Applied Statistics I – BIST/STAT5505-002
Fall 2018: Mo 11:15AM - 1:10PM, We 11:15AM - 12:05PM; AUST 344

Instructor: Ofer Harel   <ofer.harel@uconn.edu>
Office Hours: AUST 320; Mo and Thur 9:00am-10:00am or by appointment
Grader: Di Zheng   <di.zheng@uconn.edu>

Course Description (STAT5505-5605):
Statistics from a data analytic viewpoint incorporating parametric and nonparametric methods, exploratory data analysis, graphical methods, one-sample problems, jackknifing, bootstrapping, robustness, two-sample problems, k-sample problems including one-way ANOVA, randomized block designs, two-way ANOVA, additivity, simple linear regression, multiple linear regression, analysis of covariance, and categorical data.

Course Objectives:
This is the first part of a sequence course (STAT5505 and STAT5605). At the end of the course, students should be able to

- Apply graphical methods for exploratory data analysis.

- Demonstrate comprehensive knowledge of univariate and multivariate data distributions, one-, two-, and k-sample analyses, parametric and nonparametric methods, jackknifing and bootstrapping, and categorical data analyses.

- Conduct statistical analyses using SAS and R computer packages.

Reference Text:

1. **Special Notes** in pdf files, prepared by Professor Nalini Ravishanker, posted on the HuskyCT course website (available through `https://lms.uconn.edu/`).

2. *Statistical Methods.* Snedecor and Cochran, 1989. Iowa State University Press.

3. *Graphical Methods for Data Analysis.* Chambers et al. 1983. Chapman & Hall.

4. *An Introduction to Categorical Data Analysis*, 3rd Edition. Agresti, A. Wiley, 2013.

Course Materials:
Lecture notes, assignments, sample code, datasets, and other course material will be posted on the HuskyCT course website (available through `https://lms.uconn.edu/`).
Please visit this site often to ensure timely obtainment of materials. The lecture notes will be available online before each class.

Software:

- SAS ($\geq$v 9.4); SAS ODS, BASE, PROCEDURES, STAT, GRAPHICS, IML, and MACRO will be used. Available for (free) use through

  -library (HBL, level 1).

  -Skybox (Virtual PC): `http://skybox.uconn.edu/`

- R: freely available for download at `http://www.r-project.org/`.

NOTE: UCLA's Statistical Computing website offers excellent tutorials/resources for SAS and R (and other languages): `www.ats.ucla.edu/stat/`.

Course Activities & Grading:

- Homework

  - Approximately 9-12 homeworks will be assigned during the semester. Students may consult amongst themselves or with the instructor, but each student must submit his/her own work.
  - All homework assignments are to be typed in Word or pdf documents, formatted according to the grader's instructions (posted on HuskyCT course website), and submitted through the HuskyCT course website. **Students may submit each assignment only once.**
  - All completed assignments are to be submitted by the due date. Assignments will be accepted late up to 2 days beyond the due date, but with penalty. Late submissions within the 2-day grace period will only be worth 50% - 95% of the points. Submissions beyond 2 days will not be graded and will receive no credit.
  - No credit will be given for submitted assignments exhibiting duplication or copying of solutions (from peers or existing solutions).

- Participation: We will have "active learning" in the classroom via discussion, Q&A, and problem solving. You must read the material (reading from the text and notes posted on the course HuksyCT site) before coming to class, and participate. There will be pop quizzes and the dates will be randomly selected.

- There will be one in-class midterm exam on Monday, October 22, 2018, in GENT 131, and one final exam. The final exam will be given during final exam week according to the school scheduled date. Final exam week for Fall 2018 takes place from Monday, December 10th through Sunday, December 16, 2018. Students are required to be available for their exam during the stated time. If you have a conflict with this time, you must visit the Dean of Students Office to discuss the possibility of rescheduling this exam.

  Please note that vacations, previously purchased tickets or reservations, social events, misreading the exam schedule and over-sleeping are not viable excuses for missing a final exam. If you think that your situation warrants permission to reschedule, please contact the Dean of Students Office with any questions.

- There will be one small project assigned after the midterm, due by 11:59pm, Friday, December 7, 2018.

The grades will be assigned as follows:

Homework Assignments	25%
Participation/Quizzes	5%
Small Project	5%
Midterm Exam	30%
Final Exam	35%

This grade assignment requires a passing grade in each exam, else the final course grade is up to the discretion of the instructor. In order to obtain a good course grade, students must successfully complete all homework assignments, the course project, the mid-term exam, and the final exam; attend every lecture; and actively participate in class.

Topics & Schedule: *Approximate Course Schedule (subject to change)*:

Week	Topic	Reading*
1. Aug 27, 29	Introduction, Graphical & Numerical Summaries of Data (Univariate Qualitative)	Ch 1 & 2
**. Sept 3	Labor Day - No class	
2. Sept 5	More Graphical & Numerical Summaries of Data (Univariate Quantitative)	Ch 2
3. Sept 10, 12	More Graphical & Summaries of Data (Multivariate), Basic Probability Concepts	Ch 2 & 3
4. Sept 17, 19	Data Distributions (Discrete Data Models)	Ch 3
5. Sept 24, 26	Data Distributions (Continuous Data Models)	Ch 3
6. Oct 1, 3	Data Distributions (Multivariate Distributions)	Ch 3
7. Oct 8, 10	Limiting Theory & Point Estimation	Ch 4
8. Oct 15, 17	Point Estimation	Ch 4
**. Oct 22	Midterm	
9. Oct 22, 24	Interval Estimation	Ch 4
10. Oct 29, 31	Interval Estimation, Hypothesis Testing	Ch 4
11. Nov 5, 7	Hypothesis Testing, One-sample & Two-sample Problems (Parametric & Nonparametric)	Ch 4
12. Nov 12, 14	One-sample & Two-sample Problems, (Parametric & Nonparametric), Jackknife, Bootstrap, Monte Carlo Methods	Ch 4
**. Nov 19, 21	THANKSGIVING RECESS	
13. Nov 26, 28	Categorical Data Analysis (2×2 contingency tables)	Ch 5
14. Dec 3, 5,	Categorical Data Analysis ($r \times c$ tables)	Ch 5

*Reading chapters refer to those in Professor Ravishanker's Special Notes.

NOTE: This course adheres to the policies from the University Senate, the Office of Institutional Equity, the Office of the Provost, and Community Standards. See `http://provost.uconn.edu/syllabi-references` for more information.