9 August 2018

MEMORANDUM FOR STUDENTS ENROLLED IN MATH 377, FALL 2018

SUBJECT: Math 377 Course Letter

1. **Introduction.** Welcome to Math 377, Advanced Probability and Statistics. This course is designed to provide you with tools to answer questions dealing with uncertainty by providing a solid foundation in probability and a strong introduction to statistical inference. This course is at a higher mathematical level, in terms of theory and computational requirements, and includes more topics on probability theory than Math 356. The follow-on course, Math 378, will focus on predictive modeling using traditional statistical techniques as well as methods from machine learning; it serves as an introduction to data science.
2. **Learning Goals.** The learning goals for this course are:
   1. Develop a mathematical foundation in probability and statistics.
   2. Gain/advance empirical analytic expertise.
   3. Acquire, use, and improve computer programming skills.
3. **Course Materials.**
4. **General** **Information**. Most information for the course can be found on the course website on Blackboard. I will use the website for distributing updates and other messages. Please let me know if you do not have access to Math 377 in Blackboard.
5. **Course Text**. The textbook for the course is Computational and Inferential Thinking: The Foundations of Data Science by Ani Adhikari and John DeNero (available for free online at <https://www.inferentialthinking.com>). This text provides an introduction to inferential statistics in the context of data science in the Python programming language.
6. **Computers/Software**. We will make extensive use of the computer so bring it to class every lesson. We will be using a free software package called Python. This package is an interpretive language and will require more skill than just point-and-click. We will primarily use Jupyter notebooks, but I encourage you to explore Spyder as well. Both are part of Anaconda, which you will install on your computer.
7. **Preparation.** At USAFA, we like to emphasize critical thinking and independent learning. We don’t want to spend too much class time lecturing. We would rather assume that you can make a decent effort preparing for each class; we can spend class time working through example problems. Read assignments prior to class so that you will be prepared for the discussion of the problems.
8. **Course Policy Expectations.** You are responsible for being familiar with the policies described or listed below.
   1. USAFAI 36-2014 documents the order of precedence of cadet activities. If you have an obligation that requires you to miss class, send your instructor an e-mail at least one lesson in advance with the SCA number and text along with the date or lesson you want to miss. If the SCA requires approval, ask for it; if the SCA requires coordination, then state you are coordinating the absence.
   2. At the end of an in-class graded event, your instructor will stop the event with the command **‘Cease Work!’** **No work, writing or erasing on the examination thereafter is permitted**. If work, writing or erasing continues after the cease work command, then a violation of academic standards as defined in USAFA Instruction 36-3534 has occurred.
   3. Cadets must be familiar with the Dean’s Policy on Academic Integrity and Documentation, the Dean’s letter on Academics with Honor, and the Dean’s Classroom Standards Letter.
9. **Graded Reviews.** GRs and the quiz will be loosely based on problems from the book and homework. Lesson objectives are posted on the course website. The authorized resources are calculator, Excel, and R. You are responsible for scheduling make-ups at least one lesson prior to being absent.
10. Enroll in data8 on edX.
11. **R Self-Study.** You will complete a course called Math377 R Programming in a package called swirl. This is an incredibly helpful introduction to the R programming language. Work through swirl course 1 (see syllabus for details).
12. **Project.** There are two projects in this course. The first is an INDIVIDUAL effort project due on Lesson 18 (with a 25 point progress check due on Lesson 10). The second is a GROUP project culminating in an in-class presentation during the last week of class (with a 25 point progress check due on Lesson 34). These projects are designed to be challenging tests of course knowledge. Please review the project material on Blackboard early.
13. **Homework.** Homework problems can be found on the syllabus. While these problems are mandatory, I will not require you to turn in homework. However, these problems are selectively chosen to enhance your understanding of the topic, as well as to prepare you for graded events. If you turn in any homework, I will provide timely feedback.
14. **Final.** There is a final examination that covers the entire course. There are no final exemptions.
15. **Grades.** If you want to guarantee an “A” grade, you will need to earn at least 90% of the total points. You will need at least 80% to guarantee a “B” and 70% to guarantee a “C”. If you finish below a 60% average, you will most likely fail the course. The distribution of the course points are as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Graded Events** | **Points per**  **graded event** | **Total**  **Points** | **Overall**  **Percentage** |
| GRs (3) | 125 | 375 | 37.5% |
| Project (2) | 150 | 300 | 30% |
| Quiz (1) | 75 | 75 | 7.5% |
| Final Exam | 250 | 250 | 25% |
| **Total** |  | **1000** | **100%** |

1. **Final Comments.** If you have any questions or concerns, don’t hesitate to ask for help.

//signed//

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