MATH 3450 – Biostatistics I
TTh 11:00 – 12:15    Welder 220

INSTRUCTOR:  Jack Follis
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Email:        follisj@stthom.edu
OFFICE       Math 113
OFFICE HOURS MW 11:00 am – 2:30 pm
              TTh 10:00 am – 11:00 am
Or by appointment

Course Catalog Description: Basic concepts leading to advanced applications in biostatistics. Topics include study design, data collection, descriptive statistics, probability and probability distributions, confidence intervals, hypothesis testing, power of statistical tests, and simple regression with an emphasis on applications in the biomedical sciences and biomedical research. Data will be analyzed using statistical software packages.

Prerequisite: Six credit hours in a natural science or six credit hours in mathematics

COURSE OBJECTIVES:
Upon completion of this course, students will be able to:

- Identify different types of data/variables and the appropriate summary statistics for describing each
- Identify study populations, study questions, exposure and outcome variables for a study
- Calculate and interpret Odds Ratios and Relative Risk
- Identify the strengths and weaknesses of different study designs
- Create tables, pictures and/or graphs for summarizing data sets and results
- Identify random variables and probability distributions
- Construct and interpret confidence intervals
- Conduct appropriate hypothesis tests
- Calculate and explain p-values
- Estimate and interpret the parameters of simple linear regression models
- Read and interpret results of an appropriate medical research article
- Learn how to use software for statistical analyses
Instructional methods:

This is blended learning course. Blended/hybrid courses are courses which “… combine the flexibility of online instruction with the benefit of face-to-face instruction in the classroom.” Additionally, “These courses effectively combine classroom-based instruction with online instruction thereby reducing the amount of time spent in the physical classroom.” These courses maintain the same academic standards and rigor of traditional courses.

Lectures for the course will be available for you to download/view on Blackboard, with the class meetings on Tuesdays and Thursdays to discuss the concepts covered in the online lectures and/or work through problems and applications of the material. Having the lectures online not only allows you to move through the lectures at your own pace, but it allows you a chance to review the lectures. There will be online and in-class quizzes over the material covered.

Since at least 30% of this course (lectures) will be online, the in-class component of the course will not meet for the fully scheduled course time.

Technology

1) Course syllabus, documents, and lectures will be available on the UST Blackboard site.
2) Software: This course will use Excel and the R Statistical Software Package (and RStudio). The R Statistical Software Package (and RStudio) is free open source software used by a large number of researchers. It is highly recommended that students download their own copy for use outside of the classroom. Instructions for how to download and install RStudio will be available online.
3) Students are expected to access their UST email accounts. All email communications from the professor will be via the email list in Blackboard and this will send emails to the UST email account of each student. If you do not regularly access this account it is IMPERATIVE that you have your email forwarded to the account which you regularly use.
Course Outline:
The outline below is tentative; it may change in the event of circumstances beyond the instructor's control.

1. Introduction
2. Ethics, Study Design and Data Collection
3. Descriptive Statistics
   a. Categorical Variables
   b. Continuous Variables
   c. Relationships between variables
4. Probability
   a. Screening Tests & Bayes Rule
   b. Prevalence & Incidence
   c. Odds Ratios & Relative Risk
5. Probability Distributions
   a. Random Variables
   b. Probability Distributions
   c. Discrete Probability Distributions
6. Normal Probability Distributions
   a. Standard Scores
   b. Standard Normal (z) Distribution
   c. Normal Distributions
7. Sampling Distributions and the Central Limit Theorem
8. Confidence Intervals
   a. Introduction
   b. Proportions
   c. Means
9. Hypothesis Testing
   a. Introduction
   b. Proportions
   c. Means
   d. Chi-square tests
10. Linear Regression
11. ANOVA
12. Special Topics
GRADE IN COURSE:

- Quizzes* 40%
- Online Quizzes* 10%
- Assignments** 15%
- Midterm 15%
- Final 20%

* There are no make-ups for missed quizzes.
**Late assignments and/or electronic submissions will only be accepted with the instructor’s consent.

**GRADING SCALE:** In this class the final course grades will be determined using the following grade scale:

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<td>80-82.9</td>
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<td>B</td>
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**Policy on Academic Dishonesty**  
(From the 2016-2017 Undergraduate Catalog)

**Policy/Procedure**
Every offense against academic honesty seriously undermines the teaching-learning process for which the University exists, and such offenses will be dealt with expeditiously according to the following criteria.

**Definition**
Academic dishonesty includes but is not limited to:
1. Cheating on an examination or test; for example, by copying from another’s work or using unauthorized materials before or during the test, including the use of electronic devices;
2. Plagiarism, which represents as one’s own the work of another, whether published or not, without acknowledging the precise source;
3. Participation in the academic dishonesty of another student, even though one’s own work is not directly affected;
4. Any conduct which would be recognized as dishonest in an academic setting.

**Penalty**
The penalty for an incident of academic dishonesty is, at the discretion of the faculty member, either a mark of zero for the work in question or a grade of F for the course.

**Disabilities**
Any student with a disability requiring accommodations in this course is encouraged to contact me after class or during office hours. Additionally, students will need to contact Counseling and Disability Services in Crooker Center. This office can be reached at (713) 525-2169 or 6953

**DROPPING THE COURSE:** If you decide you do not wish to continue the course, it is your responsibility to go through the proper channels and officially drop the course.

**Tutorial Services**
Students needing extra assistance with course concepts may also visit the Tutorial Services Center and/or ust.askonline.net.