CUNY School of Professional Studies

Syllabus

DATA 605: Fundamentals of Computational Mathematics

Instructor Name: Lawrence Fulton
Instructor Email Address:

Degree Program: M.S. in Data Science
Credits: 3 graduate credits
Prerequisites: None
Type of Course: Required course

Course Description

The course will provide an overview of the commonly used mathematical techniques in Data Analytics & Statistics. A lot of emphasis will be given to computational techniques and implementing math in programs. Students will be expected to do a fair bit of hands-on programming. We'll be primarily using R as our programming environment. All assignments will need to be submitted in as R-Markdown documents. Students can expect to walk away with a good under- standing of the kinds of math they'll need to be successful in the exciting area of Data Analytics.

Program Learning Outcomes Addressed by the Course

1. Business Understanding. Apply frameworks and processes to build data-analytic solutions from an understanding of business goals.
2. Data Programming. Use industry standard statistical tools and simulation packages.
3. Foundational Math and Statistics. Emphasis on probability, statistics, and computational methods.
4. Data Understanding. Collect, describe, model, explore and verify data.
5. Prescriptive Modeling. Selecting prescriptive modeling techniques, generating test designs, building and assessing models.
6. Model Implementation and Deployment. Students will learn to implement mathematical models.
7. Presentation. Students will deliver presentations of their project results.

Learning Objectives:

1. Apply linear algebra to solve data science problems.
2. Apply probability and statistics to solve data science problems.
3. Apply univariate and multivariate calculus to solve data science problems.

Assignments and Grading

1. Assignments: During the course, you will be completing a series of individual assignments, participating in forum discussions, and completing a final examination.
2. Examinations: This course has a single examination, a comprehensive final.
3. Grade Evaluation: Grades in this course are determined by the percentage of points obtained.

Assignment	Percentage
Homework	15x3% = 45%
Discussions Contribution	15x 1%= 15%
Examination	1x 40%= 40%
Total	100%

Grading Rubric: The grading rubrics follow.

1. Each homework will be graded as {zero, check minus, check, and check plus}. The associated grades are {0%, 1%, 2%, 3%}.

2. Discussions are applied analysis from the texts. You must post a response by Wednesday at midnight (ET) and respond to at least one of your colleagues' contributions by Saturday at midnight (ET), providing meaningful feedback on the analysis.

Late Policy for Homework:

Late work is penalized 20% per day. All assignment due dates and times are shown in Blackboard.

Grade Distribution

I assign grades based on the following table.

Quality of Performance	Letter Grade	Range %	GPA/ Quality Pts.
Excellent - work is of exceptional quality	A	93 - 100	4.0
	A-	90 - 92.9	3.7
Good - work is above average	B+	87 - 89.9	3.3
Satisfactory	B	83 - 86.9	3.0
Below Average	B-	80 - 82.9	2.7
Poor	C+	77 - 79.9	2.3
	C	70 - 76.9	2.0
Failure	F	< 70	0.0

Course Materials (All Open Source)

[Introduction to Probability](#)
Introduction to Probability, Grinstead, C. Snell, J., 1997

[A First Course in Linear Algebra](#)
A First Course in Linear Algebra, Beezer, R., 2008

[Linear Regression using R](#)
Linear Regression Using R: An Introduction to Data Modeling, Lilja, D., 2016

[Apex Calculus](#)
APEX Calculus, Hartman, G. 2014

Relevant Software and Other Tools:

Students should have R Studio & R installed in their computers. Relevant libraries that are required will be posted in the assignments and course materials. Students are expected to submit R-Markdown files for their assignments.

Course Meeting Time:

See the course website.

The Course schedule follows.

(L=Linear Algebra text, P=Probability Text, C=Calculus Text, R=Regression)

Accessibility and Accommodations

The CUNY School of Professional Studies is firmly committed to making higher education accessible to students with disabilities by removing architectural barriers and providing programs and support services necessary for them to benefit from the instruction and resources of the University. Early planning is essential for many of the resources and accommodations provided. For more information, please see: [Disability Services on the CUNY SPS Website.](#)

Online Etiquette and Anti-Harassment Policy

The University strictly prohibits the use of University online resources or facilities, including Blackboard, for the purpose of harassment of any individual or for the posting of any material that is scandalous, libelous, offensive or otherwise against the University's policies. Please see: [“Netiquette in an Online Academic Setting: A Guide for CUNY School of Professional Studies Students.”](#)

Academic Integrity

Academic dishonesty is unacceptable and will not be tolerated. Cheating, forgery, plagiarism and collusion in dishonest acts undermine the educational mission of the City University of New York and the students' personal and intellectual growth. Please see: [Academic Integrity on the CUNY SPS Website.](#)

Student Support Services

If you need any additional help, please visit [Student Support Services](#).