MAT121 Statistics I

Summer 2022

May 31, 2022 - Jul 3, 2022

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Office: 25 University Avenue, R111
Office Hours: Monday/Tuesday/Wednesday/Thursday/Friday -- 3:00 PM – 5:00 PM

ZOOM Link: Available on the course web page and D2L as well.
Course Web Page: https://pengdsci.github.io/MAT121/

Course Logistics:

- Book- *Elementary Statistics, 3rd Edition*. Navidi and Monk, 3rd edition.

To access the electronic version of the textbook, you need to follow the provided by the publisher at the following URL:

https://www.mheducation.com/highered/support/aleks/first-day-of-class/ia-d2l-mhcampus.html

Course Description (from the Catalog):

Introduction to statistics and statistical inference. Concepts include descriptive statistics, sampling distributions, confidence intervals, and hypothesis testing, along with a formal introduction to linear regression and categorical data analysis. Statistical software including, but not limited to SPSS and Excel, will be used to facilitate the understanding of important statistical ideas and for the implementation of data analysis in many areas of application.

Course Learning Outcomes:

1. Describe a dataset by producing appropriate graphs and calculating descriptive statistics.
2. Interpret graphs and descriptive statistics.
3. Understand and apply the Central Limit Theorem.
4. Compute and interpret confidence intervals for population means, proportions, and differences in means and proportions.
5. Perform and interpret test of hypotheses test for means, proportions, the difference in means (independent and dependent samples), and proportions.
6. Perform a linear regression to determine the relationship between two quantitative variables and make predictions using the linear regression equation. Interpret the slope, correlation coefficient, and coefficient of determination.
7. Be proficient in all of the above using some type of technology.

Topics:

We will cover data collection, frequency distributions, measures of central tendency and variability, scatter plots and correlation, probability, definitions of random variables, confidence intervals, and hypothesis testing. Students will also be introduced to the free homegrown application: **IntroStatsApps**.

Evaluation:

- **Exams (4 Weekly Exams, 15% each) 60%**
  All midterm exams (including the final exam) will be administrated via D2L.

  All exams must be completed before 11:59 PM every Sunday to receive credit. However, you are strongly encouraged to complete these weekly exams as earlier as possible.

  I will make each weekly and the final exam on Thursday, you have up to three and half days to complete them. The answers to the exams will be posted on the course web page every Monday. There will be no make-up weekly exam.

  Exam #1: Sunday, 6/05/2022
  Exam #2: Sunday, 6/12/2022
  Exam #3: Sunday, 6/19/2022
  Exam #4: Sunday, 6/26/2022

- **Final Exam 40%.**

  The final exam is cumulative including the new topics regression covered after midterm #4.

  Due: Sunday, 7/3/2022, 11:00 PM

  A letter grade will be assigned based on performance in the course according to the following scale

Grade	Quality points	Percentage equivalents	Interpretation
A	4.00	93-100	Excellent
A-	3.67	90-92	
B+	3.33	87-89	Superior
B	3.00	83-86	
B-	2.67	80-82	
C+	2.33	77-79	Average
C	2.00	73-76	
C-	1.67	70-72	
D+	1.33	67-69	Below Average
D	1.00	63-66	
D-	0.67	60-62	
F	0	< 60%	Failure

Refer to the Undergraduate Catalog for a description of NG (No Grade), W, Z, and other grades.

Make-Up Policy:
There will be **no** make-up exams during the semester since you have a wide time window to complete these exams. If you miss any of the weekly exams for any reason, your final exam grade will be used to replace the missing grades in the midterms. Please keep in mind that the final exam is cumulative and **must be completed within 2 hours**.

Use of D2L:
Weekly exams will be administered via D2L. All printed course materials will be posted on the course webpage that is also linked to your D2L front page. You are expected to check the course webpage regularly for updates and new posts.

IMPORTANT NOTE: The following list of tentative topics is subject to change as the semester progresses if it will enhance student learning and the overall quality of the course.

Tentative Course Schedule-Subject to Change

Week 01	- Course outline and logistics - Frequency tables and charts - Numerical measures- raw data - Central tendency - Variation (spread) - Location: Z-score and Quantile - Boxplot and IQR
	- Probability concepts - Additive probability rules - Concepts of Random Variables - Characterizing discrete random variables - Characterizing continuous random variables
Week 02	- Standard Normal Distribution - Standard normal distribution table - Given two z-scores to find the probability - Given one z-score and probability to find the other z-score
	- Normal Distribution - z-score transformation - Two basic problems of normal distributions - Central limit theorem (CLT) - Sampling distribution of sample means
	- Review of Sampling Distribution of Sample Means - The case of normal populations - The case of a large sample - The case of small sample - Sampling distribution of sample proportions - The CLT for sample proportions

Week 03	- Concept of confidence interval (CI) for the mean
	    o Terms of confidence interval
	    o Steps for constructing confidence interval
	- Normal confidence intervals for μ and *p*
	    o The case of large sample (CLT)
	    o The case of proportion: *np>5 and n(1-p)>5*

	- T-distribution
	    o Use of t-table to find critical values
	- t-confidence interval for μ.
	    o Steps for constructing t-confidence intervals

Week 04	- Conceptual Framework of Hypothesis Testing
	    o The logic of hypothesis testing
	    o The components and terms of hypothesis testing
	- Normal Tests – Critical value and p-value methods
	    o Large sample test for population μ
	    o Testing *p* when *np >5* and *n(1-p) >5*

	- t-test – Critical value method only (for this class)
	    o small normal sample with unknown σ
	- Testing two dependent population means: paired tests
	        o Dependent populations: before and after designs

Week 05	- Two-sample independent Tests
	        o Testing population means: two-sample t-test
	        o Testing population means: two-sample normal test

	- Correlation coefficient
	- Least-square regression line
	- Inference of Linea Regression
	    o Coefficient of Determination
	    o Hypothesis Testing on the Slope Parameter

	- Concepts of Goodness of fit test o Observed and null tables - Chi-square test of independence

ACADEMIC & PERSONAL INTEGRITY

It is the responsibility of each student to adhere to the university's standards for academic integrity. Violations of academic integrity include any act that violates the rights of another student in academic work, that involves misrepresentation of your own work, or that disrupts the instruction of the course. Other violations include (but are not limited to): cheating on assignments or examinations; plagiarizing, which means copying any part of another's work and/or using ideas of another and presenting them as one's own without giving proper credit to the source; selling, purchasing, or exchanging of term papers; falsifying of information; and using your own work from one class to fulfill the assignment for another class without significant modification. Proof of academic misconduct can result in the automatic failure and removal from

this course. For questions regarding Academic Integrity, the No-Grade Policy, Sexual Harassment, or the Student Code of Conduct, students are encouraged to refer to the Department Undergraduate Handbook, the Undergraduate Catalog, the Ram's Eye View, and the University website at www.wcupa.edu.

STUDENTS WITH DISABILITIES

If you have a disability that requires accommodations under the Americans with Disabilities Act (ADA), please present your letter of accommodations and meet with me as soon as possible so that I can support your success in an informed manner. Accommodations cannot be granted retroactively. If you would like to know more about West Chester University's Services for Students with Disabilities (OSSD), please visit them at 223 Lawrence Center. Their phone number is 610-436-2564, their fax number is 610-436-2600, their email address is ossd@wcupa.edu, and their website is at https://www.wcupa.edu/universityCollege/ossd/. In an effort to assist students who either receive or may believe they are entitled to receive accommodations under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, the University has appointed a student advocate to be a contact for students who have questions regarding the provision of their accommodations or their right to accommodations. The advocate will assist any student who may have questions regarding these rights. The Director for Equity and Compliance/Title IX Coordinator has been designated in this role. Students who need assistance with their rights to accommodations should contact them at 610-436-2433.

EXCUSED ABSENCES POLICY

Students are advised to carefully read and comply with the excused absences policy, including absences for university-sanctioned events, contained in the WCU Undergraduate Catalog. In particular, please note that the "responsibility for meeting academic requirements rests with the student," that this policy does not excuse students from completing required academic work, and that professors can require a "fair alternative" to attendance on those days that students must be absent from class in order to participate in a University-Sanctioned Event.

REPORTING INCIDENTS OF SEXUAL VIOLENCE

West Chester University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to comply with the requirements of Title IX of the Education Amendments of 1972 and the University's commitment to offering supportive measures in accordance with the new regulations issued under Title IX, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. **Faculty members are obligated to report sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred to the person designated in the University Protection of Minors Policy.** Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at: https://www.wcupa.edu/_admin/diversityEquityInclusion/sexualMisconduct/default.aspx

INCLUSIVE LEARNING ENVIRONMENT AND ANTI-RACIST STATEMENT

Diversity, equity, and inclusion are central to West Chester University's mission as reflected in our Mission Statement, Values Statement, Vision Statement and Strategic Plan: Pathways to Student Success. We disavow

racism and all actions that silence, threaten, or degrade historically marginalized groups in the U.S. We acknowledge that all members of this learning community may experience harm stemming from forms of oppression including but not limited to classism, ableism, heterosexism, sexism, Islamophobia, anti-Semitism, and xenophobia, and recognize that these forms of oppression are compounded by racism.
Our core commitment as an institution of higher education shapes our expectation for behavior within this learning community, which represents diverse individual beliefs, backgrounds, and experiences. Courteous and respectful behavior, interactions, and responses are expected from all members of the University. We must work together to make this a safe and productive learning environment for everyone. Part of this work is recognizing how race and other aspects of who we are shape our beliefs and our experiences as individuals. It is not enough to condemn acts of racism. For real, sustainable change, we must stand together as a diverse coalition against racism and oppression of any form, anywhere, at any time. Resources for education and action are available through WCU's [Office for Diversity, Equity, and Inclusion](#) (ODEI), DEI committees within departments or colleges, the student [ombudsperson](#), and centers on campus committed to doing this work (e.g., [Dowdy Multicultural Center](#), [Center for Women and Gender Equity](#), and the [Center for Trans and Queer Advocacy)](#).

Guidance on how to report incidents of discrimination and harassment is available at the University's [Office of Diversity, Equity and Inclusion](#).

EMERGENCY PREPAREDNESS

All students are encouraged to sign up for the University's free WCU ALERT service, which delivers official WCU emergency text messages directly to your cell phone. For more information, visit www.wcupa.edu/wcualert. To report an emergency, call the Department of Public Safety at 610-436-3311.

ELECTRONIC MAIL POLICY

It is expected that faculty, staff, and students activate and maintain regular access to University provided e-mail accounts. Official university communications, including those from your instructor, will be sent through your university e-mail account. You are responsible for accessing that mail to be sure to obtain official University communications. Failure to access will not exempt individuals from the responsibilities associated with this course.