GEORGE WASHINGTON UNIVERSITY
DEPARTMENT OF STATISTICS

Course Information

STAT1111.10 -- Business and Economic Statistics I **– Fall 2024**
CRN: 80423

Lectures: Tuesday & Thursday, 6:10–7:25pm
Classroom: Corcoran Hall (COR) -- Room 104

Instructor (SBA): Saeid B. Amini, Ph.D., MBA, JD, LL.M.
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TA: Chuanhui Peng
TA E-mail: chuanhuip@gwu.edu
TA Office Hours: Monday 4:00-5:00pm, Friday 2:00-4:00pm,Rome Hall, 7th Floor (Stat. Dept., Rm.755)

Bulletin Course Description
STAT 1111. This is an introductory class in the statistical sciences with emphasis on Business and Economics applications. The topics include: Numerical measures of central tendency and variability, frequency distributions & graphical presentations, probability, random variables, sampling distributions, estimation, confidence intervals, testing of hypotheses, linear regression and correlation (3 Credits= 3 hours of in-class lectures).

Prerequisites
Prior knowledge of Algebra and calculus is very helpful but is not required.

TEXT/Software

Authors	Title	Edition
James McClave & Terry Sincich (with MyStatLab)	Statistics for Business & Economic	12,**13**,14

Recommended: Student Solution Manual
Statistical Software (required): Either Statistix ver. 10 ($47 a copy – GWU Store)
　　　　　　　Or any other package (i.e. SPSS/R/Excel/Minitab/SAS,…)

LEARNING OUTCOMES:
At the end of the semester you should be able to:
   --compute descriptive statistics
   --tabulate, present descriptive data obtained from a population or sample
graphically
   --apply laws of probability
   -- understand Sampling Distribution of sample mean
   --construct and interpret large-sample and small-sample confidence
intervals
   --evaluate evidence for and against hypotheses using statistical tests
   --find the least-squares equation for simple linear regression and assess
the utility of the model

COMPUTER PROGRAM:
For this course, you need to learn and use at least one statistical software
package such as Statistix, SAS/SPSS/Minitab/R. The most useful and
powerful among them is SAS. For this type of courses, I personally like
Statistix package. It is simple to use, yet very powerful and relatively cheap.
It was ordered for the class and available at the bookstore for $47 (I strongly
recommend you buying a copy – you will not regret). I will be using Statistix
software throughout the semester. However, if you are familiar with any
other statistical software that you wish to use it would be fine. SAS and
SPSS are available at Gelman library free of charge and R programs are free
and available online.

COURSE HOMEPAGE: http://blackboard.gwu.edu. Please check this page
frequently. I will post important information (homework, quizzes, projects,
handouts, etc.).

COURSE STRUCTURE: The course consists of two live in-class
lectures per week (T&TR). I'll try to record and save the lectures on
Echo360. During the lectures, we will cover the concepts, solve
example problems, and use statistical computer program, Statistix
(https://www.statistix.com/) to analyze data.

COURSE CONTENT: The course will cover the following materials:
Chapter
1. Statistics, Data & Statistical Thinking; Types of Data & Methods Data
   Collection
2. Methods for Describing Data (Graphical Presentations and Summary
   Statistics);
3. Probability Theory (Event, Sample Space, and computing probability
   of events);
4. Discrete & Continuous Random Variables – computing expected
   value, variance, and probability of events);
   ---------------------- **Midterm Exam (Chapters 1-4)** --------------------------

5. Sampling Distributions – Sampling Distribution of sample mean;
6. Inferences based on a Single Sample – Estimation with Confidence Interval;
7. Inference based on a Single Sample – Test of Hypothesis (population means and proportions);
8. Inferences based on Two Samples: Confidence Intervals and Tests of Hypothesis Testing: two mean and two proportions);
11. Simple Linear Regression: Pearson Correlation and estimating linear relationship using regression)

------------------ **Final Exam (Chapters 1-8 & 11)** -----------------------

CLASS FORMAT

Classes will be a combination of lectures, problem solving, use of statistical software (e.g. Statistix), and discussions. The class environment will be informal and relaxed. I would like to encourage you to participate by asking questions and volunteering answers. Class time will be used to build upon the concepts covered in the text, not to simply repeat them. You should therefore do the assigned readings before class, so you will:

     (1) be able to participate in class discussion;

     (2) be able to follow the in-class examples, which may not be in the text; and

     (3) be prepared to ask any unanswered questions you might have.

In order to strengthen the course and make it a more interesting and valuable experience, several assignments are included to sharpen your problem solving skills. Therefore, I recommend you attend each lecture and view the assignments as an opportunity to gain valuable experience for your future.

Homework: From the 13th Edition of the textbook, Homework (HW) problems for the entire semester have been assigned and provided at the end of this syllabus. Please try to do the assigned HW problems after each lecture. You are required to post your answers within 3 days of the completion of each chapter and post it through BB. While you are not going to be graded based on correct answers, HW will be graded as 10/10; 5/10 and 0/10 based on whether you attempted to answer all the questions (10/10); partial attempts (attempted 50% or less 5/10); and 0/10 if no answers submitted or attempted less than 50% of the assigned HW problems. You MUST POST YOUR ANSWERS before our answers posted for a given chapter. We will post the answers to the assigned HW problems for the previous chapter when we start a new chapter. For example, the answers for Chapter 2 HW problems will be posted on the day I start Chapter 3, etc. If you post your answers after our posting, you will get 0/10 for that chapter.

In order for you to do well in this course, I strongly suggest that you do all the assigned HW problems before the due date because many

problems and questions on the quizzes and exams are based on the homework problems and those discussed in class.

Quizzes: There will be 6 quizzes throughout the semester. These quizzes will cover materials from the preceding chapter(s). Quizzes may have multiple choice and assay questions. There will ***be NO make up for the missed quizzes.***

Projects: There will be a **mini**-project that you are required to work on individually or a team of up to 3 students. The project is designed to teach the students on how to work with data, use commercially available Statistical software (I ordered Statistix for the class but you can use any other packages such Excel, R, SAS) and statistical writing skills. A short report describing 1) your data, 2) statistical tools you used to analyze the data, 3) results and 4) conclusion, is expected. *You need to find or collect data on at least 50 objects/subjects/entities with at least 7 variables including at least **one nominal, one categorical and three numerical data. You need to analyze your data using the** materials you learned in at least two chapters (e.g. Chapters 2 & 7). The data collection and the first analysis must be completed and is due on or before midterm exam. The final project is due one week before the final exam. Additional instructions will be provided in the class.*
For FULL credit, Data for the project MUST be identified by Sepetmber 26, 2024.

Data: I prefer you collect your own data (original) on at least 50 subjects on 6-7 variables. You should have at least one variable that is nominal, ordinal and continuous (e.g., gender, race, how many times did you call home last month, how much cash you have in your pocket, age, height, weight, the number of times you go to the gym every week, what is the distance of your home from GWU,.. etc.). If you cannot or do not want to collect your own data, you can use any database that has the above mentioned characteristics.

Analysis: You need to use the most appropriate tools you learned in the class to analyze your data. You should have both **descriptive** (e.g., graphs, summary statistics, etc.) and **inferential** Statistics (e.g., testing claim(s) using appropriate objective hypothesis techniques -- testing of mean(s), regression analysis,.. etc.). I use Statistix in class)

Report: A short report describing 1) your data (e.g. where did you get it, how did you get it, what is the number of subjects, what the variables of interest and whether they are nominal, ordinal, continuous, etc.); 2) what statistical tools you used to analyze the data, 3) results of your analysis and 4) conclusion, is expected. *Additional instructions may be provided in the class and you can contact me regarding your project at any time.*

Some helpful hints/guidelines about the mini-project:

The project is designed to teach the students on how to work with real data, use commercially available statistical software and develop statistical analysis and writing skills.

The project is a semester-long assignment and should NOT be done on the day it is due. It is 10% of your final grade and getting a good grade is highly correlated with your efforts during the entire semester.

Exams: There will two exams: midterm and final. The dates are set below but are subject to change. While any changes made will be announced well in advance (in class as well as Blackboard), it is the student's responsibility to keep up with these announcements. Each exam has two parts: (I) Short answers/multiple choice questions similar to quiz questions worth 30% of the exam and is closed-book; and (II) an open-book portion worth 70% requiring problem solving like HW and the problems we work on in the class.

   Midterm Exam: TBA (plan for October 22, 2024); covering Chapters 1-4
   Midterm Review Class (plan for Saturday, October 19)
   Final Exam: TBA (**December 12-17);** Covering Chapters. 1-8 & 11

Grading: Your final letter grade will be based on a total score computed as follows:

        Quizzes: 20%
        Project: 10%
        HW: 5%
        Midterm: 30%
        Final Exam:35%

Letter Grades of A, A-, B+, B, B-, C+, C, C-, D+, D, D-, and F are possible results for the semester grade based on the student's performance. The major letter grades are pegged to the following total points out of a possible 100.

Grade	Points Needed	Corresponding
A	90+	90- 100%
B	80 - 89	80- 89%
C	70 - 79	70- 79%
D	60 - 69	60- 69%
F	<60	< 60%

Plus and minus levels will be assigned accordingly between these scores. As a general rule, students should not anticipate any deviation from this grading scale. There is no "curve" in the grading scale.

>> *ATTENDANCE:* Students are expected and strongly encouraged to attend all class meetings. It is my expectation that students will have read the

assigned text material prior to coming to class, and will be prepared to discuss this material in class. I would strongly suggest that if you are unable to attend a particular class, you should obtain the lecture notes from another student. I do not provide copies of my lecture notes to students who have missed a class. Furthermore, students are expected to be aware of any changes in the dates of assignments or tests. Absence will not be accepted as an excuse for ignorance.

ALSO, PLEASE NOTE that in accordance with federal regulation {34 CFR 602.24(f)}, GWU has established <u>Average Minimum amount</u> of direct in class instruction, and independent, out-of-class, learning expected per week. For example, a 15-week semester, including exam week, students taking a 3-credit course should include 2.5 hours of direct instruction (in class) and a minimum of 5 hours of independent learning or 7.5 hours per week.

>> *HOLIDAYS & BREAKS:*
      (1) Fall Break   --- Thursday, October 10, 2024
      (2) General Election Day --- Tuesday, November 5, 2024
      (3) Thanksgiving Break --- T &TR, November 25-30, 2024

CLASS POLICIES
Attendance: I will NOT take attendance but attendance is necessary to perform well in the course. Please be in the class before the start of lecture and leave after the lecture ended.

Make-Up Exams: There will be no make-up quizzes or exams. However, students that need to reschedule <u>either the midterm or final exam</u> can do so by notifying me AT LEAST ONE-WEEK PRIOR TO THE EXAM.
SPECIAL REQUESTS FROM YOUR INSTRUCTOR. Please,...
- If you want a quick reply to your emails, send them to:
  a. sbajd98@yahoo.com
  b. your emails must have your full name, course number (STAT1111) and a mention of the issue in the <u>SUBJECT line</u> of the email.
- **Bring your textbook to class.**
- **Please bring a calculator and notes from blackboard to every class**.
- Turn off your cell phones during the class.
- Avoid using your personal computer for anything other than accessing the course materials. Sit on the last row of the class if you plan to use your computer/smart phone for unrelated purposes.
- Do not engage in conversation with your neighbors while the instructor teaches.
- Do not disturb the class or your classmates.

- Avoid tardiness. Come to class on time and do not leave before the class ends.

Incomplete Grade. A grade of Incomplete will only be given to a student who is passing the course but cannot complete the course due to illness or other well-documented circumstances beyond his/her control.

University Policy on Religious Holidays:
1. 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;
2. Faculty should extend to these students the courtesy of absence without penalty on such occasions, including permission to make up examinations;
3. 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

[NOTE: for other university policies on teaching, see http://www.gwu.edu/~academic/Teaching/main.htm]

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

AI and ChatGPT

The Provost's Office has guidance regarding the use of Generative Artificial Intelligence at GW at the following links: Guidelines for Generative Artificial Intelligence and Additional Guidelines for Generative Artificial Intelligence.   Information on GenerativeAI and teaching can be found on the LAI website https://library.gwu.edu/generative-ai

Please note: The administrative unit "Student Rights and Responsibilities" has become "Conflict Education and Student Accountability (CESA)."

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

CLASSROOM EMERGENCY LOCKDOWN BUTTONS

"All classrooms have been equipped with classroom emergency lockdown buttons. If the button is pushed, GWorld Card access to the room will be disabled, and GW Dispatch will be alerted. The door must be manually closed if it is not closed when the button is pushed. Anyone in the classroom will be able to exit, but no one will be able to get in."

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 such as in front of the buildings, etc.

Class Schedule and Assignments

Date	Day	Topic	Chapter
8/22	TR	*Introduction to Basic Concepts: Data, Variable, Values Types of Statistical Applications, Fundamental elements of Statistics (study of single variable)	Ch. 1
8/27	T	*Types of Data, Data Collection methods, Sampling techniques Data: Qualitative & Quantitative	Ch. 1
8/29	TR	*Review of Chap1 & Start Chapter 2, Describing Qualitative data (Graphical presentations of Qualitative & Quantitative data) §§2.1 & 2.2 Introduce Statistix software ---	Ch. 2
9/3	T	* Describing Quantitative data (measures of center and variability) §§ 2.3-2.4	Ch. 2
9/5	TR	* More on measures of central tendencies, variations & relative Standing (§§ 2.5-2.6)	Ch. 2
9/10	T	* Review of §§ 2.5-2.6 and checking for outliers (§ 2.7)	Ch. 2
9/12	TR	*Describing Bivariate Relationships & Time Series Data (Detecting and Dealing with Biases) (§§2.8-2.10)	Ch. 2
9/17	T	*Probability Theory – Sample space, Event, and probability Venn Diagram, Union, Intersection, Independence, disjoint Counting techniques (combinations, permutations)	Ch. 3
9/19	TR	*Probability Theory – Rules of Probability (§§3.3-3.4)	Ch. 3
9/24	T	*Conditional Probability – Multiplicative Rule (§§3.5-3.6)	Ch. 3
9/26	TR	*Random variables, Discrete Probability Distributions (§§4.1-4.2)	Ch. 4
10/1	T	*Binomial Distributions (§4.3); skip §4.4	Ch. 4
10/3	TR	* Random variables, Continuous Probability Distributions General and Standard Normal distributions (§§4.5-4.6)	Ch. 4
10/8	T	* Computing area under the curve for General Normal (§4.6)	Ch. 4
10/10	TR	No Class – Fall Break (review Chapters 1-4)	

10/15　T　　　* Continue with §4.6 & Assessing normality (§4.7)　　　Ch. 4

10/17　TR　　* In Class Review of Chapters 1-4

10/19　SAT　 Additional Review session Before midterm exam (**NOT MANDATORY**)

10/22　T　　　*Midterm Exam – Chapters 1-4

10/24　TR　　*Sampling Distributions – Concepts & Properties (§§5.1-5.2)　Ch. 5

10/29　T　　　*Sampling Distribution of Mean and Central Limit Theorem (§5.3)　Ch. 5

10/31　TR　　*Sampling Distribution of Mean and Central Limit Theorem　Ch. 5
　　　　　　　　(Review of §5.3 and Sampling Distribution of sample proportion)

11/5　T　　　NO CLASS – General Election Day

11/7　TR　　*Statistical Inference: estimating confidence intervals (§§6.1-6.3)　Ch. 6
　　　　　　　For populations mean, Sample Size Calculation (§6.5)
　　　　　　　(single sample only – for population mean and population proportion)

11/12　T　　　*Estimating confidence interval Cont. (§§6.1-6.5)　　　Ch. 6

11/14　TR　　*Hypothesis testing – Tests of Significance, Hypothesis　Ch. 7
　　　　　　　Null & Alternative hypothesis (one sided; two sided)
　　　　　　　test statistics, critical values, p-values

11/19　T　　　*Single Sample Hypothesis testing Cont. - Power of test,　Ch. 7
　　　　　　　 Type I and Type II errors (may skip § 7.8 – depending on the time)

11/21　TR　　*Single Sample Hypothesis testing Cont. - Power of test,　Ch. 7
　　　　　　　 Type I and Type II errors (skip § 7.8)
　　　　　　　*Review of Chapters 6 & 7

11/26　T　　　No Class – Thanksgiving Break

11/28　TR　　No Class – Thanksgiving Break

12/3　T　　　*Comparing two Population Means (assuming equal & unequal　Ch. 8
　　　　　　　Population Variances); Confidence Interval; Degrees of Freedom

12/5　TR　　*Comparing two Population Means　　　　Ch. 8
　　　　　　　Confidence Interval; Degrees of Freedom
　　　　　　　(Project Due)

12/10　T　　　*Comparing two Population Means (assuming equal & unequal　Ch. 8

Population Variances); Confidence Interval; Degrees of Freedom
- Chapter 11 – A Touch of Simple Regression   Ch. 8, 11
   //   FINAL EXAM: Chapters 1-8, 11   .

Suggested Homework Problems (from 13rd Edition) for the first 4 chapters; additional problems will be assigned in class.

Ch.1: 1.15, 1.18, 1.20, 1.27, 1.33, 1.36, 1.37

Ch. 2: 2.3, 2.6, 2.15, 2.22, 2.29, 2.42, 2.50, 2.59, 2.58, 2.65, 2.88, 2.96, 2.108, 2.110, 2.115, 2.131, 2.146

Ch. 3: 3.6, 3.7, 3.16, 3.33, 3.38, 3.45, 3.60, 3.62, 3.84, 3.109, 3.115, 3.122

Ch. 4: 4.1, 4.12, 4.14, 4.19, 4.21, 4.29, 4.31, 4.37, 4.44, 4.45, 4.56, 4.70, 4.73, 4.74, 4.86, 4.89, 4.93, 4.94, 4.95, 4.96, 4.100, 4.136, 4.137, 4.154, 4.173, 4.179, 4.194, 4.198, 4.200

Ch. 5: 5.3, 5.4, 5.12, 5.13, 5.25, 5.30, 5.45, 5.47, 5.62, 5.64

Ch. 6: 6.4, 6.11, 6.13, 6.26, 6.30, 6.32, 6.47, 6.50, 6.61, 6.114, 6.126

Ch. 7: 7.11, 7.12, 7.25, 7.31, 7.39, 7.52, 7.70, 7.122, 7.125, 7.132

Ch. 8: 8.3, 8.11, 8.12, 8.15, 8.14, 8.18, 8.26, 8.28, 8.29, 8.31, 8.37, 8.48, 8.49, 8.51, 8.62, 8.70, 8.121

Ch. 11. Will be assigned in class,..

REMEMBER:... No Pain, No Gain!!

Good luck