DESCRIPTION (FROM THE CATALOG)

Restricted to informatics majors and students pursuing the informatics minor. Examine fundamental principles of probability and statistics. Cultivate an understanding of descriptive and inferential statistics. Conduct and interpret statistical analyses using statistical analysis software, and apply these analyses to common issues in informatics. Three lecture hours a week for one semester. Offered on the letter-grade basis only.

DETAILS

Important note: The information presented in this syllabus is subject to expansion, contraction, change, or stasis during the semester. In case of conflict between versions, the copy on Canvas takes precedence.

Course Number. 28075
Prerequisites.
Time. TTh 1700–1830
Place. UTC-1.116
Dates. January 9–May 1, 2023
Final Exam. Take-home, due at our official exam time
Instructor. Mick McQuaid
Email. mcq@utexas.edu
Office. 1616 Guadalupe St, Room 5.402
**Office Hours.** TUE 1430–1630, WED 1300–1500 or by appointment

**MATERIALS**

Our textbook is the freely available Diez, Çetinkaya-Rundel, and Barr (2019). Additional textbooks you can use include the freely downloadable Wickham, Çetinkaya-Rundel, and Grolemund (2023) and James et al. (2021). A more advanced textbook is the freely available Kuhn and Silge (2022), the full text of which is available at tmwr.

**LEARNING OUTCOMES**

- learn to describe data using statistics and contingency tables to summarize
- learn to use probability distributions
- learn to visualize data using R
- learn to develop confidence intervals
- learn to conduct hypothesis tests
- learn to conduct single and multiple regression using R
- learn to write reproducible reports using Quarto

**CLASS FORMAT**

The class will be half lecture, half work time on a computer. You should definitely bring a laptop computer class, especially on Thursdays.

**SCHEDULE**

Week 1 (10 Jan, 12 Jan) Introduction to data — Introduction to R — Introduction to R Studio — Introduction to R markdown
Week 2 (17 Jan, 19 Jan) Summarizing data — Examining numerical data — Considering categorical data — More on R markdown — Introduction to Quarto

Week 3 (24 Jan, 26 Jan) More on R and quarto — Visually summarizing data — Milestone 1 due

Week 4 (31 Jan, 2 Feb) Probability — Defining probability — Conditional probability — Sampling from a small population — Random variables — Continuous distributions

Week 5 (7 Feb, 9 Feb) Distributions of random variables — Normal distribution — Geometric distribution — Binomial distribution — Negative binomial distribution — Poisson distribution — Milestone 2 due

Week 6 (14 Feb, 16 Feb) Foundations for inference — Point estimates and sampling variability — Confidence intervals for a proportion — Hypothesis testing for a proportion

Week 7 (21 Feb, 23 Feb) Inference for categorical data — Inference for a single proportion — Differences of two proportions — Testing for goodness of fit using chi-square — Testing for independence in two-way tables — Exercise 1 due

Week 8 (28 Feb, 2 Mar) Inference for numerical data — One-sample means with the t-distribution — Paired data — Difference of two means — Power calculations for a difference of means — Comparing many means with ANOVA

Week 9 (7 Mar, 9 Mar) Introduction to linear regression — Fitting a line, residuals, and correlation — Least squares regression — Types of outliers in linear regression — Inference for linear regression — Exercise 2 due

Spring Break

Week 10 (21 Mar, 23 Mar) Multiple and logistic regression — Introduction to multiple regression — Model selection — Checking model conditions using graphics — Multiple regression case study: Mario Kart — Introduction to logistic regression — Milestone 3 due
Week 11 (28 Mar, 30 Mar) More on R and the tidyverse
Week 12 (4 Apr, 6 Apr) In class work on milestone 4 and 
exercise 3 — Milestone 4 due
Week 13 (11 Apr, 13 Apr) Typical UX experiments
Week 14 (18 Apr, 20 Apr) Typical data science experiments
— Exercise 3 due

GRADING

I plan to grade assignments within two weeks of their due 
date except where circumstances interfere. The grading scale 
used along with the grade components follow.

• A >= 90.0%
• B >= 80.0% & < 90%
• C >= 70.0% & < 80.0%
• D >= 60.0% & < 70.0%
• F < 60.0%

Group work: 4 milestones, each 10 points.

• Milestone 1: description (tables, summary stats)
• Milestone 2: description (visualization)
• Milestone 3: regression
• Milestone 4: regression diagnostics

Individual work: 3 assignments, each 10 points + 1 
exam 30 points.

• Exercise 1: description
• Exercise 2: regression
• Exercise 3: regression diagnostics
POLICIES

Policy on Academic Integrity. Students who violate University rules on academic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on academic dishonesty will be strictly enforced. For further information, please visit the Student Conduct and Academic Integrity website at: http://deanofstudents.utexas.edu/conduct.

Accommodations. Any student with a documented disability (physical or cognitive) who requires academic accommodations should contact the Services for Students with Disabilities area of the Office of the Dean of Students at 471-6259 (voice) or 471-4641 (TTY for users who are deaf or hard of hearing) as soon as possible to request an official letter outlining authorized accommodations.

Religious Holy Days. Religious holy days sometimes conflict with class and examination schedules. Sections 51.911 and 51.925 of the Texas Education Code address absences by students and instructors for religious holy days. Section 51.911 states that a student shall be excused from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student whose absence is excused under this subsection may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence.

University policy requires students to notify each of their instructors as far in advance of the absence as possible so that arrangements can be made.
Instructor absence. Section 51.925 prohibits the university from discriminating against or penalizing an instructor who is absent from class for the observance of a religious holy day. Proper notice must be given to the department chair. Prior to the begin of classes each semester, the instructor must provide the department chair a list of classes that will be missed due to observance of a religious holy day. The list must be personally delivered, acknowledged and dated by the chair, or sent via certified mail, return receipt requested.

Consistent with regular university policy, the instructor is responsible for finding a qualified substitute UT Austin instructor for any missed class(es).

Personal Pronouns. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender identity & expression, and nationalities. Class rosters are provided to the instructor with the student’s legal name, unless they have added a “chosen name” with the registrar’s office, which you can do so here: https://utdirect.utexas.edu/apps/ais/chosen_name/. I will gladly honor your request to address you by a name that is different from what appears on the official roster, and by the pronouns you use (she/he/they/ze, etc). Please advise me of any changes early in the semester so that I may make appropriate updates to my records. For instructions on how to add your pronouns to Canvas, visit https://utexas.instructure.com/courses/633028/pages/profile-pronouns. More resources available on the Gender and Sexuality Center’s website, https://www.utgsc.org.

Basic Needs Security. Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. UT maintains the UT Outpost (http
which is a free on-campus food pantry and career closet. Furthermore, please notify the professor if you are comfortable in doing so. This will enable him to provide any resources that he may possess.

**Mental Health Information.** I urge students who are struggling for any reason and who believe that it might impact their performance in the course to reach out to me if they feel comfortable. This will allow me to provide any resources or accommodations that I can. If immediate mental health assistance is needed, call the Counseling and Mental Health Center (CMHC) at 512-471-3515 or you may also contact Bryce Moffett, LCSW (iSchool CARE counselor) at 512-232-2983. Outside CMHC business hours (8am-5pm, Monday–Friday), contact the CMHC 24/7 Crisis Line at 512-471-2255.

**REFERENCES**


