# MA120 S Mathematical Foundations

Seminar Leader: Ann-Kathrin Blankenberg
Course Times: Mo and Wed 17:30-19:00
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## Course Description

This course focuses on the (basic) tools important for the study of political science and economics: analytic geometry, functions of a single variable, and calculus. The course will also be of interest for any student with a general interest in mathematics, or who does not intend advanced specialization in economics. This course is highly recommended for students who want to specialize in Economics, but do not have a strong background in mathematics. After successfully completing this course they will have to take (the more advanced) Mathematics for Economics course in the fall semester.

*This course also fulfills the mathematics and science requirement for humanities students.*

## Learning Outcomes

➢  Mastery of basic mathematical knowledge and its application to economics
➢  Ability to understand and participate in debates on the uses of mathematics in economics
➢  Capacity to complete exercises and projects proper to mathematical analysis or its use in economics

## Requirements

### Textbook

For this course, we will use the textbook "Maths for Economics" by Geoff Renshaw ($4^{th}$ edition, $3^{rd}$ edition will work as imperfect substitute) and required readings/exercises will mostly be from this book. It is vital for your success in the course that you prepare our sessions by carefully studying the assigned parts of the textbook and that you carefully do the exercises provided in class and the book. Mathematics is not a topic that is easily understood by just browsing through the readings but requires the actual use of the concepts discussed in class. <u>To be successful, you will need to practice maths continuously and do many more of the exercises than we can actually do together in class</u>. Because of this importance of exercising, an essential part of the grade will be based on the exercises given throughout the course.

### Attendance

Attendance at ALL classes is expected. Absences due to illness or compelling circumstances outside of the students' control are excused if notification is given via email before the course. The instructor may require additional documentation in case of absences or frequent exams/quizzes on the day of absence. Optional non-academic travel, hosting visiting family and friends, or work schedules are not grounds for excused absences.

SPECIAL CONSIDERATIONS FOR SPRING 2021:
Some students might need to begin the semester remotely due to travel restrictions caused by the pandemic. In addition, all students and instructors must refrain from in-person attendance if they are feeling ill. Instructors should make efforts to offer alternatives to in-person attendance where needed, including remote participation or asynchronous options.

## Academic Integrity

Bard College Berlin maintains the staunchest regard for academic integrity and expects good academic practice from students in their studies. Syllabi should note that, instances in which students fail to meet the expected standards of academic integrity will be dealt with under the Code of Student Conduct, Section 14.3 (Academic Misconduct) in the Student Handbook.

# Grading

## Assessment

Assessment will be based on attendance, preparation for classes, regular and active participation, professionalism (see below), quizzes, exercises as well as a midterm (60 minutes) and final examination (90 minutes). The worst-graded quiz and exercise will not count towards the grade.

## Policy on Late Submission of Exercises

Exercises that are up to 24 hours late will be downgraded one full grade (from B+ to C+, for example). After that, we will accept late submissions only until the end of the week in which they were due (Sun, 23:59), but these cannot receive a grade of higher than C. Thereafter, the student will receive a failing grade for the assignment.

## Grade Breakdown

Seminar preparation, professionalism and participation 20%
Quizzes and exercises 20%
Midterm examination 30%
Final examination 30%

# Schedule

Spring 2020 classes start on Monday, February 01 and run until Friday, May 14 with spring break planned from Mar. 29 - Mon, Apr. 5, 2021. Completion week is from May 17 - 21.
Students are required to be on campus during completion week and the final exam will be scheduled during this week. Given the current situation regarding COVID-19, exam in completion week may be take place online. Scheduled class times are available online under the relevant course heading:
https://berlin.bard.edu/academics/courses/

The schedule provided is provisional in order to allow for flexibility. It is the students' responsibility to keep themselves informed of any changes to the schedule provided here. An up-to-date schedule will

be maintained by the course management on the internet in Google classroom. The password to join google classroom will be handed out in class.

Class sessions will generally consist of three parts: Exposition of mathematical concepts and techniques, exercising their use as well as a discussion of their use in economics via examples where appropriate.

| | Topic | Reading |
|---|---|---|
| Week 1<br>Feb 01 & 03 | Introduction | Renshaw, Ch. 1 |
| Week 2<br>Feb 8 & Feb 10 | Repetition of arithmetic | Renshaw, Chs. 2 |
| Week 3<br>Feb 15 & Feb 17 | Algebra and functions | Renshaw, Ch. 2 |
| Week 4<br>Feb 22 & Feb 24 | Algebra and functions, linear equations | Renshaw, Chs. 2-3 |
| Week 5<br>Mar 01 & Mar 3 | Linear equations | Renshaw, Ch. 3 |
| Week 6<br>Mar 8 & Mar 10 | Linear equations and their application in economics<br>*# No class on Mar 8 due to Federal Holiday* | Renshaw, Ch. 3 |
| Week 7<br>Mar 15 & Mar 17 | Quadratic equations | Renshaw, Ch. 4 |
| Week 8<br>Mar 22 & Mar 24 | Quadratic equations<br>*# mid-term is Mar 24, during class hours* | Renshaw, Ch. 4 |
| Mar 29 & Mar 31 | Spring break | |
| Week 9<br>Apr 07 | Limits and rectangular hyperbola<br>*# No class on* Apr 5 *due to Federal Holiday* | Renshaw, Ch. 5 |
| Week 10<br>Apr 12 & Apr 14 | Derivatives and differentiation | Renshaw, Ch. 7 |
| Week 11<br>Apr 19 & Apr 21 | Derivatives and differentiation | Renshaw, Ch. 7 |
| Week 12<br>Apr 26 & Apr 28 | Economic applications of functions and derivatives | Renshaw, Ch. 8 |
| Week 13<br>May 3 & May 5 | Economic applications of functions and derivatives | Renshaw, Ch. 8 |
| Week 14<br>May 10 & May 12 | Mathematics of finance and growth/<br>Review | Renshaw, Ch. 10 |
| Week 15<br>May 17 – Fri, May 21<br>Completion week | FINAL EXAMINATION: to be scheduled | |

*Classes missed due to federal holidays will not be rescheduled.*

## Professionalism

Being a student is your full-time job and with it come a set of responsibilities and expectations, as with any other job. Maintaining a professional attitude towards your course of study is something that also prepares you for later work life. A professional attitude towards your studies is shown by coming to class on time, being prepared, being courteous to your teachers and fellow students. It is exhibited by writing your essays with care, actively participating in class, avoiding distractions (excessive bathroom breaks, using smartphones to check on irrelevant issues during class etc.), not missing classes except for the most dire of circumstances and in general by adapting to the rules of the course without trying to bargain for personal exceptions.

## Ethics/Academic honesty

A core value of the academy is truth and the pursuit thereof. Nothing can shake the foundations of this pursuit as much as academic dishonesty as it undermines the trust that is indispensable to it. This is why I will not excuse any instance of academic dishonesty. Plagiarism, cheating during exams, copying homework assignments (or doing individual assignments with a classmate) all constitute violations of academic honesty and of the clause on "academic integrity" that each student has signed in the student handbook. They can lead to failing the course and will be reflected in the student's record (having a record of academic dishonesty can make obtaining scholarships, achieving a study abroad place or admission to another program difficult if not outright impossible). If students fail to meet the expected standards of academic integrity, this will be dealt with under the Code of Student Conduct, Section III Academic Misconduct.

(version: 05.01.2021)