quiz #11: Discrete probability distributions [canvas]	Seltman section 3.9 for a brief overview [PDF]. (optional: common prob distributions [link]) Overview goals: focus on which distribution is appropriate for a given situation, how to use the CDF if given, and any direct comparisons between functions.
Mar 9	Simple continuous Probability Distribution overview - multivariate normal, t, F, exponential, Gamma, Chi-Squared [slides]	Canvas Quiz #12: Continuous probability distributions [canvas] HW#4: Probability distribution word problems [due in 2 weeks]	Overview goals: focus on which distribution is appropriate for a given situation, how to use the CDF if given, and any direct comparisons between functions. Stats problem review slides [probability questions only]
Mar 14 & 16	**HAVE A GREAT SPRING BREAK!!!**		
Mar 21	Nonparametric testing methods 1 [slides - 1-37 only]	Canvas Quiz #13: Nonparametric testing methods [canvas]	You should be able to choose the appropriate test using this chart

		HW#5: Non-parametric testing word problems	[pdf] (which will be available during upcoming exams) Tests covered include: Chi Square [wiki], Fisher's Exact [wiki], McNemar [wiki], Sign test [wiki], Wilcoxon signed-rank [wiki], Mann-Whitney U [wiki], Kruskal-Wallis [wiki], Friedman [wiki]
Mar 23	Nonparametric testing methods practice in-class - review slides	HW #6: P1 Project Update HW #7: P1 Project Consultation (list of teams and email addresses to help make connections outside of class [gSheet])	
Mar 28	In-class review and project work	HW #8: P1 Project Report slides and presentation [due Apr 6 - one week after the exam] HW #9: P2 Project Brainstorming [due Apr 6 - one week after the exam]	
Mar 30	**EXAM 2:** In the classroom, **bring your laptop** as a portion of the exam will be online, but to be taken during class time. (contact Dr. Albert prior to class for alternate accommodations and be prepared to provide documentation) Here is the exam seating chart.		
Apr 4	Categorical outcome tests review - Chi Square, Fisher's, McNemar's in detail [slides]	Finish P1 previous assignments and P2 brainstorm for Thursday. Feedback on class points so far [distribution info]	Seltman chapter 16.1-16.2
Apr 6	Project selection in class. Come with potential topics. Bring laptops. If you can't come, have someone pick for you. Everyone in class will be assisted to find groups and topics. Outside of class - you are on your own. HW #10: P2 Proposal assigned. Draft document for selecting teams and projects		
Apr 11 (Dr. Albert away)	P2 project team effort	Use the time to meet with your team. Work on proposal and project progress.	
Apr 13	Continued P2 project effort	HW #11: P2 project update HW #12: P2 project consultations (team memberships and emails [gDoc])	
Apr 18 (Dr. Albert away)	ANCOVA [slides]	Working on project in class with any time remaining	Seltman chapter 10
Apr 20 (Dr. Albert away)	Two-way ANOVA [slides]	HW #13: P2 Project Report slides and presentation [due before class on Apr 27 - exam 3 day] Canvas Quiz #14: ANCOVA and two-way ANOVA [canvas]	Seltman chapter 11

Apr 25	Stats word problem section description and review [review slides] (Optional: Job keywords overview [10 mins, slides], unedited student-submitted [example problems])	Practice for new section of stats word problems for future exams - including tomorrow's Reminder - Thursday exam 3 and all assignments to be turned in BEFORE class on Thursday.	In class exercises will be given as summary reviews of the material over the semester - similar in style to earlier homework.
Apr 27	**EXAM 3:** In the classroom, **bring your laptop** as a portion of the exam will be online, but to be taken during class time. (contact Dr. Albert prior to class for alternate accommodations and be prepared to provide documentation) Additional in-class pop-quiz. Here is the exam seating chart. All projects, assignments, and canvas quizzes are to be turned on before class on this day to allow for grading and review on May 2nd.		
May 2	Course review lightning presentation [slides - over 140!]. Grading wrap up [current snapshot - all but final exam (out of over 105 points - remember points not percentages!)] & Final words. Reminder of special final start time.		
May 4	Final project presentations - some of the better recorded presentations played in class, celebrated, and discussed, **as well as notable departures from proper statistical analysis and examples of what not to do**. Group videos to be presented [folder]		
10:30am - 12:30pm May 9	**EXAM 4:** In the classroom, **bring your laptop** as a portion of the exam will be online, but to be taken during class time. (contact Dr. Albert prior to class for alternate accommodations and be prepared to provide documentation) (Note the policy of dropping lowest exam grade) Here is the exam seating chart. Alternate time, 10:30am-12:30pm, Tuesday, May 9th.		