**ENVPU 6246, Analytics in Environmental Science Policy – Math Section**

**Mondays (IAB 404), 10:00am – 12:30pm, 1:00pm – 3:30pm, Summer 2023 (June 5 – August 7)**

**Number of credits: 1**

**Instructor:** Anyi Wang, PhD; Adjunct Assistant Professor, School of International and Public Affairs
aw2544@columbia.edu

**Office Hours:** By appointment. I will also be available after class on Mondays from 3:30pm.

**Response Policy:** I will respond to emails within 24 hours. I will be available over the weekends to answer questions, if necessary. My preferred method of discussing substantive issues is to schedule an in-person or zoom meeting.

# Course Overview

The Math Section of the ENVPU 6246 reviews the mathematical skills that are essential for the natural science courses in the Summer semester and the social science courses in the Fall semester of the MPA in Environmental Science and Policy program.

This course begins with a review of the basics of *algebra, exponents, logarithms,* and *inequality* – the mathematical operations that are most often encountered by students in the summer science courses. The course then covers the math skills that are more relevant to the economics and statistics courses in the fall. These include topics on *second-order polynomial equations, functions and graphs, linear functions, simultaneous equations, functions with two inputs, derivatives* and *partial-derivatives*. Whenever possible, the course will use statistics and economics examples to familiarize and prepare students with the application of the relevant math skills.

The Math Section ends with a description of some common mathematical signs and symbols students might encounter in textbooks or academic papers.

A student who has completed this course will be competent to understand the mathematical operations from future economics and statistics lectures, and to solve mathematical problems for assignments and exams.

# Learning Objectives

By the end of this Math Section, students will:

L1. Reestablish their grasps of the fundamental mathematic skills covered by this course.

L2. Be able to understand and conduct data transformation using logarithms and exponents.

L3. Be familiar with the two-dimensional coordinate system, and the graphic representation of functions.

L4. Be proficient in deducting linear functions from known points and finding the intersection of two linear functions.

L5. Be proficient in finding optimizing conditions (maximum or minimum output) of functions.

L6. Be able to understand and use complex mathematical formulas.

# Readings

This course does not have any textbooks required or recommended for purchase. The following reading materials will be placed on *Canvas* to facilitate learning, in addition to the lecture slides posted before each week’s class. Students are free to supplement these materials with any calculus or pre-calculus textbooks for a more thorough review of any content.

1. *A Math Primer: A review of basic quantitative skills for the MPA Program in Environmental Science and Policy*.

This is a mini textbook written by Dr. P. Louchouarn for the MPA in ESP program. Chapters 1-6 covers fundamental mathematical contents, while Chapter 7 can be used by students to prepare for statistics.

1. *Lecture Notes*.

Three lecture notes covering the key topics of the Math Section, with additional examples.

# Course Requirements (Assignments)

All students will be given a math screening test at the very first lecture. Those who score above 90% will have the option to skip the Math Section, and automatically receive a passing grade (P) for the Math Section. All other students are expected to attend the Math Section to ensure that they are competent in all mathematical skills essential for the ongoing and upcoming ESP science courses. The results of the screening test will be announced via email before the second lecture. For students who do not pass the screening test, this test result will not affect final grading of the Math Section.

**Practice questions**: Each week, at the end of the lecture slides, students will find a number of practice questions and their solutions (on separate slides). Students are expected to practice and review these questions on their own.

**Final exam**: The final exam will be a take-home exam. *Bluebooks* will be distributed at the last lecture (on July 10). Exam questions will be posted on *Canvas* after the last session of lecture (4:00pm on July 10). Students will have one week to complete the exam independently. The exam questions, their difficulties and workload mimic a typical economics or statistics take-home assignment. Students are free to use all the course materials, internet resources, and calculating software when working on the exam. The duration of the final exam is one week. So students shall return the *Bluebooks* to IAB1404 by 4:00pm on July 17. The final exam will be graded in one week, and students can pick up their graded *Bluebooks* at IAB1404 after July 24.

Students who passed the screening test are exempt from the final exam.

# Evaluation/Grading

The final grades for the Math Section is “Pass” or “Fail” (P/F). Students who passed the screening test will automatically receive a “Pass”. All other students’ grades depend on the score (percentage of questions answered correctly) of the final exam as described below:

FINAL GRADING SCALE

|  |  |
| --- | --- |
| **Grade** | **Percentage** |
| **P** | 70–100 % |
| **F** | 0–69.9 % |

# School Policies

Academic and Professional Conduct

The program and its faculty will not tolerate academic dishonesty. You should properly cite ideas in your papers that are not originally yours at all times.

The Code of Academic and Professional Conduct provides information on proper citations, plagiarism policies, and outlines SIPA’s expectations of academic and professional conduct for its students, faculty, and staff. Read the Code of Academic and Professional Conduct, and the Dean’s Discipline Policy and Procedures: <https://sipa.columbia.edu/students/policies/academic-policies-and-regulations>

Accessibility Statement

Please contact disability@columbia.edu for learning accommodations.

Names/Pronouns

You deserve to be addressed in a manner that reflects your identity. You are welcome to let the instructor know your pronoun(s)and/or name (if different from University records) at any time, either in person or via email.

Discrimination

We embrace the diversity of gender, gender identity & expression, sex, sexual orientation, race, ethnicity, national origin, age, religion, disability status, family status, socioeconomic background, and other visible and non-visible identities. Columbia University does not tolerate unlawful discrimination, discriminatory harassment, sexual assault, domestic violence, dating violence, stalking, or sexual exploitation and all such conduct is forbidden by Columbia University Policy.

Duty to Report

You deserve a University community free from discrimination, harassment, and gender-based misconduct including sexual harassment, sexual assault, domestic and dating violence, stalking, and sexual exploitation. It is therefore University policy to require Columbia faculty and staff to report to EOAA any instance or allegation of prohibited conduct involving any undergraduate or any graduate student that is disclosed to, observed by, or otherwise known to that employee. This requirement to report is in place to help ensure that students are provided appropriate resources and to allow the University to mitigate harm to our community.

Confidential Resources

There are confidential resources on campus who do not have a Duty to Report, including:

* Sexual Violence Response & Rape Crisis/Anti-Violence Support Center (SVR)
* Ombuds Office
* Medical Services
* University Counseling and Psychological Services
* University Pastoral Counseling
* Columbia Office of Disability Services

University employees working in a confidential capacity will not report information shared with them.

Inclusion

In the MPA in Environmental Science and Policy program, faculty and staff are committed to the creation and maintenance of “inclusive learning” spaces – classrooms and other places of learning where you will be treated with respect and dignity, and where all individuals are provided equitable opportunity to participate, contribute, and succeed.

In this class, all students are welcome regardless of race/ethnicity, gender identities, gender expressions, sexual orientation, socio-economic status, age, disabilities, religion, regional background, Veteran status, citizenship status, nationality and other diverse identities that we each bring to class.

# Course Schedule/Course Calendar

|  |  |
| --- | --- |
| **Date** | **Addressed Topics and Activities** |
| Jun 5 | **Screening Test**Algebra, Exponents, Logarithms, Inequality |
| Jun 12  | Second-Order Polynomial Equations;Functions and Graphs;Linear Functions;Simultaneous Equations |
| Jun 26 | Functions with Two-Inputs;Derivatives;Optimization of Functions |
| Jul 10 | Partial Derivatives;Signs and Symbols;**Final Exam begin (4:00pm), *Bluebook* distributed in class** |
| Jul 17 | **Final Exam complete (4:00pm, submit *Bluebook* to IAB1404)** |