# MATH 356-002: Loss Models
## *Spring 2020 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.

## 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

**Course-Section and Instructors**

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

**Office Hours for All Math Instructors**: Spring 2020 Office Hours and Emails

**Required Textbook:**

| Title | *Loss Models from Data to Decisions* |
|---|---|
| Author | Klugman, Panjer, Willmot |
| Edition | 3rd |
| Publisher | Wiley |
| ISBN # | 978-1119523789 |

**University-wide Withdrawal Date**: The last day to withdraw with a **W** is **Monday, April 6, 2020**. 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** | 15% |
| **Midterm Exam I** | 25% |
| **Midterm Exam II** | 25% |
| **Final Exam** | 35% |

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. AttendanceNote

**Homework Policy**: 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. Homework will be collected and periodic quizzes will be given. Late homework will not receive full credit. There will be no makeup tests, quizzes, or homework.

**Exams**: There will be two midterm exams held in class during the semester and one comprehensive final exam. Exams are held on the following days:

| | |
|---|---|
| Midterm Exam I | Lecture 14 |
| Midterm Exam II | Lecture 23 |
| Final Exam Period | MAY 8 - 14, 2020 |

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 2020 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.

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

**Accommodation of Disabilities**: Disability Support Services (DSS) 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 Chantonette Lyles, Associate Director of Disability Support Services at 973-596-5417 or via email at lyles@njit.edu. The office is located in Kupfrian Hall, Room 201. A Letter of Accommodation Eligibility from the Disability Support 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 Disability Support Services (DSS) website at:

- https://www.njit.edu/studentsuccess/accessibility/

**Important Dates** (See: Spring 2020 Academic Calendar, Registrar)

| Date | Day | Event |
|---|---|---|
| January 21, 2020 | T | First Day of Classes |
| January 31, 2020 | F | Last Day to Add/Drop Classes |
| March 15 - 22, 2020 | Su-Su | Spring Recess: No Classes/ University Open |
| April 6, 2020 | M | Last Day to Withdraw |
| April 10, 2020 | F | Good Friday - University Closed |
| May 5, 2020 | T | Friday Classes Meet - Last Day of Classes |
| May 6 & 7, 2020 | W & R | Reading Days |
| May 8 - 14, 2020 | F - R | Final Exam Period |

# Course Outline

| Lecture | Section | 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 | Chapter 8 | Frequency and Severity with Coverage Modifications |
| 11 | Chapter 8 | Frequency and Severity with Coverage Modifications |
| 12 | Chapter 8 | Frequency and Severity with Coverage Modifications |

| 13 | | *Review for Midterm Exam I* |
|----|------------|------------------------------------------------|
| 14 | | **MIDTERM EXAM I** |
| 15 | Chapter 9 | Aggregate Loss Models |
| 16 | Chapter 9 | Aggregate Loss Models |
| 17 | Chapter 9 | Aggregate Loss Models |
| 18 | Chapter 11 | Maximum Likelihood Estimation |
| 19 | Chapter 11 | Maximum Likelihood Estimation |
| 20 | Chapter 11 | Maximum Likelihood Estimation |
| 21 | Chapter 12 | Frequentist Estimation for Discrete Distributions |
| 22 | | *Review for Midterm Exam II* |
| 23 | | **MIDTERM EXAM II** |
| 24 | Chapter 13 | Bayesian Estimation |
| 25 | Chapter 13 | Bayesian Estimation |
| 26 | Chapter 15 | Model Selection |
| 27 | Chapter 15 | Model Selection |
| 28 | | *Review for Final Exam* |