



**DAVIS UNIVERSITY**

**COURSE SYLLABUS**  
**MTH220: INTRODUCTION TO PROBABILITY**  
**SUMMER QUARTER 2025**

**QUARTER:** SUMMER QUARTER 2025

**COURSE SYLLABUS FOR:** INTRODUCTION TO PROBABILITY

**CREDIT HOURS:** 5 CREDITS

**INSTRUCTOR:**

**INSTRUCTOR EMAIL:**

**INSTRUCTOR OFFICE HOURS:**

**COURSE DESCRIPTION:** Topics include probability spaces, random variables, conditional expectation and probability, independence, joint distributions, consequences, conditional distribution, the Central Limit Theorem.

**PREREQUISITES:** Analytic Geometry And Calculus II

**TEXT:** *Probability and Simulation*, Giray Ökten, Springer Undergraduate Texts in Mathematics and Technology, Springer, 2020. Softcover ISBN: 9783030560690. E-book ISBN: 9783030560706

**LATE WORK POLICY:** All students are expected to submit homework assignments electronically on the date specified on the syllabus. No late homework will be accepted and the student will receive a "0" (zero) for the homework assignment. Should the student refuse to complete the assigned work for the class, it could result in the student failing the class. All work assigned is expected to be completed on the date assigned. The instructor reserves the right to

alter the schedule as necessary. Please be sure to check your email/Moodle for any changes to the schedule.

**PLAGIARISM AND COPYRIGHT INFRINGEMENT POLICY:** Work that is found to be plagiarized receives a grade of zero and often causes a student to fail a class. Documentation of plagiarism is added to the student's academic file as a violation of accepted student conduct and is subject to disciplinary action. Plagiarism is the use of another person's exact words, or their ideas written in the student's words without giving the original author credit.

Plagiarism can result from any of the following:

- Quote material directly without using quotation marks.
- Paraphrase the original so that many of the phrases are the same as the original. A good rule is no more than 3 or 4 words in a row should be the same as the original.
- Copy the original sentence pattern, substitution synonyms for key words.
- Neglect to indicate the source of the original material.

#### **ASSESSMENTS:**

##### Content

Online Homework	15%
Written Assignments	10%
Exams	50%
Final Exam	25%
Total	100%

**COURSE GRADE: A = 93%-100%**

**B = 85%-92%**

**C = 77%-84%**

**D = 70%-76%**

**F = below 70%**

**TENTATIVE CLASS SCHEDULE:**

(Subject to change)

Week: Date	Content Covered	Assignments & Assessment Due
<b>Week 1:</b>	<u>Probability</u> <ul style="list-style-type: none"> <li>● Axioms of probability</li> <li>● Random sampling</li> <li>● Project: Verifying polynomial identities</li> <li>● Conditional probability and randomized surveys</li> <li>● Bayes' theorem</li> </ul> <u>Discrete random variables</u> <ul style="list-style-type: none"> <li>● Discrete random variables</li> <li>● Expectation of a function of a random variable</li> <li>● Discrete uniform random variables</li> <li>● Bernoulli, binomial, geometric, Poisson random variables</li> </ul>	
<b>Week 2:</b>	<ul style="list-style-type: none"> <li>● Conditional expectation</li> <li>● Markov's inequality and Chebyshev inequality</li> </ul> <u>Continuous random variables</u> <ul style="list-style-type: none"> <li>● Uniform random variables and strong law of large numbers</li> <li>● Exponential and normal random variables, central limit theorem</li> </ul>	Homework 1- Mon Midterm Exam- Friday
<b>Week 3:</b>	<u>Joint distribution of random variables</u> <ul style="list-style-type: none"> <li>● Joint distribution of discrete random variables</li> <li>● Jointly continuous random variables</li> <li>● Joint distributions and independence</li> <li>● Further multivariate topics</li> </ul> <u>Sums and symmetry</u> <ul style="list-style-type: none"> <li>● Sums of independent random variables</li> </ul>	Homework 2- Mon
<b>Week 4:</b>	<u>Expectation and variance in the multivariate setting</u> <ul style="list-style-type: none"> <li>● Sample mean and sample variance</li> <li>● Covariance and correlation</li> <li>● The bivariate normal distribution</li> <li>● Finer points</li> </ul>	

<b>Week 5:</b>	<p><u>Topics from conditional distributions and jointly continuous random variables</u></p> <ul style="list-style-type: none"><li>• Conditional distribution of a discrete random variable</li><li>• Conditional distribution for jointly continuous random variables</li><li>• Conditional expectation</li></ul> <p><u>Moment generating functions</u></p> <ul style="list-style-type: none"><li>• Moment generating functions: discrete random variables</li><li>• Moment generating functions: continuous random variables</li><li>• Moment generating functions of sums of independent random variables</li></ul>	Homework 3- Mon Final Exam- Friday
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