Washington
University in St.Louis
SCHOOL OF MEDICINE
Public Health Sciences

Introductory Statistics for Clinical Research
M19-511
Fall 1: 2016
Course Syllabus

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Office Hours: By appointment (send email to schedule)

Course Description: This introductory course in biostatistics is designed for medical students, clinicians and health researchers. The course will introduce students to basic statistical concepts including hypothesis testing, probability distributions and relevant basic statistical methods. Through lectures, labs, and homework assignments, students will learn to apply statistical concepts to the medical context. This course includes introductions to the use of computers for statistical analysis, summarizing and exploring data, probability theory, discrete and continuous probability distributions, populations and samples, sampling distributions and statistical inference, and hypothesis testing. Upon completion of the course, students will be able to summarize quantitative data and carry out and interpret simple data description and analyses using the SAS program. Prerequisite for the course is knowledge in SAS.

Prerequisite: Introduction to SAS for Clinical Research: M19-510

Lectures: Mondays and Wednesdays from 9am to noon (8/29 – 10/14)

Course website: Please visit the Blackboard course website on a regular basis. This is where you will find course announcements, data necessary to complete the homework assignments, and handouts. It is your responsibility to check for and print the course handouts and bring them with you to class.

Calculator: Students will be allowed and encouraged to use a calculator, for homework, and on exams. The choice of calculator is yours but make sure it can take square roots and raise to powers (e.g. TI-30).

Statistical Software: The course provides a further introduction to SAS, a statistical software package. Several homework assignments require you to use SAS for one or more questions.

Textbooks:

Title	Edition	Author(s)	Purchase
Principles of Biostatistics	2	Marcello Pagano Kimberlee Gauvreau	*Recommended*
Fundamentals of Biostatistics	6/7	Bernard Rosner	*Recommended*

Attendance: Class attendance is required. As a courtesy to other students, you are expected to arrive on time. More than one unexcused absence from class may result in a lowered grade. Do not enroll if you have absences already planned. The value of the class stems from the quality of the input received from peers and course instructors.

Exams: There will be a midterm and final examination. You will have the complete class length (3 hours) to complete the examination. The exams are open notes and you will be allowed to use a scientific calculator. No graphing calculators, cell phones, PDA's, computers, or laptops can be used during the examination.

Homework: Homework assignments can be found on blackboard under course documents in the homework folder.

Each homework assignment will be graded on a pass/fail basis. In order to receive credit for a homework assignment, students must complete every question. Homework assignments will be reviewed at the beginning of class on the day they are due, and students will have an opportunity to correct their homework assignments during this period.

All assignments must be *neatly* written or typed and stapled in the top left hand corner. Problems should be submitted in the order in which they were assigned. All graphs should be properly labeled and only relevant SAS output should be included in homework.

Classroom environment: This is a course where students bring research ideas in development. Ideally, everyone should be involved in classroom discussions. In order for everyone to feel comfortable presenting work and voicing opinions and suggestions, a climate of tolerance and respect is essential.

Course Syllabus Subject to Change: Every effort will be made to follow the syllabus content and schedule. If circumstances dictate, there may be modifications made during the semester and every effort will be made to notify students in a timely manner.

Readings: You should complete the required readings before each class session.

Grading: Your grade will consist of four components: Homework, Midterm, Final, and class participation.

M19-511 Course Grade

Components	Points	Percentage
Homework Assignments	100	30%
Midterm	100	30%
Final	100	30%
Class Participation	100	10%
Total	**400**	**100%**

Academic Honesty:
Students are expected to complete exams and assignments in accordance with Washington University's academic rules and regulations regarding honesty and integrity. Any evidence of academic misconduct, including cheating, failure to cite sources, and plagiarism will result in appropriate action as dictated by Washington University. Violations of academic honesty will result in notification to the Associate Dean of Academic Affairs at the Washington University School of Medicine, as well as to the MPHS Director and Program Committee. Any hint of violation during exams/assignments will result in no grade for the exam/assignment. For more information, see the University's Student Academic Integrity Policy:
www.wustl.edu/policies/undergraduate-academic-integrity.html

M19-511 Lecture Schedule
Fall 2016

Date	Topic	Readings*	HW Due
8/29	Introduction to M19-511/Overview Descriptive Statistics	pp. 7-30 pp. 38-59	
8/31	**Lab A:** Using SAS for Descriptive Analysis		
9/5	*Holiday – Labor Day*		
9/7	Probability Diagnostic Testing and Screening	pp. 125-155	1
9/12	Discrete & Continuous Probability Distributions **Lab B:** Probability Distributions	pp. 162-191	2
9/14	Estimation for Means Estimation for Proportions Midterm review	pp. 196-210 pp:323-329	
9/19	**Midterm Exam**		3
9/21	One Sample Hypothesis Test – Means One Sample Hypothesis Test - Proportions	pp: 232-243 pp:329-338	
9/26	Two Sample Hypothesis Test	pp: 259-278	
9/28	Non-Parametric Hypothesis Testing Chi-Square Test	pp: 302-316 pp: 342-360	4
10/3	**Lab C:** Estimation and Hypothesis Testing		
10/5	One Way ANOVA Correlation	pp. 285-298 pp. 398-411	
10/10	Introduction to Linear Regression Final review	pp. 415-443	5
10/12	**Final Examination**		

*Readings are from *Principles of Biostatistics* by Marcello Pagano & Kimberlee Gauvreau

Discipline-Specific Competencies

Biostatistics: Develop and apply statistical reasoning and methods in addressing, analyzing and solving problems in clinical research; health care; and biomedical, clinical and population-based research.

Competencies:

1. Describe the roles biostatistics serves in the discipline of public health.

2. Describe basic concepts of probability, random variation and commonly used statistical probability distributions.

3. Describe preferred methodological alternatives to commonly used statistical methods when assumptions are not met.

4. Distinguish among the different measurement scales and the implications for selection of statistical methods to be used based on these distinctions.

5. Apply descriptive techniques commonly used to summarize public health data.

6. Apply common statistical methods for inference.

7. Apply descriptive and inferential methodologies according to the type of study design for answering a particular question.

8. Interpret results of statistical analyses found in public health studies.

Special Needs:
Per University policy, students with a learning, sensory, or physical disability or other impairment, should contact the Washington University Center for Advanced Learning Disability Resources (DR) at 935-4062 (tel) or visit http://disability.wustl.edu/DisabilityResources.aspx. The DR office is located in Cornerstone on the Danforth Campus. Students whose second language is English and/or those in need of assistance in lectures, reading or writing assignments, and/or testing, may contact the University Writing Center at 935-4981 or visit **http://artsci.wustl.edu/~writing/home.html**