Business Mathematics

Peking University HSBC Business School

Fall 2014 / 1st Module
ME

Instructor: Daeyong Lee

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Class meeting: Lectures are given on M/Th at 08:30~10:20

Classroom: 209

Office hours: M/Th 10:30~11:30 am, or by appointment

Teaching assistant: TBA

TA office hours: TBA

1. Course Overview

Business mathematics covers key mathematics concepts ranging from probability to optimization. This course reviews basic mathematical and statistical tools needed for graduate studies in management at Peking University HSBC Business School. The mathematical contents are both motivated and illustrated with economic applications. Students are required to grasp a firm concept of each topic covered in class. The ultimate goal of this course is to facilitate students to take advanced, financial, or applied econometrics.

 • **Prerequisites:**

     There is no prerequisite for this class. Students with a background in statistics and/or econometrics will find this class more accessible.

2. Coursework and Grading

- Quiz: 30%
- Midterm: 30%
- Final exam: 30%
- Class participation:10%
- FYI, GPAs below 70 are considered as failure of the course by the PKU academic rule.

• **Quiz:**

     During the semester, students will take 5 quizzes. The quiz will ask problem solving questions. The dates are as following: Sep. 11, Sep. 18, Oct. 16, Oct 23, and Oct 30. The quiz

helps students to keep on track of the course and to have deeper understanding of key concepts covered in class. Students who miss a quiz DO NOT have a make-up quiz and thus will have zero score for the missing one.

• **Exams:**

There will be a midterm (30%) and a final exam (30%). Both exams will include problem solving type questions. The midterm will be on **Monday, September 29**. The Final will be held on **either November 10 or 11** (I will update it once I get the exam schedule from the administrative office). Since **there will be no make-up exam,** please carefully plan your 2014 Fall schedule ahead.

• **Class Participation:**

Students are strongly recommended to have active participation in class such as addressing practice questions.

• **Rescheduling the Class:**

September 8 (Mid-Autumn Festival holiday) → September 10, same venue and time.

• **Class Policy:**

Students are not allowed to use their laptops or cellphones in the classroom.

3. Course Materials

• **Required Textbook:**

Ian Jacques, *Mathematics for Business and Economics*, 7th edition, Pearson Education, 2013.

• **Recommended References:**

Raymond A. Barnette, Michael R. Ziegler, and Karl E. Byleen, *College Mathematics for Business Economics, Life Sciences and Social Sciences*, 12th edition, Pearson Education, 2010.

4. Class Schedule (tentative)

Part 1. Probability

Week 1

1. Introduction and Overview
2. State Space and Discrete / Continuous Random Variable

Week 2

1. Independence
2. Density, PDF, and CDF
3. Mean, Variance, and Higher Moments

4. Distribution (Uniform, Normal, Chi, and etc.)

Part 2. Linear Algebra

Week 3

1. Vector
2. Matrices
3. Linear Independence

Week 4

4. System of Linear Equations
5. Determinants
6. Positive and Negative Definite

Part 3. Calculus

Week 5

1. Single and Multivariate Differentiation
2. Chain and Product Rule

Week 6

3. Integration
4. Fundamental Theorem of Calculus

Part 4. Optimization

Week 7

1. Convex and Concave
2. Local Min / Max vs. Global Min / Max
3. Saddle Point

Week 8

4. Unconstrained Optimization
5. Constrained Optimization
6. Kuhn-Tucker Theorem

Part 5. Advanced Topics

Week 9

1. Hypothesis Testing
2. Estimation
3. Dynamics and Value Function