MATG 633 Section 01 Spring 2016

Advanced Statistical Inference

Class Time: MTh 3-4:15 P.M. *Class Room*: RLC 102

Instructor: Angel R. Pineda, Ph.D. *Office*: RLC 200A
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Office Hours: Monday 2-2:50 P.M., Tuesday 12-12:50 pm, Wednesday 4:30-5:20 P.M., Thursday 11:00-11:50 A.M., or by appointment.

Textbooks:

Required:
1) Mathematical Statistics and Data Analysis 3rd Edition (2007)
by John A. Rice
Publisher: Duxbury Press

2) An Introduction to Statistical Learning: with Applications in R (Springer Texts in Statistics) 2013.
by Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani
Publisher: Springer
This text is available for free online:
http://www-bcf.usc.edu/~gareth/ISL/

Recommended:
1) Introductory Statistics with R (Statistics and Computing) 2nd Edition
by Peter Dalgaard
Publisher: Springer
This text is available in digital format from Pollack Library.

Catalog Course Description:
This is a data intensive course on statistical inference. Topics covered in this course include regression analysis, hypothesis testing, analysis of variance, nonparametic modeling, and sequential tests of hypotheses. Students will utilize appropriate software for data analytics. Not open to students with credit for MATH 433.

Prerequisite: MATH 432 or MATG 630 or permission of the Graduate Director.*:*

Course Objectives:
After completing this course, the students should be able to:

- Summarize data and conduct exploratory data analysis
- Compare two samples using parametric and non-parametric methods in the context of data science applications
- Design and analyze experiments
- Analyze categorical data
- Apply statistical learning methods to real world data science problems
- Use and statistically analyze multivariate linear regression techniques
- Use and statistically analyze multivariate linear classification techniques
- Use cross-validation of analysis of statistical models

Course Homepage (Moodle):

Here you will find four features that will be used in this course:

- *Email:* make sure that your email on Moodle is one that you check regularly. Homework assignments, announcements and other class related information will be sent via email.
- *Course Information and Documents:* material covered each week, assignments and solution keys.
- *Student Discussion Board:* this online forum allows for students and faculty to communicate about the course.
- *Grades:* students will be able to keep track of their grades online.

Grading:
Homework (20 %)

Midterm Exams: (20 % each)

Exam I	Exam II
Thursday March 3	Thursday April 14

Course Project (20 %), due Thursday May 5
In the course project, the student will write a paper on a topic of their choice with the instructor's approval. The project will use advanced statistics in a data science context. Details for the course project will be given after Exam I.

Comprehensive Final Exam (20 %), Saturday May 14, 11 am – 1 pm.
The final exam for this class will serve as the qualifying exam in statistics for the master's program in applied mathematics-data analytics.

Tentative Grading Scale

Percent	93-100	90-92	87-89	83-86	80-82	77-79	70-76	67-69	60-66	0-59
Grade	A	A-	B+	B	B-	C+	C	D+	D	F

The exact grading scale will be determined after the final exam. The numerical scores in the tentative grading scale guarantee the associated letter grade but the instructor may change the scale to the student's benefit.

Dates to Remember

January 29: Late Registration & Add/Drop Ends
March 3: Exam I
March 11: Midterm Grades Due
March 14-18: Spring Break (No Classes)
March 25-28: Easter Holiday (No Classes)
March 29: Monday Schedule
April 14: Exam II
April 22: Last Day to Withdraw from Courses
May 5: Course Project Due
May 9: Friday Schedule (No Classes)
May 10: Last Day of Classes
May 14: Final Exam

Class Policies

- Late homework will not be accepted after the solutions are distributed. In case the homework is handed in before the solutions are posted it will be marked 20% off for every day (or part thereof) it is late.
- Failure to attend class on a day of a quiz will result in a zero grade for that quiz.
- The lowest HW grade will be dropped.
- No make-up exams will be given, unless you have a medical or family emergency. These emergencies require valid documentation. The grade for a missed exam is zero.

- Cell phones (or other technology not related to the class) in the classroom is only allowed with express permission of the instructor for special circumstances. In general cell phone or other potentially disruptive technology use is not allowed in class.

Suggestions

- The course requires a time commitment of about 9 hours outside of class time. Make sure to make enough space in your schedule to spend the time needed.
- I suggest you work in groups on your homework but hand in individual solutions, not copied from each other. Doing the homework is when most of the learning occurs.
- I encourage you to come to office hours regularly. I will do my best to help you.

Academic Integrity:

Recall that as students of Manhattan College, you have each signed The Manhattan College Honor Pledge as a part of the Honor Code:

As a Manhattan College student, I will not lie, cheat, or steal in my academic endeavors, nor will I accept the actions of those who do. I will conduct myself responsibly and honorably in all my activities as a Manhattan College student. I am accountable to the Manhattan College community and dedicate myself to a life of honor.

Whenever you put your name on work to be handed in for grading in this class, you are reaffirming the above pledge. Violations of the Honor Code include, but are not limited to, cheating, plagiarism, fabrication, and other forms of academic misconduct. Please see the Manhattan College Community Standards, pp 45-47, for specific examples of the above.

Special Accommodations:

- Students with special needs should bring appropriate documentation to the Specialized Resource Center, Miguel 300, http://manhattan.edu/academics/specialized-resource-center, to obtain an Academic Adjustment/Auxiliary Aid form. Bring the completed form to me as soon as possible, and together we will decide on how best to fulfill the adjustments and/or aids listed on the form.
- Student athletes should bring their event schedules to me as soon as possible.

The material in this syllabus may be changed at the instructor's discretion. Any changes will be communicated to the students.