

HSci 2117: Introduction to Statistics for Health Sciences

COURSE DESCRIPTION: HSci 2117 is an introductory course in probability and statistics for students in the health sciences. The course explores the foundational concepts in descriptive and inferential statistics including: probability, sampling distributions, estimation, correlation, t-Tests, simple linear regression, and chi-squared tests. Coursework will focus on the application of statistical concepts and methods within the health sciences.

Be aware that the online information should be regarded as the definite source and checked regularly for updated information. We try not to change the syllabus once the course has begun, but on occasion this is necessary to address inconsistencies or for clarification.

COURSE OBJECTIVES: In this course, you will learn to ...

- Describe the role of descriptive and inferential statistics within the framework of the scientific method.
- Differentiate the types of data numerically and graphically.
- Describe the theories and practices of statistical inference, probability, and confidence intervals.
- Interpret inferential statistics including correlation, simple linear regression, and t-Tests.
- Apply statistical concepts to health sciences scenarios.

COURSE REQUIREMENTS (e.g. pre-requisites): None

COURSE ASSESSMENT:

Homework Assignments (HW) - 2	40%
Quizzes - 6	30%
Discussion Activities (DA) - 7	30%
Total	100%

REQUIRED TEXT(S):

Lock, R. H., Lock, P. F., Morgan, K. L., Lock, E. F., & Lock, D. F. (2017). *Statistics: Unlocking the power of data* (2nd ed.). Wiley. ISBN-13: 978-1-119-30884-3

Additional readings: selected reference material will be provided on Blackboard.

COURSE SCHEDULE

Wk	Topic	Learning Objectives	Reading	Assignment
1	Univariate statistics	<ul style="list-style-type: none"> Describe uses of statistics in the health sciences Distinguish between different types of variables Collect information in a dataset to answer statistical questions Develop visual displays of data and calculate summary statistics Describe a margin of error and compute and interpret confidence intervals for means and proportions 	Sections 1.1 - 1.2, 3.1 - 3.3 Review Sections 2.1 - 2.3	RP Now Practice Quiz 1 DA 1
2	Hypothesis tests for means and proportions	<ul style="list-style-type: none"> Describe the phenomenon of sampling variability Describe statistical significance and practical significance Compute and interpret results from a test for a single mean Compute and interpret results from a test for a single proportion 	Sections 4.1 - 4.3, additional readings	Quiz 2 DA 2
3	Relationships, randomization, & confounding	<ul style="list-style-type: none"> Analyse variability to identify relationships between variables Describe the effect of confounding variables on a relationship Describe the purpose of random sampling and randomized experiments 	Sections 1.2 - 1.3, 2.4 - 2.6, additional readings	Quiz 3 DA 3
4	Estimation in the health sciences	<ul style="list-style-type: none"> Describe the purpose of estimation and hypothesis testing Describe the role of statistics within the scientific method Evaluate statistical significance and practical significance of results 	Sections 1.3, 4.4, Appendix A Chapter 1-4	HW1 DA 4
5	Differences in means	<ul style="list-style-type: none"> Compute and interpret summary statistics for quantitative variables across multiple groups Develop visual displays of data representing variability within groups and between groups Compute and interpret results from tests for differences in means Evaluate the potential effect of confounding variables on tests for differences in means 	Sections 2.4, 6.4, 8.1-8.2	Quiz 4 DA 5
6	Contingency Tables	<ul style="list-style-type: none"> Compute and interpret differences in incidence, prevalence, absolute risk, and relative risk Compute and interpret two way tables, joint frequency, and conditional/marginal frequency Develop visual displays of data for contingency tables Compute and interpret results from tests for differences in proportions 	Sections 2.1, 6.3, 7.2, additional readings	Quiz 5 DA 6
7	Linear Regression	<ul style="list-style-type: none"> Describe the linear regression model Compute and interpret simple linear regression model coefficients and model fit statistics Compute and interpret the results from tests for regression models 	Sections 2.5 - 2.6, 9.1, 10.1	Quiz 6 DA 7
8	Hypothesis Tests in Health Science Literature	<ul style="list-style-type: none"> Describe the relationship between descriptive and inferential procedures Apply statistical tools and procedures to health science data Evaluate and interpret statistical analyses of data in health science literature 	Appendix A Chapter 6-10, Unit D Essential Synthesis	Review HW2

FORMATTING & GRADING POLICY

Grading Policy

The Department of Clinical Research and Leadership follows the grading policy of the School of Medicine and Health Sciences. Students will receive a letter grade rather than a grade based on a 100-point scale. In undergraduate level courses, grades used are A to F, where A=Excellent, B=Good, C=Satisfactory, D=Low Pass, F=Fail. At the discretion of the instructor, A-, B+, B-, C+ or C-, D+ or D- may also be assigned. An A+ is not awarded as a final grade. The Faculty member is responsible for evaluating the performance of students in a meaningful, useful and timely manner and for assigning grades on a basis that is rational, just, and unbiased.

Grades are based on the following scale:

Percentage	Grade	Percentage	Grade
100 – 93	A	76 – 73	C
92 – 90	A-	72 – 70	C-
89 – 87	B+	69 – 67	D+
86 – 83	B	66 – 63	D
82 – 80	B-	62 – 60	D-
79 – 77	C+	Less than 60	F

Late Policy

You are responsible for requesting permission, prior to the due date, to submit an assignment late. You must contact the instructor via email and propose a revised target date and obtain the instructor's permission in a written email response. The instructor has the discretion to deduct some points from assignments submitted late, without permission. The instructor will deduct points for repeated late assignments when the student does not seek permission in writing. Students who request more than one extension per semester may be requested to submit documentation of the nature of their extension request (i.e., physician's note, etc).

Discussion Boards

You are required to participate in all discussion forums, contributing meaningfully and professionally each week. Postings in online discussions should be thoughtful and concise. Discussion boards are our source of communication - asking questions, sharing ideas and promoting critical thinking. Making regular contributions is beneficial for you and for your classmates. Meaningful contributions to class discussion include insights, experiences from your professional (or personal) life that help to illustrate a point being discussed by the class and questions to promote critical thinking. Although soft and fluffy responses (i.e. "Good job") are fun and encouraging, they do not promote growth. Instead, try for constructive feedback that leads to higher level thinking. Grades for postings and responses that demonstrate or promote critical thinking will be rewarded more highly.

Remote Proctoring System

When applicable, GW's Health Sciences courses use the Remote Proctor NOW (RP Now) system to ensure quiz and exam integrity. This system consists of a camera and microphone (built-in or external/peripheral) and a reliable connection to the RP Now website. RP Now scans the testing environment and locks down the desktop so that you cannot navigate to another screen. Each student is expected to thoroughly review the testing requirements before each quiz/exam as stated in the REMOTE PROCTOR tab in the Blackboard course. Failure to do so may result in a rules violation or suspicious activity report. Each student's quiz/exam session will be reviewed by Software Secure, Inc. (SSI) and/or GW Health Sciences faculty/administration for violations and/or suspicious activities. All reported violations and/or suspicious activities will be recorded and investigated by program officials.

Detailed instructions can be found in the RP Now tab on the main course menu. Be sure you give yourself ample time to review all information there, test your equipment, take a practice quiz, and work out any potential technical issues.

UNIVERSITY POLICIES

Plagiarism and Academic Integrity

Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information. For the remainder of the code, see: studentconduct.gwu.edu/code-academic-integrity

The George Washington University's Code of Academic Integrity applies to all work done for this course including written assignments and discussion postings. Using someone else's words, ideas, phrases, or data, and representing them as your own, either intentionally or unintentionally, is known as PLAGIARISM. Plagiarism is a serious form of academic dishonesty and is a violation of the University's Code of Academic Integrity. Plagiarism can be grounds for a failing grade in an assignment or even in a course. It is expected that all students read and be familiar with the University's Code of Academic Integrity.

For more information on student rights and responsibilities, see the [Guide to Student Rights and Responsibilities](#).

For more information about plagiarism and how to avoid it, click on this link to [GW's Gelman Library](#). If you have questions throughout the semester, please email your professor.

Professionalism and Confidentiality of Proprietary Information

We expect students to remain professional, respectful and courteous in all communication with other students and the instructor, including emails and discussion board postings.

Please do not communicate any proprietary and/or confidential information from your present or previous employers and/or organizations. You may discuss any information that is in the public domain (e.g., websites, articles). Please consult your instructor if you have any questions.

Statement on Disabilities

Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in Rome Hall, Suite 102, to establish eligibility and to coordinate reasonable accommodations. For additional information, please refer to <https://disabilitysupport.gwu.edu/>.

University Policy on Religious Holidays

- Students should notify faculty during the first week of the semester of their intention to be absent from class on their day(s) of religious observance.
- Faculty should extend to these students the courtesy of absence without penalty on such occasions, including permission to make up examinations.
- Faculty who intend to observe a religious holiday should arrange at the beginning of the semester to reschedule missed classes or to make other provisions for their course-related activities.

Mental Health Services

The University's Mental Health Services (202-994-5300) offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include: crisis and emergency mental health consultations confidential assessment, counseling services (individual and small group), and referrals. counselingcenter.gwu.edu/

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Student Average Workload Requirement

Over the 8-week course, students should expect to spend an average of 5 hours per week of direct or guided instruction (e.g., peer-reviewing classmates writing assignments, engaging in team-based assignments, discussion boards) and 9 hours per week in independent learning (e.g., independent research, reading), for a total of 14 hours per week. The time may vary for each student based on professional background, academic experience, and learning style.