

MA110 – Mathematical Foundations

Seminar Leader: Stephan Müller
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Office Hours: Wednesday, 13-14:00 or by appointment

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

For this course, we will use the textbook “Maths for Economics” by Geoff Renshaw (5th edition, 4rd 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. 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. Because of this importance of exercising, an essential part of the grade will be based on the exercises given throughout the course.

Academic Integrity

Bard College Berlin maintains the highest standards of academic integrity and expects students to adhere to these standards at all times. 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.

Accommodations

Bard College Berlin is committed to inclusion and providing equal access to all students; we uphold and maintain all aspects of Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990, and the ADA Amendments Act of 2008, and Section 3 of the German Disability Equality Act of April 27, 2002 (Federal Law Gazette I p. 1468). If you have a disability, or think you may have a disability, please contact the Disability Accommodation Coordinator, Atticus Kleen, (accommodations@berlin.bard.edu) to request an official accommodation.

Requests for accommodations should be made as early as possible to ensure adequate time for coordination and planning. Please note that accommodations are not retroactive and may require advance notice to implement.

If you have already been approved for accommodations with the Disability Accommodation Coordinator, please arrange to meet with me outside of class so that we can develop an implementation plan.

Students may face extenuating circumstances related to various personal or external factors, which impact their academic performance. While these circumstances often do not fall within the legal framework of Disability Accommodations, Bard College Berlin is committed to supporting students experiencing such circumstances. A student needing a short extension or a replacement assignment because of an extenuating circumstance is encouraged to make arrangements directly with instructors if possible. If further support is needed, please visit the [Bard College Berlin Accessibility page](#). Questions about this process can be directed to James Harker (j.harker@berlin.bard.edu) or Maria Anderson-Long (m.andersonlong@berlin.bard.edu).

Attendance

Attendance at all classes is a crucial part of the education offered by Bard College Berlin. To account for minor circumstances, two absences from twice-per-week courses or the equivalent (e.g. one absence from a once-per-week course) should not affect the participation grade or require documentation.

Bard College Berlin may not offer credit for any course in which a student has missed more than 30% of classes, regardless of the reasons for the absences. The full Bard College Berlin attendance policy can be found in the Student Handbook, Section 2.8.

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).

Students receive mid- and end-of-semester grades for their seminar work. Students are entitled to make an appointment with an instructor to discuss seminar participation, or may be asked to meet with the instructor at any stage in the semester regarding class progress.

Grade Breakdown

Seminar preparation, professionalism and participation, quizzes and exercises 40%
Midterm examination 30% Final examination 30%

Schedule

The Spring semester runs from Monday, January 27 and runs until Friday, May 16, with the fall break planned from Monday, April 14, - Sunday, April 20, 2025.

- Normal course sessions end on Friday, May 9.
- Completion week is from Monday, May 12 through Friday, May 16.

- Make-up classes and final exams can take place in completion week.
- Students are required to be on campus during completion week.

Scheduled class times will be available online under the relevant course heading:

<https://berlin.bard.edu/academics/courses/search/>

Classes missed due to federal holidays will not be rescheduled. Classes missed due to conferences or due to illness (of the professor) are rescheduled.

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.

Topics

- Introduction
- Repetition of arithmetic (Renshaw, Ch. 1)
- Algebra and functions (Renshaw, Ch. 2)
- Linear equations (Renshaw, Ch. 3)
- Linear equations and their application in economics
- Quadratic equations (Renshaw, Ch. 4)
- Some further equations and technique (Renshaw, Ch. 5)
- Derivatives and differentiation (Renshaw, Ch. 6)
- Derivatives in action (Renshaw, Ch. 7)
- Economic applications of functions and derivatives (Renshaw, Ch. 8)

Week 8: Midterm Exam (to be scheduled) - during class hours

Week 15: Final Exam (to be scheduled)