NJIT New Jersey's Science & Technology University

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF MATHEMATICAL SCIENCES

MATH 447-002: Applied Time Series Analysis
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: An introduction to applied univariate time series analysis. Topics include regression techniques for modeling trends, smoothing techniques (moving average smoothing, exponential smoothing), autocorrelation, partial auto-correlation, moving average, and autoregressive representation of series, Box-Jenkins models, forecasting, model selection, estimation, and diagnostic checking, Fourier analysis, and spectral theory for stationary processes. Effective From: Fall 2010.

Number of Credits: 3

Prerequisites: Math 341 with a grade of C or better or Math 333 with a grade of C or better.

Course-Section and Instructors

Course-Section	Instructor
Math 447-002	Professor A. Pole

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

Required Textbook:

Title	*Time Series Analysis: With Applications in R*
Author	Cryer and Chan
Edition	2nd
Publisher	Springer
ISBN #	978-0387759586

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, April 6, 2020**. It will be strictly enforced.

COURSE GOALS

Course Objectives: This course will introduce concepts and tools for interpreting and modeling time series

data.

Course Outcomes: On successful completion of this course, the student will be able to -

- Demonstrate understanding and application of statistical methods for describing and modeling times series data.
- Perform statistical analysis of time series including sample statistics, model parameter estimation, hypothesis testing, and prediction.

Course Assessment: Assessment of objectives is achieved through homework assignments and two examinations: a midterm exam and a comprehensive final exam.

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 Assignments	30%
Midterm Exam	35%
Final Exam	35%

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

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

Midterm Exam	Week 8
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

Weeks and Chapters
WEEK 1 Chapter 1. Introduction to time series analysis; course overview
WEEK 2 & 3 Chapter 2. Fundamental concepts
WEEK 4 & 5 Chapter 3. Trend modeling
WEEK 6 & 7 Chapter 4. Models for stationary time series
WEEK 8 MID TERM EXAM Chapter 5. Models for nonstationary time series
WEEK 9 *SPRING BREAK*
WEEK 10 & 11 Chapter 6. Model Specification
WEEK 12 & 13 Chapter 7. Parameter Estimation

WEEK 14 Chapter 8. Model Diagnostics
WEEK 15 Chapter 9. Forecasting
WEEK 16 *Review*
EXAM WEEK **FINAL EXAM**

Updated by Professor A. Pole - 1/20/2020
Department of Mathematical Sciences Course Syllabus, Spring 2020