SIMON
BUSINESS SCHOOL
UNIVERSITY of ROCHESTER

MSM 491: Mathematics for Management

Summer 2022 (May 16 – July 15)

Instructor: Junyuan Ke	**Times:** Mon/Wed 10:00–12:15
Email: junyuan.ke@simon.rochester.edu	**Room:** TBA

Course Pages:

1. Course Blackboard Link (The Zoom link for class will be found there. Lectures slides will be uploaded before each class).

Office Hours: TBD; After class, or by appointment.

Main References: The lecture notes distributed via Blackboard are self-contained and hence there is **no required textbook for this course**. The Blackboard course site will serve as a repository for class materials. Current schedule and reading list, homework and lecture notes will all be available from it. All Zoom sessions will be recorded and made available on Blackboard. Simon IT will provide all students registered for the course with credentials to access the site.

The following books are helpful but not required for the class:

- Perloff, Jeffrey. Microeconomics. Pearson Education, 2011.
- Gonick and Smith. The Cartoon Guide to Statistics, 1993
- Larson, Ron, and Betsy Farber. Elementary statistics. Pearson, 2019

Course Description and Learning Objectives: This is an introductory course to bring incoming MBA/MS students familiar with the mathematical and statistical knowledge necessary for a contemporary graduate program of business education. We will go over materials such as basic algebra, differential calculus, concepts of probability, and their applications in business, economics and related areas.

Relation with other Courses at Simon Business School: The objective of this course is to develop and sharpen a quantitative foundation that students can use to complete the Simon MBA/MS program. The course material will start from basic arithmetic and gradually cover all the necessary mathematical and statistical concepts and methods that more advanced courses require as prior knowledge. In other words, no prior expertise is required to take this course. This course serves as a prerequisite for core Simon curriculum such as ACC 401, CIS 401, GBA 411, and GBA 412.

Grading Policy*:

- Class participation (10% of final grade)
- 2 problem sets (40% of final grade)
- Midterm (25% of final grade) and non-cumulative final exam (25% of final grade)

* After finishing MSM491, each student will receive letter grade, which will not count toward GPA.

Important Dates:

Midterm ..... 6th class (TBD)
Final Exam ..... last class (TBD)

Class Policy: Regular attendance is essential and expected.

Academic Integrity: Simon's Code of Academic Integrity (see Section 2 of the Student Handbook) states: "Every Simon student is expected to be completely honest in all academic matters. Simon students will not in any way misrepresent their academic work or attempt to advance their academic position through fraudulent or unauthorized means. No Simon student will be involved knowingly with another student's violation of this standard of honest behavior." Issues pertaining to academic integrity will be dealt with according to the Simon school code on academic integrity.

Tentative Course Outline:

Topic 1: Basic Algebra

Class 1, 05/16: Number systems, order of operations, solving linear equations, functions, slope and intercept using derivatives, demand functions.

Class 2, 05/18: Linear supply and demand functions, slope properties, cost and revenue function, (plotting) linear budget constraint, solving systems of linear equations algebraically and graphically, solving for equilibrium, break-even analysis, non-linear functions, solving for optimal solution.

Class 3, 05/23: Quadratic equations, exponential functions, log and natural log, applications of exponential functions.

Topic 2: Differential Calculus

Class 4, 05/25: Calculus and differentiation, slope of linear functions, continuous and differentiable functions, constant function rule, power function rule, higher-order derivatives, second derivative, concave and convex functions

No class, 05/30: Memorial Day

Class 5, 06/01: Turning points, local maxima/minima, average cost function, marginal cost and marginal production, profit maximization, perfectly competitive market

No class, 06/06 0/08: Summer Break

Class 6, 06/13: Midterm Review, **problem set 1 due**

Class 7, 06/15: **Midterm exam**

No class, 06/20 Juneteenth Holiday

Topic 3: Probability and Statistics

Class 8, 06/22: Probability and statistics, population and sample, definition of probability, set and sample space, event, rules of AND and OR, mutually exclusive and collectively exhaustive, discrete and continuous random variables, frequency distributions, histograms, probability distributions, probability density function

Class 9, 06/27: Cumulative distribution function, measures of central tendency and dispersion, expected value, variance and standard deviation, statistical estimation

Class 10, 06/29: Skewness, normal distribution, z tables, covariance and correlation, standard error of the mean, central limit theorem, hypothesis testing

No class, 07/04 Independence Day

Topic 4: Mathematics of Finance

Class 11, 07/06: Interest rate, time value of money, compound interest, future value single deposit, present value and future value; problem set 2 due.

Class 12, 07/11: Final review

Class 13, 07/13: **Final Exam** (non-cumulative)