

Arcadia University
Spring 2021
Math 118.1, Mathematical Concepts II -Synchronous

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Office Hours: I will be available most Tuesdays & Thursdays from 10-12 or 4-5, please just let me know ahead of time that you would like to meet. Send me an invite through google calendar.
Text: Burger, Edward & Starbird, Michael - The Heart of Mathematics, 4th Edition, Wiley Publishing. Please make sure you get this edition and not an earlier one.
Prerequisites: MA117, Mathematical Concepts I

Hello! Welcome to Mathematical Concepts II! This is the second semester of a two-semester sequence of courses. It will further explore some of the greatest ideas in humankind within the scope of mathematics and various problem-solving techniques. The main topics of interest will be probability, statistics, and the application of mathematics in decision-making. Although you will be challenged, the main overarching goals are:

1. To develop a deeper understanding (and hopefully appreciation) for rich mathematics ideas
2. To build sharper skills for analyzing problems
3. To develop a new perspective and outlook at the way you view the world by connecting these ideas and ways of thinking outside of a mathematics course.

Just as in MA117, MA118 is not a traditional math course and in fact very little mathematical background is expected. I ask that you come into this course with an open mind and a willingness to make mistakes and learn from them.

Some general points about the course:

- MA118 satisfies the AUC QRM (Quantitative Reasoning — Mathematics) requirement, and therefore devotes significant time to exploring how mathematics can, and should be used, effectively.
- Class time will be spent introducing new mathematical concepts, going over assignments, working in groups, and investigating unsolved problems (not all of which will have a clear and definitive answer). We will follow the first half of the book very closely, but not every single topic is covered in class. Students should have their textbook every day. Please do not work ahead on HW problems unless you know you will be absent. Often, we start these in groups in class.
- Students should have their own scientific or graphing calculator. It does not need to be anything fancy. Calculators are also available to rent for the semester. You **CANNOT** use cellphones as a calculator on tests.

Quizzes/Exams

There will be 2 quizzes and 1 cumulative final exam. If you miss a quiz/exam or are caught cheating a 0 is automatically assigned. Don't cheat it's not worth it!

*Details to follow how we will complete this online

Homework/Assignments

Homework will primarily be in the form of problems from the textbook called "mindscapes" at the end of each section. **All** homework is expected to be completed, however only a few mindscapes will be collected and graded. I will supply a rubric for collected HW assignments. HW grades will be based on *thorough completion and effort*. I need to see a well thought out process and effort not just random scribbled down answers. You are allowed and encouraged to work together on HW assignments (no copying answers). We review HW in class so you must be prepared to ask questions. There will be some additional assignments/experiments through canvas as well.

It is expected you read the sections after we have completed it in class.

Lastly, there is also a course project we will start about mid-semester which will involve data collection, creating a visual piece, and presentation in front of the class.

Attendance Policy

I will take attendance for all of our live classes. You are permitted up to 2 absences for any reason, 3 or more will adversely affect your grade (unless excused).

- If absent, you are expected to get any missed notes from a classmate, and to have **all** assignments completed upon return. A missed quiz will result in a 0.

Grading breakdown

- Class attendance, participation, webcam on	12%
- Checked Mindscapes and other canvas assignments	15%
- Dear data project	20%
- Quizzes (x2)	25%
- Final	28%
Total	100%

This break-down of grades is tentative and subject to change with ample notice. I follow a standard letter grade assignment. I generally DO NOT round (79.8 = C+), however if you are a student who constantly comes to class prepared and participates, I may be inclined.

MA118 – Course Overview

Section	Topic	Tentative Related Assignments (in class/HW)
Ch 8 – Taming uncertainty (Probability)	8.1 – Scenarios involving chance 8.2 – Probability 8.3 – Coincidences 8.4 – Systematic counting (combinations & permutations) 8.5 – Applications of probability (game theory, weather predictions, Bayesian 2-way tables)	8.1 – Ask 23 random people birthday. Reflect on results. Book #1,2,3,4,5,6,18,19,20,21,22 8.2 – 1-5, 7,10,12-17,10,20,21,24,28,30,34,40,45, story 8 from ch. 1. Birthday calculation problems. 8.3 – 1,2,5,6,12,14,21,24,26,3,32,36. Randomness experiment. 8.4 – 3,5,6,7,8,11,12,15,17,18,19,26; supplemental worksheet 8.5 - 1,2,3,4,6,26-28 & 29; supplemental worksheet
Ch 9- Deriving meaning from data (Statistics)	9.1 – Pitfalls of statistics 9.2 – Describing Data (5 number summary, graphs/charts, histograms) 9.3 – Famous distributions 9.4 – surprising implications from data 9.5 – Cause & effect, correlation	9.1 – 2,7. Find news article and examine for bias or distortion. 9.2 - 1,2,3,10,23 9.3 - 1,2,4,5,11,12,16 9.4 - 1,2,3,4,5,6,10,16,20 9.5 - 3,13,15,17,19-22,29 Semester project – Collect data on yourself for 1 week on 2 different topics. Create visual project & present.
Ch10 – Applications of Rigorous thinking	10.1 – Expected Value 10.2 – Risk factors (public vs personal safety) 10.3 – Interest 10.4 – Voting methods 10.5 – Dividing up scarce resources	10.1 – 3,7,14,15,20,21 10.2 - 3,6,10,11,19 10.3 – 1,2,4,6,7 10.4 – 3,7,10-15,17,18 10.5 – 1,5,6,7,15,19,20

Tentative Schedule & Due Dates

<i>Class Date</i>	<i>Sections Covered</i>	<i>Graded Assignment Due</i>
<i>Tuesday, January 26, 2021</i>	<i>Intro to course/8.1</i>	
<i>Thursday, January 28, 2021</i>	<i>8.1</i>	
<i>Tuesday, February 2, 2021</i>	<i>8.1/8.2</i>	<i>Birthday experiment due Feb 1 by midnight</i>
<i>Thursday, February 4, 2021</i>	<i>8.2</i>	
<i>Tuesday, February 9, 2021</i>	<i>8.2/8.3</i>	<i>Coin experiment due Feb 8 by midnight</i>
<i>Thursday, February 11, 2021</i>	<i>8.3</i>	
<i>Tuesday, February 16, 2021</i>	<i>8.4</i>	
<i>Thursday, February 18, 2021</i>	<i>8.4</i>	<i>8.4 mindscapes due Sunday (2/21)</i>
<i>Tuesday, February 23, 2021</i>	<i>Review day</i>	
<i>Thursday, February 25, 2021</i>	<i>Quiz#1(8.1-8.4)</i>	
<i>Tuesday, March 2, 2021</i>	<i>8.5</i>	
<i>Thursday, March 4, 2021</i>	<i>8.5</i>	<i>8.5 mindscapes due Sunday(3/7)</i>
<i>Tuesday, March 9, 2021</i>	<i>9.1</i>	
<i>Thursday, March 11, 2021</i>	<i>9.1/9.2</i>	
<i>Tuesday, March 16, 2021</i>	<i>Spring Break</i>	
<i>Thursday, March 18, 2021</i>	<i>Spring Break</i>	
<i>Tuesday, March 23, 2021</i>	<i>9.2/9.3</i>	<i>Bias assignment due & 10 data topics brainstorm</i>
<i>Thursday, March 25, 2021</i>	<i>9.3</i>	<i>9.3 mindscapes due Sunday (3/28)</i>
<i>Tuesday, March 30, 2021</i>	<i>9.4</i>	<i>**Submit final 2 topics for data collection project</i>
<i>Thursday, April 1, 2021</i>	<i>9.4/9.5</i>	
<i>Tuesday, April 6, 2021</i>	<i>9.5</i>	<i>**Start collecting data(4/6-4/12)</i>
<i>Thursday, April 8, 2021</i>	<i>Review Day</i>	
<i>Tuesday, April 13, 2021</i>	<i>Quiz#2 (8.5, 9.1-9.5)</i>	<i>**Data submission due</i>
<i>Thursday, April 15, 2021</i>	<i>10.1</i>	
<i>Tuesday, April 20, 2021</i>	<i>10.1/10.3</i>	
<i>Thursday, April 22, 2021</i>	<i>FLEX</i>	
<i>Tuesday, April 27, 2021</i>	<i>FLEX</i>	
<i>Thursday, April 29, 2021</i>	<i>Data Project Presentations</i>	<i>**Data project due!!</i>
<i>Tuesday, May 4, 2021</i>	<i>Data Project Presentation</i>	
<i>Thursday, May 6, 2021</i>	<i>Final Review Day</i>	

- **Disability statement:** *Arcadia University provides reasonable accommodations for students with documented disabilities. If you require accommodations or other academic supports due to a physical, psychological, psychiatric or learning disability, you should contact Disability Support Services at (215) 572-4033.*
- **Student Athletes:** *Student athletes should identify themselves at the end of the first class and give the instructor a copy of the semester's games/meets.*
- **Title IX Statement:** *Arcadia University is committed to assuring a safe and productive educational environment for all students. In order to meet this commitment and to comply with Title IX of the Education Amendments of 1972 and guidance from the Office for Civil Rights, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator. The only exceptions a 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. Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at <https://www.arcadia.edu/university/policies-guidelines/title-ix>.*