北京大学
汇丰商学院
Peking University HSBC Business School

# FIN500
# Business Mathematics (Math Session M)
# Module 1, 2019-2020

## Course Information

***Instructor: Yilin Zhang***
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Office Hours: Wednesday 3-5:50PM / Or by appointment @Room 660

***Teaching Assistant: TBA***
Email: TBA
Office hours: TBA

***Classes:***
Lectures: Monday, 1:30-3:20PM
Venue: TBA

***Course Website:***

http://cms.phbs.pku.edu.cn/claroline/course/index.php?cid=19BM_M

*Instructions:*
Register and login onto the CMS website; then search for the course "Business Math (Math Session, M)" or "19BM_M" under my name and enroll with key "***2019Fin500M***". All the announcements and lecture notes will be posted on the website so *please check the course website as frequently as possible*.

*NOTE: Please do **not** enroll in the other session (EF) as the teaching plans are different.*

***Class Wechat Group (Only for Session M):***

Scan the following QR code (effective till Sept.9) to join the class (session M only) Wechat group. You can discuss with your classmates and the TA about any course related issues in the group. The TA may also make course related announcement in the group.

*Available soon.*

# 1. Course Description

## *1.1 Context*

Course overview:

This course reviews the important mathematical tools and methods used in economic and finance. Students will have plenty of chances to practice and get familiar with these techniques during the course. The course is intended to prepare students for the master-level study in economics and finance at PHBS. The class will start from reviewing the basic math concepts and algebra and then move through topics including differential and integral calculus, optimization, matrix algebra, as well as the applications in financial economics. The proofs and derivations will be kept to a minimum but the class will still be mathematical in nature. Students are strongly recommended to read the lecture notes, reference books and practice on your own beyond finishing the homeworks. ***On average*, students should spend about 14 hours per week (i.e. 2 hours/day) *IN ADDITION TO the lecture time* on studying for this course**.

## *1.2 Textbooks and Reading Materials*

The lecture notes are self-contained. The notes will be posted ahead of time so you can have a preview. A hard copy of the notes will be available for you to pick up in the classroom at the beginning of each class.

Recommended textbook:

Ian Jacques, *Mathematics for Economics and Business*, 7th Edition

Supplemental text (optional; I will post some relevant chapters)

Alpha C. Chiang, *Fundamental Methods of Mathematical Economics*, 4th Edition

Detailed reference list:

- Review of basic concepts and algebra
  - Chapter 1-3 of Jacques' textbook
  - *Chapter 2 and 10 of Chiang's (For slightly more advanced contents)*
- Linear Algebra
  - Chapter 7 of Jacques'
  - *Chapter 4-5 of Chiang's (For slightly more advanced contents)*
- Calculus (including integration) and optimization
  - Chapter 4-6 of Jacques'
  - *Chapter 6,7, 11 (differentiation), 9 and 12 (optimization) of Chiang's (For slightly more advanced contents)*
- Linear programming
  - Chapter 8 of Jacques

# 2. Learning Outcomes

## *2.1 Intended Learning Objectives / Outcomes*

| Learning Goals | Objectives/Outcomes | Assessment |
|---|---|---|
| 1. Our graduates will be effective communicators. | 1.1. Our students will produce quality business and research-oriented documents. | |
| | 1.2. Students are able to professionally present their ideas and also logically explain and defend their argument. | |
| 2. Our graduates will be skilled in team work and leadership. | 2.1. Students will be able to lead and participate in group for projects, discussion, and presentation. | |
| | 2.2. Students will be able to apply leadership theories and related skills. | |
| 3. Our graduates will be trained in ethics. | 3.1. In a case setting, students will use appropriate techniques to analyze business problems and identify the ethical aspects, provide a solution and defend it. | |

| | | |
|---|---|---|
| | 3.2. Our students will practice ethics in the duration of the program. | |
| 4. Our graduates will have a global perspective. | 4.1. Students will have an international exposure. | |
| 5. Our graduates will be skilled in problem-solving and critical thinking. | 5.1. Our students will have a good understanding of fundamental theories in their fields. | √ |
| | 5.2. Our students will be prepared to face problems in various business settings and find solutions. | |
| | 5.3. Our students will demonstrate competency in critical thinking. | √ |

## *2.2 Course specific objectives*

After completing this course, students should be comfortable with the mathematical techniques and concepts required for the more advanced study in economics, econometrics and finance at PHBS.

## *2.3 Assessment/Grading Details*

| **Assessment Components** | **Weights** |
|---|---|
| Midterm *(fifth week, details TBA)* | 30% |
| Final *(1-3PM, Monday, Nov.11)* | 35% |
| Homework | 25% |
| Participation | 10% |
| Total | 100% |

Grade System (*Tentative*):

The final grades for the course will be converted into letter grades according to the following criteria:

| **Letter Grades** | **Criteria** |
|---|---|
| A+, A & A- | $\geq 70^{th}$ percentile |
| B+, B* & B- | $\geq 10^{th}$ percentile and total score >70 |
| C & D | $< 10^{th}$ percentile and total score $\geq 70$ |
| F | Total score < 70 |

**: There is a minimum requirement of B (3.0) on average GPA for graduation.*

Exams:

All the exams are closed-book exams. The final exam will be comprehensive and will cover both materials before and after the midterm. If you expect any time conflict with the exam dates, please let me know as early as possible ***before*** the exam so we can make arrangement. If you miss the midterm exam *for a legitimate reason* (proper documents, e.g. medical documents and doctor's letter, must be provided *beforehand*), the weight of your midterm will go to the final exam, i.e. the final will count 65%.

Homeworks:

There will be 4-5 homeworks. You can work in groups on the homeworks but you must *write up and submit your individual copy* of the homework.

***Any late submission within 24 hrs of the deadline will receive no more than 80% of the credits for the homework;***

***any late submission beyond 24 hrs of the deadline will not be accepted unless due to serious illness (in which case doctoral documents are required) or family emergency.***

Participation:

Participation score will be based on the attendance to the lectures and the TA sessions as well as your involvement in the class activities.
Full attendance is ***required*** as the materials are cumulative. You need to get my pre-approval if you are absent from any class. If you *miss more than one class without pre-approval*, your participation score will get a demerit.

Office Hours:

My office hours are on Wednesday afternoon from 3-5:50pm or by appointment.
The TA will have two times of office hours in room 213/214 each week and each time will be two hours.
*(In weeks where there is a TA session, there will be no TA office hours or only one 2-hour TA office hour session.)*
Please DO make use of these office hours to clarify any course-related question you may have.

TA Sessions:

There will be two TA sessions, one before each exam, where the TA reviews the lecture notes and answers course-related questions. Besides, some of the homework or other exercise questions will be discussed in detail during the TA sessions. While full attendance is not required, you are *strongly encouraged* to go to the TA sessions.

Class Conduct:

Please come to class ***on time***. If you are late for some reason, please enter the class and take a seat without disturbing the class. If you are repeatedly late in attending the classes, your participation score may get a demerit. And please do not forget to turn off your cell phones and other noisy devices during the classes.

Email Policy:

You are strongly encouraged to ask questions *during the lectures and the office hours*. However, if you need to reach me outside the lectures or office hours with course-related questions or comments, you may email me at ylzhang@phbs.pku.edu.cn to make an appointment. Please include "***Fin500***" in the subject field to help me identify the emails.

## *2.4 Academic Honesty and Plagiarism*

It is important for a student's effort and credit to be recognized through class assessment. Credits earned for a student work due to efforts done by others are clearly unfair. Deliberate dishonesty is considered academic misconducts, which include plagiarism; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; or altering, forging, or misusing a University academic record; or fabricating or falsifying of data, research procedures, or data analysis.

All assessments are subject to academic misconduct check. Misconduct check may include reproducing the assessment, providing a copy to another member of faculty, and/or communicate a copy of this assignment to the PHBS Discipline Committee. A suspected plagiarized document/assignment submitted to a plagiarism checking service may be kept in its database for future reference purpose.

Where violation is suspected, penalties will be implemented. The penalties for academic misconduct may include: deduction of honour points, a mark of zero on the assessment, a fail grade for the whole course, and reference of the matter to the Peking University Registrar.

For more information of plagiarism, please refer to *PHBS Student Handbook*.

## 3. Topics, Teaching and Assessment Schedule

Topics and outline[1]:

***Week 1*: *Review of basic concepts and algebra***

***Week 2-5*: *Calculus***

- Single variable differentiation
- Multi-variable differentiation (total differentiation, partial differentiation)
- Integration

***Week 6-7*: *Linear Algebra***

- Vectors, arrays and matrices
- Special matrices
- Matrix operations (addition, subtraction, multiplication)
- *Cramer's rule

***Week 8*: *optimization***

- Unconstrained optimization (local/global maxima and minima, FOC, SOC)
- Constrained optimization (with equality constraints)

***Week 9*: *Linear programming***

*1. The actual coverage and the schedule may be revised as the course evolves.*

*2. Topics marked with a "*" will be covered only if we have enough time.*

## 4. Miscellaneous

Disabilities:
To ensure that disability-related concerns are properly addressed from the beginning, students with disabilities who require reasonable accommodations to participate in this class are asked to see me as soon as possible.