ENVPU6246: Analytics for Environmental Science
Part II: Quantitative Review

MPA Environmental Science & Policy

Columbia University, SIPA

Summer 2017

Quantitative Review Class Sessions

Monday, June 12th	5pm-6:30pm	403 IAB	**Diagnostic Exam - Optional**
Wednesday, July 5th	4:10pm-6pm	407 IAB	
Monday, July 10th	4:10pm-<u>7pm</u>	407 IAB	
Wednesday, July 12th	4:10pm-<u>7pm</u>	407 IAB	
Monday, July 17th	4:10pm-6pm	407 IAB	**Final Exam**

Instructor:
Josephine Gantois
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Office Hours (at Lehman Library Group Study Area 329 A):
Office hours will take place between classes to allow you to work on the problem sets and come with questions. Please do not let any gaps open up, as soon as something is unclear come and see me.
Thursday, July 6th, 6:30pm-7:30pm.
Thursday, July 13th, 6:30pm-7:30pm.

Textbooks:
There are no required textbooks for this course. Handouts will be provided. Skim through the handout before class to acquaint yourself with the material. Mark down concepts that are relatively more challenging than other concepts in the handout.

Course Overview & Objectives:
This section will present the mathematical foundations and basic quantitative skills required to effectively master the environmental science, economics, and statistical and quantitative analysis coursework in the Environmental Science and Policy MPA program. Students will learn basic algebra, functions and equations, slopes and derivatives, and multivariate calculus.

The role of math in economic analysis is significant. Linear and nonlinear functions are needed to model economic behavior. Math, especially calculus, simplifies the analysis of these functions. In preparation for courses in the Fall and Spring semesters, this review will expose all students to a minimum quantitative functioning.

Math Diagnostic Exam:
Students will be allowed to take a math and quantitative skills diagnostic test prior to the start of the Summer term. Students with passing scores (80% or above) on the diagnostic test will automatically be given a passing score **for the quantitative half** of this course and do not need to attend the class sessions (This **does not impact** their required attendance nor grading for the GIS portion of the course). Students whose grades fall below a 60% on the diagnostic exam will be required to attend all three math sessions outlined below, and pass the math final exam. Students who fall between a 60% and an 80% on the diagnostic test are required to attend the final two sessions, and pass the math final exam.

Problem Sets:
You will have a short problem set after each class. The goal of each problem set is to provide you with some exercises so you can practice the material covered in class. You are expected to work through all of the exercises even if you do not succeed solving them all. Grading is on a pass/fail scale. You pass if you attempted solving each and every question, and fail otherwise. You are allowed to work in groups but each student must submit their own copy of the solution. If you choose to work in a group write down the names of the people you worked with at the top right corner of the page.

Requirements and Grading:
1. This course is a pass/fail course. The GIS section of the course is worth **50%** of the total grade, and the math/quantitative review is worth **50%** of the total grade.

2. Grading for the entire course:

GIS		50%
Math		
	Math homework	20%
	Math Final Exam	30%
Total		100%

QUANTITATIVE REVIEW

Wednesday, July 5th
Lecture: Introduction to Algebra & Equations
1. Rules of algebra for simplifying expressions and solving equations
   1.1. Some formalism
   1.2. Addition and multiplication (subtraction and division)
   1.3. Powers and roots
   1.4. Exponentials and logarithms

Monday, July 10th
Lecture: More Equations & Introduction to Functions
2. Second order polynomial equations
3. Functions (part I)

    3.1. Graphing functions of one variable

    3.2. Linear functions

4. Systems of Linear Equations

Wednesday, July 12th

Lecture: Introduction to Multivariate Functions & Calculus

5. Functions (part II)

    5.1. Functions of two variables

    5.2. Differentiation and optimization of univariate functions

    5.3. Partial differentiation of multivariate functions

<u>Academic Integrity Statement:</u>

The School of International & Public Affairs does not tolerate cheating and/or plagiarism in any form. Those students who violate the Code of Academic & Professional Conduct will be subject to the Dean's Disciplinary Procedures. Cut and paste the following links into your browser to view the Code of Academic and Professional Conduct and the Dean's Discipline Policy and Procedures online.

http://bulletin.columbia.edu/sipa/academic-policies/academic-and-professional-conduct/

http://bulletin.columbia.edu/sipa/academic-policies/discipline-procedures/index.html

Violations of the Code of Academic and Professional Conduct should be reported to the Associate Dean for Student Affairs.