

MATH 356: Loss Models

Spring 2022 Course Syllabus

NJIT Academic Integrity Code: All Students should be aware that the Department of Mathematical Sciences takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

Please be sure you read and fully understand our [DMS Online Exam Policy](#).

COURSE INFORMATION

Course Description: This course will introduce a variety of frequency, severity, and aggregate models that are useful for actuarial applications. This will include analyzing data from applications, determining a suitable model, providing measures of confidence for decisions based on the model, and estimating losses.

Number of Credits: 3

Prerequisites: [MATH 341](#) with a grade of C or better.

Course-Section and Instructors:

Course-Section	Instructor
Math 356-002	Professor S. Mahmood

Office Hours for All Math Instructors: [Spring 2022 Office Hours and Emails](#)

Required Textbook:

Title	<i>Loss Models from Data to Decisions</i>
Author	Klugman, Panjer, Willmot
Edition	5th
Publisher	Wiley
ISBN #	978-1119523789

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, April 4, 2022**. It will be strictly enforced.

POLICIES

DMS Course Policies: All DMS students must familiarize themselves with, and adhere to, the [Department of Mathematical Sciences Course Policies](#), in addition to official [university-wide policies](#). DMS takes these policies very seriously and enforces them strictly.

Grading Policy: The final grade in this course will be determined as follows:

Homework and Quizzes	20%
Midterm Exam I	25%
Midterm Exam II	25%
Final Exam	30%

Your final letter grade will be based on the following tentative curve.

A	90 - 100	C	65 - 74
B+	85 - 89	D	55 - 64
B	80 - 84	F	0 - 54
C+	75 - 79		

Attendance Policy: Attendance at all classes will be recorded and is **mandatory**. Please make sure you read and fully understand the [Math Department's Attendance Policy](#). This policy will be strictly enforced.

Homework: Integrity - Your work is expected to be your own. Help from tutors, classmates etc is encouraged but you are responsible for mastering the material. Homework will be assigned at all classes.

Quiz Policy: There will be announced quizzes periodically. There are no makeup quizzes.

Technological Requirements: If the course delivery mode changes to converged learning or synchronous online, students will need access to a computer with a webcam. Exams will be proctored using ProctorU. Quizzes will be proctored using Respondus LockDown Browser+Monitor. Students must follow all instructions related to environment checks and camera positioning.

Exams: There will be two midterm exams held in class during the semester and one comprehensive final exam. The final exam will be held during the following week:

Midterm Exam I	February 22, 2022
Midterm Exam II	April 5, 2022
Final Exam Period	May 6 - May 12, 2022

The final exam will test your knowledge of all the course material taught in the entire course. Make sure you read and fully understand the [Math Department's Examination Policy](#). This policy will be strictly enforced.

Makeup Exam Policy: There will be **NO MAKE-UP QUIZZES OR EXAMS** during the semester. In the event an exam is not taken under rare circumstances where the student has a legitimate reason for missing the exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the Math Department Office/Instructor that the exam will be missed.

Cellular Phones: All cellular phones and other electronic devices must be switched off during all class times.

ADDITIONAL RESOURCES

Math Tutoring Center: Located in the Central King Building, Lower Level, Rm. G11 (See: **Spring 2022 Hours**)

Further Assistance: For further questions, students should contact their instructor. All instructors have regular office hours during the week. These office hours are listed on the Math Department's webpage for **Instructor Office Hours and Emails**.

Accommodation of Disabilities: The Office of Accessibility Resources and Services (OARS) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please contact Scott Janz, Associate Director of Disability Support Services at **973-596-5417** or via email at **scott.p.janz@njit.edu**. The office is located in Kupfrian Hall, Room 201. A Letter of Accommodation Eligibility from the Office of Accessibility Resources and Services office authorizing your accommodations will be required.

For further information regarding self identification, the submission of medical documentation and additional support services provided please visit the Office of Accessibility Resources and Services (OARS) website at:

<https://www.njit.edu/studentsuccess/accessibility/>

Important Dates (See: **Spring 2022 Academic Calendar, Registrar**)

Date	Day	Event
January 18, 2022	Tuesday	First Day of Classes
January 22, 2022	Saturday	Saturday Classes Begin
January 24, 2022	Monday	Last Day to Add/Drop Classes
March 14, 2022	Monday	Spring Recess Begins
March 19, 2022	Saturday	Spring Recess Ends
April 4, 2022	Monday	Last Day to Withdraw
April 15, 2022	Friday	Good Friday - No Classes
April 17, 2022	Sunday	Easter Sunday - No Classes
May 3, 2022	Tuesday	Friday Classes Meet
May 3, 2022	Tuesday	Last Day of Classes

May 4 - May 5, 2022	Wednesday and Thursday	Reading Days
May 6 - May 12, 2022	Friday to Thursday	Final Exam Period

Course Outline

Week	Chapter	Topic
1	Chapter 1	Modeling
2	Chapter 2	Random Variables
3	Chapter 3	Basic Distributional Quantities
4	Chapter 4	Characteristics of Actuarial Models
5	Chapter 5	Continuous Models
6	Chapter 5	Continuous Models
7	Chapter 6	Discrete Distributions
8	Chapter 6	Discrete Distributions
9	Chapter 8	Frequency and Severity with Coverage Modifications
10	<i>Review for Midterm Exam I</i>	
11	<i>Midterm Exam I</i>	
12	Chapter 8	Frequency and Severity with Coverage Modifications
13	Chapter 8	Frequency and Severity with Coverage Modifications
14	Chapter 9	Aggregate Loss Models
15	Chapter 9	Aggregate Loss Models
16	Chapter 9	Aggregate Loss Models
17	Chapter 11	Maximum Likelihood Estimation
18	Chapter 11	Maximum Likelihood Estimation
19	Chapter 11	Maximum Likelihood Estimation
20	<i>Review for Midterm Exam II</i>	
21	<i>Midterm Exam II</i>	
22	Chapter 11	Maximum Likelihood Estimation
23	Chapter 12	Frequentist Estimation for Discrete Distributions
24	Chapter 13	Bayesian Estimation
25	Chapter 13	Bayesian Estimation
26	Chapter 15	Model Selection

27	Chapter 15	Model Selection
28	<i>Review for Final Exam</i>	

Updated by Professor S. Mahmood - 1/10/2022
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