College of Liberal Arts and Sciences
Department of Mathematics, Physics, and Statistics

MATH 250

Data Analysis (3 units)
Fall 2022
Section 01 Class #: 10337
Segerstrom 154 TR 11:10AM – 12:35 PM

Instructor
Katie Fitzgerald, PhD Statistics
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Office Hours: Tue 1:00 – 3:00pm (on Zoom)
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APU Mission Statement

Azusa Pacific University is an evangelical Christian community of disciples and scholars who seek to advance the work of God in the world through academic excellence in liberal arts and professional programs of higher education that encourage students to develop a Christian perspective of truth and life.

Course Description

Prerequisite: MATH 130 or MATH 361

APU Credit Hour Policy

Following the APU Credit Hour policy, to meet the identified student learning outcomes of this course, the expectations are that this 3 unit course, delivered over a 15 week term will approximate 3 hours/week classroom or direct faculty instruction. In addition, out-of-class student work will approximate a minimum of 6 hours each week.

Other Important Policies and Information

https://goo.gl/2uDWh7

Course Objectives and Desired Student Learning Outcomes for Probability and Statistics

Student Learning Outcome "By the end of this course, students should be able to…"	IDEA Objective	Assignments Used to Assess

Required Course Materials

Books: This course has

Software: This course will utilize the free statistical software R and RStudio. Students will receive instructions in the first week of class for how to access it via RStudio Cloud.

Hardware: Students are expected to bring a laptop to all class sessions. If access to a laptop is an issue, then please contact the course instructor and an accommodation will be made. This requirement will not prevent students from taking this course.

Campuswire account: This term we will be using Campuswire as our preferred platform for questions about homework, labs, and general course questions. The system is highly catered to getting you help quickly and efficiently from classmates and the instructor. Rather than emailing questions to the instructor, you should post your questions on Campuswire. **Enrollment code: 7936**

Course design:

Flipped classroom

Tips for success & how to access support for this class

- Dedicate yourself to being an engaged learner and contributing to a thoughtful learning environment for your peers
- Utilize Campuswire to ask questions, respond to your peers, and upvote others' questions and responses.
- Come to my office hours. Even if you don't know what your specific questions or points of confusion are, we can figure that out together. Office hours will be held virtually on Zoom; details will be provided on Canvas. You can also email me to set up an appointment at an alternative time.
- Collaborate! Get to know your classmates. You are encouraged to work on homework assignments and labs together
- Utilize (read) your textbook – it's not just for accessing homework problems!
- Google is your friend! Answers & discussions on math.stackexchange.com (for homework & take-home exams), and stackoverflow.com (for R Labs) are often particularly helpful
- **Start assignments *early* and ASK QUESTIONS! Ask on Campuswire, in-class, and/or in office hours.**
- Embrace the struggle & don't shy away from confusion or uncertainty. After all, statistics is the "science of uncertainty," and being "good at math" is being good at being stuck…

- Contact me about any concerns. Best way to reach me is via email (kfitzgerald@apu.edu). I do my best to respond within 24 hours.

Assessment Factors Contributing to Final Grade

Preparation Quizzes

Application Exercises

Labs

Homework

Exam
Students will be given the opportunity to submit annotated test corrections to earn up to 1/3 of the points back on their exam. Specific instructions and expectations will be provided when the exams are graded and returned.

Data Encounters

Project

Late/makeup work

- All assignments for the course are to be completed and submitted on time in order to receive full credit. A 10% penalty applies for late work submitted within 48 hours after the deadline; a 25% penalty applies for work submitted later than 48 hours after the deadline. **No late work will be accepted after an Exam has been given covering those chapters.**
- There are no makeup exams unless specifically coordinated with the instructor in advance.
- Incompletes are rare and are available only in "special or unusual circumstances" as negotiated with the instructor prior to the end of the term. See the Catalog for policies regarding Withdrawals and grade record permanence.
- Note: the professor will work with anyone in the case of extreme unexpected events, such as ones involving emergency room visits, mental health crises, or death of a loved one.

Grading

Homework & Labs.	30%
Engagement & Participation	5%
Faith Integration.	5%
Exam 1	20%
Exam 2	20%
Final Exam	20%

Grading criteria and scale

A Superior knowledge regarding details, principles, terms, and notation; superior skill in computation and application of the material.

B More than adequate knowledge regarding the major themes; ability to compute correct answers and apply the material.
C Basic knowledge and skill needed to solve problems relating to probability and statistics.
D Serious gaps in knowledge, confusion of concepts, inability to recall basic information, inadequate skill in computation or application.
F Absence of knowledge, incapable of correct computation, misunderstands most concepts.

Final letter grades will be assigned approximately as indicated in the table below.

A 93-100%	B+ 87-89%	C+ 77-79%	D+ 67-69%	F 0-59%
A- 90-92%	B 83-86%	C 73-76%	D 63-66%	
	B- 80-82%	C- 70-72%	D- 60-62%	

Important Dates

January 11 (Tue)	First day our class meets
January 19 (Wed)	Add Deadline
January 21 (Fri)	Drop Deadline, Opt-out deadline for Immediate Access
Feb 10 (Thurs)	Exam 1 take-home posted
Feb 15 (Tue)	Exam 1 take-home DUE
Feb 17 (Thurs)	Exam 1 in-class
Feb 25 (Fri)	Faith Integration Paper 1 due
March 7 - 13	Spring break (NO CLASSES)
Mar 18 (Fri)	Faith Integration Paper 2 due
March 31 (Thurs)	Exam 2 take-home posted
April 5 (Tue)	Exam 2 take-home DUE
April 7 (Thurs)	Exam 2 in-class
April 13 (Wed)	Faith Integration Paper 3 due
April 14 (Thurs)	Easter break – (NO CLASS)
May 2 - 6	Final Exams

Course Policies

Diversity

Affirming that diversity is an expression of God's image, love, and boundless creativity, it is the University's aim to collectively nurture an environment that respects each individual's uniqueness while celebrating our collective commonalities. It is in this spirit that we collectively strive to create an inclusive environment in which all students, staff, faculty, and administrators thrive.

Azusa Pacific University encourages community members to resolve conflicts directly, when possible. If an APU community member perceives that hostile words or behaviors were directed toward an individual or a group based upon that individual's or group's identity they can submit a Bias Incident Report. Information on the reporting process is available on the website at www.apu.edu/diversity/bias/.

Faith Integration Statement

Academic Faith Integration is recognized as an important feature of courses at Azusa Pacific University. Students can expect to discover how relevant themes from their coursework and themes from the Christian faith meaningfully inform each other. Although faith integration is central to the mission of APU, instructors respectfully recognize that students come from a diversity of faith backgrounds and that they have a variety of perspectives.

Academic Integrity Policy

The mission of Azusa Pacific University includes cultivating in each student not only the academic skills that are required for a university degree, but also the characteristics of academic integrity that are integral to a sound Christian education. It is therefore part of the mission of the university to nurture in each student a sense of moral responsibility consistent with the biblical teachings of honesty and accountability. Furthermore, a breach of academic integrity is viewed not merely as a private matter between the student and an instructor but rather as an act which is fundamentally inconsistent with the purpose and mission of the entire university. A complete copy of the Academic Integrity Policy is available in the Office of Student Life, the Office of the Vice Provost, and online.

Any use of resources that the professor has not explicitly allowed or plagiarism of anyone's words or ideas without proper credit is considered academically dishonest and will result in sanctions up to and including a 0 on the assignment for a first offense and an "F" in the class for a second offense. The student is required to meet with the professor to discuss each offense. All offenses will be reported to the Vice Provost for Undergraduate Programs.

Support Services Policy

Students in this course who have a disability that might prevent them from fully demonstrating their abilities should meet with an advisor in Accessibility and Disability Resources as soon as possible to initiate disability verification and discuss reasonable accommodations that will allow the opportunity for full participation and for successful completion of course requirements. For more information, please contact Accessibility and Disability Resources by phone at 626-815-3849, or email at disabilityservices@apu.edu.

Bibliography

Diez, D., Çetinkaya-Rundel, M., & Barr, C.D. (2019). OpenIntro Statistics (4th ed.) openintro.org/os.

Tipton, E., Kuyper, A.M., Fitzgerald, K.G. – Adapted from Kim, A.Y. & Ismay, C. Introduction to Statistics and Data Science: A moderndive into R and the tidyverse. https://nustat.github.io/intro-stat-ds/index.html

Wickham, H. & Grolemund, G. (2017). R for Data Science. O'Reilly Media. https://r4ds.had.co.nz

Course Calendar (Tentative)

Week	Dates (T-Th)	Topics	DUE (Wed, 11:59pm)	DUE (Fri, 11:59pm)
1	Jan 11 - 13	Introduction & Syllabus 1.1 Probability Lab 00 – Intro to R		Discussion Post 01 Week 01 check-in
2	Jan 18 - 20	1.2 Methods of Enumeration 1.3 Conditional Probability 1.4 Independent Events 1.5 Bayes' Theorem	HW 01 Lab 01	Discussion Post 02 Week 02 check-in
3	Jan 25 - 27	2.1 Discrete Random Variables 2.2 Mathematical Expectation	HW 02 Lab 02	Discussion Post 03 Week 03 check-in
4	Feb 1 – Feb 3	2.3 Special Expectations 2.4 Binomial Distribution	HW 03 Lab 03	Discussion Post 04 Week 04 check-in
5	Feb 8 - 10	2.4 (cont'd) Exam 1 Review **Exam 1 take-home handed out (Thurs)**	HW 04 Lab 04	NA
6	Feb 15 - 17	**Exam 1 take-home DUE (Tue)** 3.1 Continuous Random Variables **Exam 1 in-class (Thurs)**	NA	Week 06 check-in
7	Feb 22 - 24	3.2 Exponential, Chi-sq, Gamma 3.3 Normal Distribution	NA	Faith Integration Paper 1 Discussion Post 05 Week 07 check-in
8	Mar 1 - 3	3.3 cont'd 4.1 Bivariate Discrete Distributions 4.4 Bivariate Continuous Distributions	HW 05 Lab 05	Discussion Post 06 Week 08 check-in
	Mar 8 – 10	SPRING BREAK – NO CLASS		
9	Mar 15 - 17	4.2 Correlation Coefficient 5.1 Transformations of One R.V.	HW 06 Lab 06	Faith Integration Paper 2 Discussion Post 07 Week 09 check-in
10	Mar 22 - 24	5.3 Several Random Variables 5.5 Random Functions with Normal Dist	HW 07 Lab 07	Discussion Post 08 Week 10 check-in
11	Mar 29 - 31	5.6 Central Limit Theorem Ch 3 – 5 Review **Exam 2 take-home handed out (Thurs)**	HW 08 Lab 08	NA
12	April 5 - 7	**Exam 2 take-home DUE (Tue)** 6.1 Descriptive Statistics 6.2 Exploratory Data Analysis **Exam 2 in-class (Thurs)**	HW 09 Lab 09	Week 12 check-in
13	April 12	7.1 Confidence Intervals for Means Thursday – Easter Break (No class)	Faith Integration Paper 3 Lab 10 Week 13 check-in	NA
14	April 19 - 21	7.3 Confidence Intervals for Proportions 8.1 Tests about One Mean	HW 10 Lab 11	Discussion Post 09 Week 14 check-in
15	April 26 - 28	8.3 Tests about proportions Review	HW 11 Lab 12	End-of-course reflection
16	May 2 - 6	FINAL EXAMS		

Course schedule, topics, exams and assignments may be changed at the instructor's discretion