MATH 481: Statistics and Data Analysis
for Middle School Teachers
Spring 2023

Instructor: Mr. Peter Moon (he/him)
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Office Hours: Mondays, 4-5pm via Zoom (zoom.lunarmath.com)
Note: Please email me ahead of time to let me know you'd like to meet during my office hours.
Class Times and Locations: Wednesdays, 5:00 PM - 7:45 PM, Building II - 3022

COURSE DESCRIPTION

(Prerequisite: MATH 214) Prepares teachers with elementary certification to teach simple data analysis and probability in middle school. Focuses on understanding basic statistics, data analysis, and related theoretical ideas: the knowledge that provides a context and rationale for the data analysis and probability that is taught to middle school students.

COURSE OBJECTIVES

During MATH 481, you will:

- Strengthen your understanding of the statistical investigation process and the key concepts of middle grades statistics (http://www.corestandards.org/Math/Content/SP/)
- Analyze statistical tasks to better promote explorations of data and key statistical concepts for your students
- Examine ways students work on statistical tasks to learn about common understandings and confusions, and trajectories of key statistical concepts
- Explore rich data sources and dynamic graphing tools to support investigations of questions that are of interest to you and your students
- Collaborate with peers to gain different perspectives on data investigations and to build a collection of lesson plans and teaching resources

NO TEXTBOOK REQUIRED

Any additional readings for the course will be available electronically or distributed in class.

COURSE OUTLINE (Tentative)

Unit 1: Statistical Investigation	Jan 25 – Feb 22
Unit 2: Inference and Simulations	Mar 1 – Mar 22
Unit 3: Bivariate Data and Associations	Mar 29 - May 3

COURSE ASSESSMENTS

Attendance and Participation: Students are responsible for attending all classes, participating in class discussions, and completing in-class activities. **Please notify me about an absence either before or as soon after the missed class as possible.** In the case of religious observances, athletic events, and other planned absences, notification must be sent during the schedule adjustment period. You must provide notification in order to have the opportunity to make up the participation points.

Homework Assignments: Please expect to have a homework assignment assigned after each week's class, due by the start of the next class. All homework assignments may be completed in groups of 1-4, and should be submitted by **one** member of the group on ELMS. Please ensure that all group members' names are easily findable at the beginning of your submitted assignment so I can award proper credit!

Quizzes: Please expect to have a relatively short quiz (typically 1-5 questions) at the beginning of each class. These are not intended to be difficult or tricky, but are instead intended as a chance for you to demonstrate your knowledge of the material and build a solid foundation for your final grade. I know everyone has an "off day" sometimes and makes mistakes on quizzes, so I will drop your 3 lowest quiz scores at the end of the semester. **If you are going to miss class, please make arrangements to make up the quiz with me in advance, or ASAP in an emergency where you weren't able to contact me beforehand.** Otherwise, you won't get credit for taking the quiz (which just means it may wind up being one of your drops at the end of the semester).

Unit Assessments: Units 1 and 2 will include a "Simulation of Practice" assignment where you will independently prepare a written or video response (your choice!) to a student's question or work. More details on this assignment will be provided in the assignment descriptions.

The Final: The final project is your chance to collect and analyze data in a statistical investigation. You will present your project to the class on May 3 and submit a written report by May 10. More details on this assignment will be provided in the assignment descriptions. Because your project will involve data collection, I highly recommend thinking of a topic by March so that you have plenty of time to collect data and analyze it.

Late Work Policy: All assignments are expected to be turned in on their due date unless an arrangement has been made with the instructor *in advance*. Unexcused late work will be docked 10% of the value of the assignment each day it is late.

COURSE GRADE

Grading System Cut off:

A+ = 97–100%	A = 93–96.9%	A- = 90–92.9%
B+ = 87–89.9%	B = 83–86.9%	B- = 80–82.9%
C+ = 77–79.9%	C = 73–76.9%	C- = 70–72.9%
D+ = 67–69.9%	D = 63–66.9%	D- = 60–62.9%
F $\leq$ 60%		

Grades will be determined in the following manner:

Participation	20%
Homework Assignments	20%
Quizzes	20%
Assessments	20%
Final:	20%
Total:	**100%**

COURSE TECHNOLOGY

Course Website: www.elms.umd.edu

Log onto ELMS to access/download the course syllabus, selected readings, class resources, assignment details, and to turn in assignments. I will use ELMS announcements to communicate regarding class cancellation, room change, or other time-sensitive information.

Additionally, a laptop will be required to complete some in-class activities. If you do not have access to one, please let me know as soon as possible so we can make arrangements to get you one during the needed class times.

UNIVERSITY POLICIES AND RESOURCES

Policies relevant to Undergraduate Courses are found here: http://ugst.umd.edu/courserelatedpolicies.html. Topics that are addressed in these various policies include academic integrity, student and instructor conduct, accessibility and accommodations, attendance and excused absences, grades and appeals, copyright and intellectual property.

TENTATIVE CALENDAR

This table is also available on ELMS, which may be updated slightly if we need to make adjustments during the semester. Please defer to the updated table on ELMS if there are discrepancies, or just ask me if you're not sure!

Please note the date of two Zoom sessions (3/22 and 3/29).
Additionally, we will not meet over MCPS Spring Break (4/5).

Class #	Date	Unit	Topic	Quizzes	Homework	Assessments
1	Jan 25	1	Syllabus; Statistical Investigation	--	M1L1 Exercises #2-1, 2-4	--
2	Feb 1	1	Study Design	Quiz 1: Good Statistical Questions and the Statistical Investigation Cycle	M1L2 Exercises #3-4, 3-6, 3-7, 4-13	--

3	Feb 8	1	Finding a Story in the Data	Quiz 2: Study Design & Bias	M1L4 Exercises #7-6, 8-2 M1L6 Exercises #11-1 (***)	--
4	Feb 15	1	Interpreting Graphs	Quiz 3: Graph Interpretations	M1L6 Exercises #12-5 (***) M1L7 Exercises #14-1 (***)	--
5	Feb 22	1	Distributions	Quiz 4: Case and Aggregate Graphs	--	ON YOUR OWN: M1L5 Exercises #10-4 (***) OR M1L8 Exercises #16-22 (***)
6	Mar 1	2	Hypothesis Testing & Simulations	Quiz 5: Shape, Center, and Variability	M2L1 Exercises #2-8 (***) M2L2 Exercises #4-3	--
7	Mar 8	2	Confidence Intervals & Simulations	Quiz 6: Simulations	M2L4 Exercises #8-2 (***), 8-4	--
8	Mar 15	2	Formula-Based Inference I	Quiz 7: Confidence Intervals	--	ON YOUR OWN: M2L5 Exercises #10-5 (***) OR M2L6 Exercises #12-6 (***)
9	Mar 22**	2	Formula-Based Inference II	Quiz 8: Hypothesis Testing	M2L7 Exercises #13-1, 13-4	--

10	Mar 29**	3	Quantitative Association I	Quiz 9: Formula-Based Inference	--	--
11	Apr 5	3	NO CLASS - MCPS SPR BREAK	--	--	--
12	Apr 12	3	Quantitative Association II	--	M3L3 Exercises #4-2 (***), 4-4 (***)	--
13	Apr 19	3	Quantitative Association III	Quiz 10: Linear Regression	RStudio Multiple Regression Activity	--
14	Apr 26	3	Categorical Association	Quiz 11: Inference for Linear Regression	M3L6 #10-3, 11-3, 11-6	FINISH Final Project Presentations
15	May 3	3	Final Project Presentations	--	--	FINISH Project
--	May 10	--	PROJECTS DUE	--	--	Project

**This session will meet on Zoom (zoom.lunarmath.com).

(***) This problem may take more time than usual.