Statistics in Translational Science
PGS 383Q, Spring 2017
_____: unique #59575
San Antonio: unique #59570

Course Coordinator:	Dr. Chris Frei, PharmD, MS, FCCP, BCPS
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Office Hours:	Thursdays 9-11am; alternate times by request

General Course Description:

This introductory course is designed to help basic, clinical, and translational scientists develop critical thinking skills necessary to (1) correctly interpret common statistical methods encountered in the scientific literature, (2) select appropriate statistical methods for their own research, and (3) independently perform common statistical tests using a commercially available statistical software package (JMP®, SAS Institute, Cary, NC).

Course Format:

Required Course Activities

Course registrants will participate in **online asynchronous** presentations, homework, and tests. Students will have a capstone assignment: to produce a **research abstract** of excellent quality that can be submitted for presentation at a scientific or professional meeting. Read below to find out more about this assignment.

In the first half of the course, each weekly presentation will have a **pre-test** and **post-test**. Participants will receive a participation grade (0% or 100%) for answering all questions on the pre-test and a numeric grade (0% to 100%) for correct answers on the post-test. The course will proceed according to the following weekly schedule:

MONDAYS @ 5:00PM	WEDNESDAYS @ 11:59PM	SUNDAYS @ 11:59PM
Pre-test posted	**Pre-test due**	**Post-test due**
Presentation posted	Post-test posted	**Homework due**

Dr. Frei will provide the answers to the pre-test questions in his presentations. Most weeks, students will receive two PowerPoint® presentations. The **first presentation** will contain new didactic content. The **second presentation** will contain screen shots and Dr. Frei's instructions, as he works through data analysis exercises using the JMP statistical software. Finally, most weeks, students will receive a **homework assignment** that is similar to Dr. Frei's demonstrations.

Optional Course Activities

Course registrants may also participate in the **UT Austin College of Pharmacy Research Excellence Day**. This half-day annual conference is an excellent place for course participants to display and discuss their research abstracts/posters.

Required Software ($25 total, to be paid by the student):

Students will need to purchase the JMP® statistical software (SAS Institute, Cary, NC). They may download a free 30-day trial version from www.jmp.com or purchase a twelve-month ($25) academic license from UT Austin's Information Technology Services (http://www.utexas.edu/its/products/jmp/purchase.php).

Recommended Texts:

There are no required textbooks for this course; however, students can borrow one of the textbooks listed below from the UT library if they need additional help with didactic course content:

1. Dawson B, Trapp RG. Basic & Clinical Biostatistics. 4th ed. United States of America: McGraw-Hill Companies, Inc.; 2004. Available online: http://accesspharmacy.mhmedical.com.ezproxy.lib.utexas.edu/book.aspx?bookid=356
2. Fletcher RH, Fletcher SW. Clinical Epidemiology: The Essentials. 5th ed. New York: Lippincott Williams & Wilkins; 2012.

Web Resources:

The ***official Canvas® web site*** for this course can be accessed either through UTDirect or via http://courses.utexas.edu. Either access point is UTEID-protected, and provides students with links to the courses in which they are currently enrolled. Students must visit this site multiple times weekly to download content, take tests, and submit homework. Students will also take their mid-term exam at this site. The website will also be used for official, course-related announcements and to exchange class information and questions via the discussion board. Be aware that any messages posted to the discussion board are available to all enrolled students and faculty. Students who encounter problems accessing Canvas® should contact the ITS helpdesk at: 512-475-9400.

When video- or voice-recordings are made available by the College of Pharmacy for any course, they are intended solely for the purpose of review by students currently enrolled in that course. Faculty and students utilizing class video- and voice-recordings should be careful not to compromise the privacy of either themselves or other users (http://registrar.utexas.edu/students/records/ferpa), or the rights of the presenter. Any additional distribution of College- or student-generated recordings (regardless of format) is prohibited without the written and signed permission of the presenter and students identifiable on the recording.

Class Attendance & Participation:

Students must complete the tests, exams, and homework by the due date. Most weeks, there will be a pre-test due by Wednesday @ 11:59pm and a post-test and homework due by Sunday @ 11:59pm. In addition, students are invited to participate in the weekly office hours in person, by phone, or online.

Examinations and Grading Policy:

The semester grade will consist of points accumulated from weekly tests, homework, a mid-term exam, a final exam, and a research abstract. The material and assessments will be cumulative, as later classes build upon basic principles introduced in earlier classes. All tests, exams, and homework are to be completed **independently**. Students are encouraged to seek help from their research team and peers for the capstone research abstract.

Weekly pre-tests and post-tests	15% of the final course grade
Weekly homework	15% of the final course grade
Midterm exam (multiple-choice questions)	20% of the final course grade
Final exam (data analysis exercises)	30% of the final course grade
Research abstract (student's own project)	20% of the final course grade

For tests, homework, and the final exam, the student's grade will be reduced by 25% each day that one of these is late. After it is late for four days, the student will not receive any points for that assessment.

No allowances will be made for a midterm or final exam being missed, other than documented illness or emergency. The student must contact the course coordinator for confirmation prior to the exam. If permission is granted to delay the exam, it is the student's responsibility to complete the College Form titled "Student Request for Alternate Exam Time" for final consideration and final approval by the Faculty member. In this event, the nature of the make-up will be at the discretion of the course coordinator (oral, written, increased weighting on the final, etc.). An unexcused absence from an exam may result in a grade of "zero" for that exam.

Tests, exams, and homework will be returned within a reasonable time after the due date. Individual student scores can be accessed on Canvas; individual grades will not be publicly posted in any manner.

If there is a disagreement over the answer to a specific question, the student should submit a written explanation via email (with appropriate documentation) to the course coordinator within 72 hours of the Canvas posting of the exam results as described above. Documentation may include statements from textbooks, handouts, packets, or current scientific reprints; your lecture notes are *not* authoritative documentation. The explanation must be clear, rational, and concise. This policy does not apply to addition or other grading errors; we will simply make corrections when identified. Note that the course coordinator will <u>not respond</u> to reconsideration requests until the deadline has passed, so <u>do not</u> expect an immediate response to your request (be patient). Only after reconsideration requests are handled by *all* faculty involved, will the grades will be updated online.

For the **research abstract**, the student should identify a dataset and one or more data and statistical analysis objectives for use in this course by the end of the 2nd week of the semester. Dr. Frei will provide some examples from former students. During this course, Dr. Frei will lead the students through a variety of exercises that will teach them to analyze their data. At the end of the course, the student will submit a 250-word research abstract containing the following headings: (1) objective, (2) methods, (3) results, and (4) conclusions. Portions of the methods, results, and conclusions sections that involve data and statistical analysis will be assessed for appropriate statistical test selection and execution. Students should consult their Supervising Professor regarding the preferred approach to data and statistical analysis; however, the students will learn how to conduct those tests in this course and they will be asked to demonstrate their ability to perform those tests at the conclusion of this course. The student is encouraged to submit their final research abstract for presentation at a research or professional meeting, after review and approval by their Supervising Professor.

Final Grade Policy:
The letter grade in this course will be determined based on the following scale:
A = 90-100%
B = 80-89%
C = 70-79%
D = 65-69%
F = Below 65%

It is the prerogative of the course coordinator to evaluate course grades and determine if an upward curve or intermediate grades (i.e., B+) are warranted.

Academic Integrity:

Students are expected to work **independently** on tests, exams, and homework. Any student suspected of dishonesty will be reported to the Dean of the Graduate School and the Dean of their College, as per University regulations, with the recommendation that an "F" be assigned for the course grade. Students are expected to have read and understood the current issue of the General Information Catalog published by the Registrar's Office for information about procedures and about what constitutes scholastic dishonesty. Also, students should refer to the Student Judicial Services website to access the official University policies and procedures on scholastic dishonesty as well as elaboration on what constitutes scholastic dishonesty.

Students with Disabilities:

Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities at 471-6259 (voice) or 232-2937 (video phone) or www.utexas.edu/diversity/ddce/ssd. All University rules concerning accommodations must be followed, including the student arranging for special accommodations **prior to each examination**. In the absence of such **prearrangement**, it will be assumed that the student is not requesting special accommodations for that exam, and will be expected to take the exam with the rest of the class at the regularly scheduled exam time.

Religious Holidays:

If you will miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, you must notify the course coordinator during the first week of class so that arrangements for all such students can be made for the full semester.

Emergency Procedures:

The following recommendations regarding emergency evacuation from the Office of Campus Safety and Security, 512-471-5767, http://www.utexas.edu/safety/:

- Occupants of buildings on The University of Texas at Austin campus are required to evacuate buildings when a fire alarm is activated. Alarm activation or announcement requires exiting and assembling outside.
- Familiarize yourself with all exit doors of each classroom and building you may occupy. Remember that the nearest exit door may not be the one you used when entering the building.
- Students requiring assistance in evacuation shall inform their instructor in writing during the first week of class.
- In the event of an evacuation, follow the instruction of faculty or class instructors.
- Do not re-enter a building unless given instructions by the following: Austin Fire Department, The University of Texas at Austin Police Department, or Fire Prevention Services office.
- If you have concerns about another students behaviors, particularly if you believe they could potentially harm themselves or others, do not hesitate to contact the Behavior Concerns Advice Line (BCAL): 512-232-5050

Campus Concealed Carry:

Students should familiarize themselves with the information provided by the University regarding the implementation of "Campus Carry" legislation. You will find an information sheet specifically for students (as well as sheets for parents, visitors, faculty, and staff) at http://campuscarry.utexas.edu/info-sheets. Information about "Campus Carry" on the UTHSCSA campus can be found at https://www.uthscsa.edu/police/campus-carry/implementation-overview.

Course Schedule

Week	Date	Assignments		Instructor
1	1/16 (MON)	Content Homework	**Course Introduction & Syllabus** Post intro video. Purchase software. Read syllabus.	Frei
2	1/23 (MON)	Content Homework	**Research Abstract Introduction** Identify dataset and analysis objectives.	Frei
3	1/30 (MON)	Content Homework	**Data Types, Distributions & Central Measures** Describe your data using stat tests from lecture. Submit Word document and JMP journals.	Frei
4	2/6 (MON)	Content Homework	**Sample Size & Power** (α and β error) Determine sample size and power for a word problem. Submit Word document and JMP journals.	Frei
5	2/13 (MON)	Content Homework	**Hypothesis Testing 1: Parametric Tests** (Student's t-test & ANOVA) Perform t-tests. Submit JMP journals.	Frei
6	2/20 (MON)	Content Homework	**Hypothesis Testing 2: Nonparametric Tests** (chi-square, Fisher's Exact, & Wilcoxon Rank Sum) Perform three stat tests. Submit JMP journals.	Frei
7	2/27 (MON)	Content Homework	**Epidemiologic Measures** No homework this week. Study for midterm exam.	Frei
8	3/6 (MON)	Content Homework	**Midterm Exam** Take exam (20 multiple-choice "knowledge" questions).	Frei
	3/13 (MON)	Spring Break	Post-Spring Break lectures will be "application" only.	
9	3/20 (MON)	Content Homework	**Survival Methods** Work class examples. Submit JMP journals.	Frei
10	3/27 (MON)	Content Homework	**Logistic Regression** (with nominal/ordinal confounders) Work class examples. Submit JMP journals.	Frei
11	4/3 (MON)	Content Homework	**ANCOVA, Least-Squares Regression, & Correlation** (with numeric confounders for LS regression) Work class examples. Submit JMP journals.	Frei
12	4/10 (MON)	Content Homework	**Research Abstract Draft** Submit 1st draft of research abstract.	Frei
13	4/17 (MON)	Content Homework	**Research Abstract Peer Reviews** Conduct & submit peer reviews of student abstracts.	Frei
14	4/24 (MON)	Content Homework	**Final Exam** Take home exam (5 data analysis exercises from "application" lectures presented in all previous weeks).	Frei
15	5/1 (MON)	Content Assessment Homework	**Course Conclusion** Complete course and instructor surveys. Submit final version of research abstract.	Frei