GEORGE WASHINGTON UNIVERSITY
DEPARTMENT OF STATISTICS

Course Information

STAT 1000-10 Statistically Speaking: Understanding Data through examples
FALL 2024 (CRN: 87247)

Lectures: ***Mondays and Wednesdays: 11:10 AM – 12:25 PM at SMTH 115***

Instructor: Dr. Srinivasan Balaji

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Office Hours: Mondays and Wednesdays 2:00 PM– 3:00 PM and by appointment.

Course Description: The course will mainly focus on learning the statistical concepts through examples. Problems and examples will be presented from real world situations and the concepts will be taught. Interaction among students will be expected and encouraged in the classes with emphasis on hands-on problem solving.

The course will cover Statistics, Probability and their applications in varied disciplines. The main topics to be covered include: Descriptive Statistics for univariate and bivariate data, probability and random variables, Binomial and normal distributions, confidence intervals and hypothesis testing, correlation and regression.

TEXT: Elementary Statistics: Picturing the World by Larson,, 8th Edition, Pearson Publishers. We will be using MyLab for the course that comes with the Etext. You may not need to buy a hardcopy of the text.

Note: You will also need a calculator such as TI-83 for the class. Calculators are allowed in all exams and quizzes.

Software: We will be using SPSS for the course. SPSS is available through GWU cloud and in all GWU labs. If time permits, we will also discuss R, the open source statistical software.

Blackboard: I will be posting the lecture notes in the blackboard. I will also be communicating and sending updates to students using blackboard. **Please check your emails regularly and read them carefully.** Students will receive an email after I post the materials in the blackboard.

Prerequisites : Basic knowledge of Algebra and Arithmetic are sufficient.
The course does not require any background in Calculus.

Online Lectures and Recording: All lectures will be captured through the lecture capture tool and the recordings will be available after the class. Some lectures may also be done online through the blackboard using the blackboard ultra tool. Students are strongly

encouraged to attend classes, and expected to work on teams.

Homework Assignments

Homework Assignments will be given periodically and will be using MyLab, the interactive tool that comes with the text. Some homework assignments maybe given outside of MyLab too.

Quizzes

There will be a 30 minute quiz each week, based on the topics covered in that week. These are blackboard multiple choice quizzes which will be automatically graded. The quizzes will be posted on Thursday evenings at 5 PM and will be due on Fridays at 5 PM. That is, you will have 24 hours to complete the quiz. Once you logon to the quiz, you should complete it in 30 minutes. (Students enrolled with DSS will get 45 minutes for the quiz).

I may also give a few in-person quizzes in the class, with a prior announcement

Project

There will be a project assigned for the class and the students are expected to work in a team for this project. It may involve using statistical software such as SPSS or R. There will be also be project presentation towards the end of the course.

Exams

There will be a closed book midterm and a closed book Final exam.

Midterm Exam: **Wednesday**, **October 9, 2024**, **11:10 – 12:25 PM**
Final Exam: To be announced (Will be during the Final exam week)

Note: DSS students will get 1 ½ times for all the quizzes and exams. For example, if an exam is for 2 hours, then the DSS students will get 3 hours. If the quiz is for 30 minutes, DSS students will get 45 minutes.

Grading Policy

Final grade is computed as follows:

Homework Assignments: 20%
Quizzes : 25%
Project: 10%
Midterm Exam: 20%
Final Exam: 25%

Tentative Class Schedule (Week by Week)

Week 1 – Introduction to Statistics and Data types

Week 2- Pie Chart, Bar Chart, and Histograms
Week 3- Measures of Central tendency and Spread
Week 4- Basic Probability and rules
Week 5 – Quiz 1 and Combinatorial and conditional probability
Week 6- Discrete random variables
Week 7- Midterm Exam (on Oct 9)
Week 8- Continuous random variables
Week 9 – Normal and sampling distributions
Week 10 – Quiz 2 and Confidence intervals
Week 11 – Confidence intervals and hypothesis testing
Week 12 – Confidence intervals and testing for difference in means
Week 13- Simple linear regression
Week 14 – Project Presentation

Learning Outcomes

As a result of completing this course, students will be able to:

1) Make probabilistic and statistical arguments.

GPAC component: Articulate precise mathematical definitions and propositions and draw inferences from them.

Addressing this component: Students will be exposed to statistical and probabilistic concepts with examples, throughout the course. They will be trained to use them in relevant contexts to infer useful results from available data.

2) Draw statistical display graphs and charts such as Pie diagrams and Bar charts based on the available data

GPAC component: Represent mathematical information symbolically, visually, numerically, and verbally

Addressing this component: Students, will be trained to tabulate and draw appropriate graphs, to represent the data symbolically and visually. Further, they will be able to calculate various numerical measures based on the data and verbally articulate the measures such as the mean, median, Variance and standard deviation.

3) Construct and interpret large and small sample confidence interval and perform hypotheses tests.

GPAC component: Interpret and explain information represented in mathematical forms (e.g., graphs, equations, diagrams, tables)

Addressing this component: Students will be trained to use datasets and construct confidence intervals and perform hypotheses testing under various assumptions. Histograms are a good example of this.

4) Develop the least squares line of best fit for simple linear regression and assess the utility of the model.

GPAC component: Use algebraic, geometric, or statistical calculations to solve problems

Addressing this component: Students will be taught to solve for the coefficients in the least squares, algebraically, using the relevant formulas and the dataset. They also will be able to determine the utility of the model by computing certain measures.

ATTENDANCE POLICY : Attendance for the class is not mandatory. However I expect you to attend the classes without fail. I suggest that you inform me at least one day prior to your absence. If you are sending me emails regarding attendance write the subject to be Attendance or Absence. In my several years of experience, I have observed that students who do not come to classes regularly perform poorly in the exams and quizzes.

AVERAGE MINIMUM AMOUNT OF OUT-OF-CLASS OR INDEPENDENT LEARNING EXPECTED PER WEEK: In a 15-week semester, including exam week, students are expected to spend a minimum of 100 minutes of out-of-class work for every 50 minutes of direct instruction, for a minimum total of 2.5 hours a week. A 3-credit course should include 2.5 hours of direct instruction and a minimum of 5 hours of independent learning or 7.5 hours per week. More information about GW's credit hour policy can be found at: provost.gwu.edu/policies- forms (webpage); or provost.gwu.edu/files/downloads/Resources/Assignment-Credit-Hours-7-2016.pdf (form)

ACADEMIC INTEGRITY

I personally support the GW Code of Academic Integrity. It states:: "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: http://www.gwu.edu/~ntegrity/code.html

SUPPORT FOR STUDENTS OUTSIDE THE CLASSROOM

*DISABILITY SUPPORT SERVICES (DSS) :*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 the Marvin Center, Suite 242, to establish eligibility and to coordinate reasonable accommodations. For additional information please refer to: http://gwired.gwu.edu/dss/

UNIVERSITY COUNSELING CENTER (UCC) ***202-994-5300 :*** The University Counseling Center (UCC) 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
  http://gwired.gwu.edu/counsel/CounselingServices/AcademicSupportServices

SECURITY: In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location.

Note: This course is similar in content to all the courses Stat 1051,1053, 1091, 1104, 1111, 1127. Credit for only one of these courses can be given. Please contact me for further information