Instructor
Bjorn Persson, 416B, 270 Bay State Road, 617 358-5926, bpersson@bu.edu

Teaching fellow
Fan Zhuo, zhuo@bu.edu

Time and location
MW 12:30 - 2:00 PM in GCB 205

Office hours
M 5:00 - 6.30 p.m., TW 10:00 - 11:30 a.m.

Website
The web site for this class is:
Use your BU login name and Kerberos password to login

Course description
This is an introductory course in mathematics for economic analysis, aimed at MA students with background in both economics and mathematics. The course consists of four parts. In the first, we introduce some concepts from linear algebra. The second and third parts are devoted to multivariate calculus and constrained static optimization. The last section provides an introduction to differential equations and dynamic optimization techniques.

Recommended readings

Prerequisites
Students are expected to be familiar the material covered in chapters 1-10 in PR/chapters 2-5 and A2 in SB (one-variable calculus/optimization, logarithmic and exponential functions and their derivatives, and basic trigonometry)

Grading and exam policy
There will be assignments, one midterm exam and a final exam. Assignments and their due dates will be posted on the course web site. No late assignments will be accepted. There will be no make-up exams. Unless a student fails to take an exam because of documented health problems or family emergencies, the score of a missed exam will be zero.

Grading weights
Assignments 20%
Midterm Exam 40%
Final Exam 40%
Exam dates
The midterm exam will take place **October 19** in class.
Final exam time and place **12.30 - 2.30 p.m., December 21**, room TBA

**Academic conduct**
It is a student's responsibility to know and understand the provisions of the CAS Academic Conduct Code (copies are available in room CAS 105). Cases of suspected academic misconduct will be referred to the Dean’s Office.

**Course outline**
Below is a preliminary list of topics. Some deviations from the actual schedule may be necessary as the class progresses. Students are responsible for attending classes and learning of any changes in the schedule.

**I. Linear algebra**
- Systems of equations
- Vectors and matrices
- Matrix algebra
- Determinants
- Linear independence
PR: Ch 11, 12, 13.1-3, SB: 7, 8.1-4, 9.1-2, 10.1-6, 11.1

**II. Multivariate calculus**
- Functions from $\mathbb{R}^n$ to $\mathbb{R}^m$
- Inverse functions
- Calculus (gradients, total derivatives, directional derivatives)
- Implicit functions
- Quadratic forms

**III. Optimization**
- Unconstrained optimization
- Constrained optimization
- Value functions
- Envelope theorems
- Comparative statics
PR: 16, 17, 18, SB: 17.1-4, 18.1-6, 19.1-5

**IV. Dynamic analysis**
- Integration
- Ordinary differential equations
- Systems of differential equations
- Eigenvalues
- Phase diagrams
- Dynamic optimization in continuous time