



Syllabus
Applied Mathematics and Statistics
550.111 Statistical Analysis I
Summer 2017
(4 credits, EQ)

Description

First semester of a general survey of statistical methodology. Topics include descriptive statistics, introductory probability, conditional probability, random variables, expectation, sampling, the central limit theorem, classical and robust estimation, confidence intervals, and hypothesis testing. Case studies from psychology, epidemiology, economics and other fields serve to illustrate the underlying theory. Some use of Minitab, Excel or R, but no prior computing experience is necessary. Recommended Course Background: four years of high school mathematics. Students who may wish to undertake more than two semesters of probability and statistics should consider EN.550.420-EN.550.430.

Prerequisites

Four years of high school math, no previous knowledge of statistics is assumed.

Instructor

Professor Fred Torcaso, fred.torcaso@jhu.edu

Office: Whitehead Hall 211-B, 410-516-4160, Office hours: To be posted on Blackboard.

Lecture Meetings

Monday through Thursday 3:00–5:30 pm, Location: To be announced.

Textbook

Required: Mendenhall, Beaver and Beaver, *Introduction to Probability and Statistics*, 14th edition, Brooks/Cole (2013). Parts of each homework assignment will be drawn directly from this textbook.

Online Resources

Please log in to Blackboard for all materials related to this course.

Course Assessment & Grading

Take-home assignments (10%), in-class assignments (10%), attendance/participation (5%), four midterms (lowest midterm grade is dropped, other three average for 75%).

93% or higher (A), 90-92% (A-), 87-89% (B+), 82-86% (B), 78-81% (B-), 75-77% (C+), 70-74% (C), 67-69% (C-), 60-66% (D), below 60% (F).

Key Dates

June 8: Midterm 1, June 15: Midterm 2, June 22: Midterm 3, June 29: Midterm 4

Course Topics (sections listed with an asterisk * might not be covered):

- Chapter 1/sections 1,2,4,5; Chapter 2/sections 1,2,3,4,5,6
Descriptive statistics, qualitative/quantitative, discrete/continuous, populations, samples, univariate/bivariate/multivariate
- Chapter 4/sections 1,2,3,4,5,6,7,8
Probability, experiments, sample spaces, events and sample points, classical notion of probability, counting basics, probability rules, conditional probability, independent events, Bayes' formula, discrete random variables and their probability distributions.
- Chapter 5/sections 1,2,3,4; Chapter 6/ sections 1,2,3,4
Some useful discrete probability distributions (binomial, Poisson, hypergeometric), and the Normal (Gaussian) probability distribution.
- Chapter 7/sections 1,2,3,4,5,6,7
Sampling distributions, independent/random sampling, sampling statistics, the distribution of sampling statistics, the Central Limit theorem, standard error.
- Chapter 8/sections 1,2,3,4,5,6*,7*,8*,9
Large sample estimation, point estimates, interval estimates, interval estimation for the mean and for the population proportion, confidence intervals and their interpretation.
- Chapter 9/section 1,2,3,4,5,6
Large sample statistical hypothesis testing involving the population mean and involving the population proportion, error probabilities, and the p -value.
- Chapter 10/section 1,2,3
Sample sample inferences involving the population mean, the student's t -distribution.

Assignments & Readings

Consult Blackboard on a regular basis. Homework will be posted on Blackboard.

Ethics

The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition. In addition, I allow (and encourage) collaboration on homework assignment with your friends, colleagues and/or teaching assistants. This is an important part of your learning. However, whatever work you collaborate on must be thrown away before you write up the corresponding solutions – this is to assure that the work you submit is your own.

Report any violations you witness to the instructor.

You can find more information about university misconduct policies on the web at these sites:

- For undergraduates: <http://e-catalog.jhu.edu/undergrad-students/student-life-policies/>
- For graduate students: <http://e-catalog.jhu.edu/grad-students/graduate-specific-policies/>

Students with Disabilities

Any student with a disability who may need accommodations in this class must obtain an accommodation letter from Student Disability Services, 385 Garland, (410) 516-4720, studentdisabilityservices@jhu.edu .

Extra Help

Office of Academic Support – Garland Hall, Suite 300, <http://academicsupport.jhu.edu>

The following free academic support services are provided by the university:

- **Study Consulting:** Senior and graduate students trained to work as study consultants. They meet individually with each of their assigned students one hour per week, or more if necessary; this is a program designed to help students help themselves.
Contact: Mrs. Fay Day – 410-516-8216; email: fday@jhu.edu
- **PILOT Learning – Peer Led Team Learning:** Students are organized into study teams consisting of 6-10 members who meet weekly to collaborate on faculty-developed problem sets. A trained student leader acts as a captain and facilitates the weekly meetings.
Contact: Mrs. Ariane Kelly – 410-516-4648; email: ariane.kelly@jhu.edu
- **Learning Den – Small Group Tutoring:** Small groups consist of a maximum of six students from the same course headed by one tutor. Visit the website (above) to register online. Contact: Mrs. Sarah Gubara – 410-516-8216; email: tutoring@jhu.edu