



**Econ2210B 570**  
**Principles of Mathematical Economics I**  
**Winter 2026**

Instructor: Dr. Tyler Pattenden  
Email: [tpattend@uwo.ca](mailto:tpattend@uwo.ca)

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**Course Information**

**Mode of Instruction:** In Person

**Calendar Description:**

An introduction to the principles of mathematical economics (linear and matrix algebra, differential calculus, maximization and constrained maximization) with applications including the theory of the firm and consumer theory.

**Pre-requisite(s):** Economics 1021A/B and Economics 1022A/B; and 0.5 from Mathematics 1225A/B, Mathematics 1230A/B, Calculus 1000A/B, and 0.5 from Mathematics 1229A/B, Mathematics 1600A/B, Calculus 1301A/B, or Calculus 1501A/B.

**Anti-requisite(s):** Economics 2141A/B.

**Extra Information:** 3 lecture hours.

**Course Weight:** 0.50

**Breadth:** CATEGORY A

**Subject Code:** ECONOMIC

Notice: Unless you have either the requisites for this course (fulfilment of pre-requisites, no anti-requisite conflicts), or special permission from your Dean to enrol in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

King's University College  
London Canada  
School of Management, Economics, and Mathematics  
Winter 2026

**Economics 2210B**  
Mathematical Economics I

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**Instructor:** Dr. Tyler Pattenden (he/they)  
**Instructor Email:** [tpattend@uwo.ca](mailto:tpattend@uwo.ca)  
**Student Hours:** TBD (see note below)

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**Course Description:**

An introduction to the principles of mathematical economics (linear and matrix algebra, differential calculus, maximization and constrained maximization) with applications including the theory of the firm and consumer theory.

**Prerequisites:**

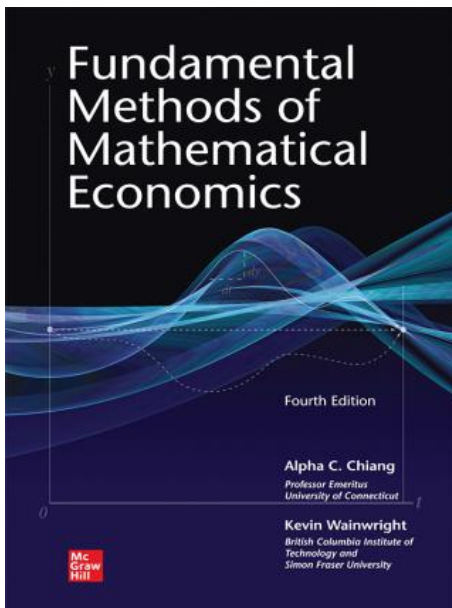
Economics 1021A/B and Economics 1022A/B; and 0.5 from Mathematics 1225A/B, Mathematics 1230A/B, Calculus 1000A/B, and 0.5 from Mathematics 1229A/B, Mathematics 1600A/B, Calculus 1301A/B, or Calculus 1501A/B.

**Antirequisites:**

Economics 2141A/B.

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**Course Materials:**



The textbook we will be using this term is:

*Fundamental Methods of Mathematical Economics* (4e.) by Chiang and Wainwright. (ISBN-13: 9780070109100) Paperback \$132.55, Ebook \$59

There are two options to purchase the textbook – eBook or hard copy. You may choose either option. The textbook (in either form) may be purchased through the Western Bookstore (<https://bookstore.uwo.ca>).

**Please note that if you purchase a previous edition of the text, the instructor warns that there are small changes between versions that may not be known by the instructor. Some sections may differ, some homework problems may differ. Buy previous versions at your own risk!**

*Although the instructor is a big fan of finding OER for courses, it is highly recommended you purchase this book – especially if you are considering graduate school in economics. This text is generally considered the “gold standard” for mathematical economics and is often used in graduate mathematical economics courses!*

**Important websites and their utilization in this course:**



**OWL Brightspace** – This learning management system will be your hub to find all posted resources for this course. This will include lecture notes, additional resources for the week and your grades! Announcements will also be sent out via OWL Brightspace for reminders regarding upcoming assessments and any pertinent information regarding the course. It is your responsibility to check OWL often (daily!).



**Gradescope** – This will be our grading platform for summative assessments for this semester. Your term tests and final examination will be uploaded for instant feedback and grading purposes. You will also upload your article report to Gradescope for grading purposes. Note that assessments *may* be released to you at the discretion of the course coordinator / instructor. You may need to schedule an appointment with your instructor to view your work directly.

- Gradescope works best when you upload a PNG or PDF file as your submission. Other file formats risk being corrupted or unseen by the grader.
- We will be using [gradescope.ca](https://gradescope.ca) in this course – please ensure you are going to this website and not gradescope.com!!

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#### **Email and Communication Policy:**

The best method to contact your instructor for this course is in-person before or after class. If this does not work for you, then you can email your instructor. All emails **MUST** be sent through your official UWO email address (username@uwo.ca) so it does not end up in spam. The subject line of your email must include the course number (i.e., **ECON2210**). I will endeavour to respond to your emails within 2 business days.

Email communication should be reserved only to provide information or ask a question that requires a brief response. Any questions asked via email that have been answered in this outline or on the course website (Brightspace) will **not** be responded to. It is your responsibility to seek the information to the best of your ability before emailing your instructor.

Mathematical questions will not be answered via email. You must speak directly to your instructor to have these answered.

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#### **Learning Outcomes:**

By the end of the course, students will be able to:

1. Explain and apply foundational mathematical concepts – including functions, algebraic manipulation, and differentiation – in economic contexts;
2. Use differential calculus and multivariate calculus tools to study economic relationships;
3. Analyse equilibrium conditions and perform comparative statics, interpreting how changes in parameters affect economic outcomes;
4. Formulate and solve optimization problems relevant to consumer choice, firm behaviour, and general economic decision-making;
5. Evaluate advantages and limitations of mathematical methods introduced and articulate how these methods inform economic reasoning; and
6. Connect mathematical results to economic interpretation.

**Evaluation:**

Your final grade will be calculated through the following scheme:

<b>Article Report</b> (due on April 7 <sup>th</sup> at 11:59pm)	10%
Weekly Review Quizzes (due each Friday; lowest 3 dropped)	10%
<b>Term Tests</b> (two throughout term)	2 x 20%
<b>Final Examination</b> (scheduled by registrar)	40%

Details regarding each evaluation are given below.

**Article Report:**

Students will select a recent article—academic, industry, or high-quality media—related to an economic question of interest and connected to the mathematical tools studied in the course (e.g., optimization, constrained choice, equilibrium models, comparative statics). Each student will write a structured report that (a) summarizes the economic problem addressed in the article, (b) explains how the mathematics in the article works or relates to course concepts, and (c) reflects on any questions, critiques, or extensions arising from the article. The goal is to help students connect real-world economic analysis to the mathematical methods they are learning.

Article reports are to be completed independently, with no AI assistance. Your submission will be checked against AI generated responses. Any suspected academic dishonesty will be reviewed, and students may be asked for additional clarification by the instructor in-person. Such a review may result in academic penalties, if deemed appropriate.

The article report is due on April 7<sup>th</sup> at 11:59PM with a 48-hour no-penalty late window. No submissions will be accepted after this window – this will result in you having a zero for this portion of your final grade.

**Review Quizzes:**

Each Wednesday at 11:59PM, a review quiz will be released on Brightspace for you to complete by Friday at 11:59PM (with the exception of Term Test weeks). Each quiz will offer two chances to complete, with your best score counting. The goal of the quizzes is to ensure you have an understanding of the material presented that week. They will be short (usually 3 to 5 questions), and likely consist of basic multiple-choice questions. These will assist the instructor in gauging your knowledge-basis after each week. They will cover both mathematical and economic-related content from that week. Your lowest three review quizzes will be dropped from your final grade.

**Term Tests:**

Two term tests, equally weighted at 25% each, are scheduled for February 4<sup>th</sup> and March 11<sup>th</sup> in-class. Topics for each test will be announced on Brightspace and in-class. Terms tests may consist of a combination of multiple choice and short answer questions. Term Test #2 will only cover material post Term Test #1.

Students that miss Term Test #1 will require academic consideration with proper documentation to write the make-up term test (date TBD). A student that misses both Term Test #1 and its make-up with academic consideration will have the weight transferred to the cumulative final examination. Term Test #2 will not have a scheduled make-up test. Rather, students with approved academic consideration will have the weight transferred to the cumulative final examination.

*Final Examination:*

The final examination will be a three-hour cumulative examination that may be a combination of multiple choice and short written answer questions. The final examination will be scheduled by the Registrar during the final examination period.

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**In-Class Notes:**

All in-class notes will be posted to OWL within 48 hours of class ending – I will do my best to post within 48 hours, but may be delayed on occasion. Note that if attendance in class begins to lack, notes may be password protected with the password given only to those that attend class. It is extremely important that you attend class, participate, ask questions, and be present in all aspects of the word. **I do not want to password protect notes, but will do so if needed.**

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**Lecture Sessions:**

In most weeks of the course, our Monday sessions will be spent reviewing key important mathematical content; framed as though you were in a “mathematics” course. This will be mostly review – covering things like differentiation rules, exponentials and logarithmic functions – but may be new content for some – like matrix algebra or multivariate calculus. Our Wednesday sessions will be spent seeing how we can utilise those mathematical concepts in some economic application. I believe this is the best way to teach this course and will allow us to spend more time on the applications, rather than some basic mathematical concepts.

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**Student Hours:**

Some professors may call this time each week “office hours”, but I cannot stand that term as it makes it sound like I do not want you around. In fact, these hours are scheduled for you to come see me (I know a scary thought, right?). I will be sitting, more than likely alone, somewhere on campus (TBD) awaiting you to grace me with your presence. This is your time to speak with me (your oh so scary instructor) about course content, future directions, life, Netflix or whatever. Student hours will occur in-person somewhere on campus. If you are unable to attend student hours, please email me to schedule an appointment.

To give you a sense of how student hours work, watch this short video: <https://vimeo.com/270014784><sup>1</sup>

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**Course Policy on Use of Artificial Intelligence (AI):**

Within this course, use of artificial intelligence (AI) tools such as Chat GPT is not permitted for any evaluation. Unauthorized use of AI will be subject to academic discipline.

*Please note that instructor reserves the right to seek additional clarification about any submitted work (e.g., explain a solution) as part of any test or exam, including any multiple-choice tests.*

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<sup>1</sup> It does bother me that Dr. Ishak calls them “office hours” ... but I digress ...

**Equal Opportunity and Evaluation Policy:**

The university is committed to academic integrity and has high ethical and moral standards. All students will be treated equally and evaluated using the criteria presented in this course outline and their respective weights. The evaluation criteria are based strictly on actual achievement, not on effort. Claims of an excellent academic history, of attendance in the course components, or of personal issues (family, relationship, financial, etc.) cannot be used to justify a higher grade in the course because they are not criteria for evaluation. The requirement for a higher grade to, for example, maintain a scholarship, enter a program, or obtain a higher GPA for various reasons, is not a justifiable reason for increasing your grade. If we increased or “bumped” your grade (i.e. gave you a grade that you did not legitimately earn), it would be unfair to the other students and also a great disservice to the scholarships and programs who are evaluating all students on the basis of their grades. This means, for example, if you receive 58% in the course we will not “bump” your grade to a 60%; you will simply need to take the course again if you need 60%.

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**Intellectual Property Statement:**

Course material (i.e., lecture notes, videos, solutions, practice question and other supplementary materials as posted on Brightspace) is the intellectual property of the instructor and course developers. This material is made available to you for your personal use in this course. Sharing, posting, selling, or using this material outside your personal use in this course is considered to be infringement of intellectual property rights.

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**EDID Statement:**

I am committed to having a respectful classroom where all feel welcomed. Our class time is a safe space to be yourself, and to question the course content. Discussion is always encouraged, and you should never feel silenced by me or a peer. We all come from different backgrounds, and that is what makes science (and the world!) an amazing place. If you ever feel disrespected, put down, or not included for whatever reason, please reach out to me. I will always be a safe person for you to talk to.

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**Decolonization Statement:**

Western sits on the traditional territories of the Anishinaabek, Haudenosaunee, Lūnaapéewak and Chonnocton Peoples. The legacy of colonization and colonialism is felt globally and is imprinted in our educational system. Western is taking some initial steps toward recognizing it. Textbooks can be biased toward a particular cultural narrative. Science (especially Statistics and Mathematics) textbooks are no exception. I will strive to include unique content as much as I can, and I seek your feedback.

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*The instructor reserves the right to adjust anything within this outline with sufficient notice to those enrolled in ECON2210B.*

**Tentative Class Schedule:**

*This is subject to change and should not be held as absolute. All textbook sections come from Chiang /Wainwright.*

Week		Monday Topics	Wednesday Topics
1	Jan 5 – 9	Course Introduction + The Nature of Mathematical Economics <i>(Chapter 1)</i>	Overview of Economic Models <i>(Chapter 2)</i>
2	Jan 12 – 16	Review of root finding and solving systems of linear equations	Equilibrium Analysis <i>(Chapter 3)</i>
3	Jan 19 – 23	Review of Matrix Operations	Finite Markov Chains <i>(Chapter 4)</i>
4	Jan 26 – 30	Review of Determinants and Inverses	Applications to Market Models and Leontief Input-Output Models <i>(Chapter 5)</i>
5	Feb 2 – 6	Review	<b>Term Test #1</b> <i>(in class)</i>
6	Feb 9 – 13	Review of Limits and Single-Variable Derivatives + Partial Derivatives	Comparative Statics Analysis <i>(Chapter 7)</i>
7	Feb 16 – 20	<b>Reading Week</b>	<b>Reading Week</b>
8	Feb 23 – 27	Differentials	Comparative Statics Analysis <i>(Chapter 8)</i>
9	Mar 2 – 6	Single-Variable Optimization	Taylor Series and the Nth Derivative Test <i>(Chapter 9)</i>
10	Mar 9 – 13	Review	<b>Term Test #2</b> <i>(in class)</i>

11	Mar 16 – 20	Exponentials and Logarithms	Optimal Timing and Other Applications <i>(Chapter 10)</i>
12	Mar 23 – 27	Multivariate Optimization	Second-Order Conditions and The Hessian Matrix <i>(Chapter 12)</i>
13	Mar 30 – Apr 3	Utility Maximization and Consumer Demand <i>(Chapter 12)</i>	Homogeneous Functions and Least-Cost Combination of Inputs <i>(Chapter 12)</i>
14	Apr 6 – 9	Nonlinear Programming and KKT Conditions <i>(Chapter 13)</i>	Final Review
	Apr 12 - 30	<b><i>Final Examination Period</i></b>	<b><i>Final Examination Period</i></b>

# KING'S UNIVERSITY COLLEGE

## GENERAL COURSE POLICIES

### 2025-2026

#### **1. Academic Accommodations, Consideration for Absences**

##### **Academic Accommodation (Accessibility)**

Accessibility Services works to ensure that academic programs are accessible to all students, and supports students who may have a condition related to, but not limited to, vision, hearing, mobility, different ways of learning, mental health, chronic illnesses, chronic pain, autism spectrum disorder, ADD/ADHD, and temporary conditions (beyond short-term academic consideration). Accessibility Services provides recommendations for accommodation based on medical documentation or psychological and cognitive assessment. The accommodation policy can be found here [Academic Accommodation for Students with Disabilities](#). Information on Accessibility Services at King's can be found [here](#).

##### **Academic Consideration for Student Absence**

If a student is unable to meet a course requirement due to substantial but temporary extenuating circumstances (medical or compassionate), they should follow the procedures below.

In some cases, where instructors have built flexibility into their assessments, this flexibility will already address consideration needs.

Requests for academic consideration should be directed to the Academic Advising Office of your faculty/college of registration. Requests must be made as soon as possible and no later than 48 hours after the missed assessment.

As a rule, documentation is required for academic consideration. For academic consideration requests on medical grounds, the Student Medical Certificate is available at [https://www.kings.uwo.ca/kings/assets/File/currentStudents/courses\\_enrollment/exams\\_and\\_tests/SMC-Feb-2025.pdf](https://www.kings.uwo.ca/kings/assets/File/currentStudents/courses_enrollment/exams_and_tests/SMC-Feb-2025.pdf).

Students are permitted one academic consideration request without supporting documentation per term per course.

Instructors may designate one assessment per half-course weight as requiring formal supporting documentation. Please refer to the course outline for each course.

For further information, please see:

[https://uwo.ca/univsec/pdf/academic\\_policies/appeals/academic\\_consideration\\_Sep24.pdf](https://uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf)

##### **Absences from Final Examinations**

If you miss the Final Exam, contact the Academic Advising Office of your faculty/college of registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a “Multiple Exam Situation” (e.g., more than 2 exams in 23-hour period, or more than 3 exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under [Special Examinations](#)).

## **Religious Accommodation**

Students should consult the University's list of recognized religious holidays, and should give notice in writing to the instructor and Academic Advising Office if a course requirement will be affected by a religious holiday/observance. Notice must be given as early as possible, and no later than two weeks prior to an examination, and one week prior to a midterm test date. It is the responsibility of such students to inform themselves concerning the work done in classes from which they are absent and to take appropriate action.

## **2. Support Services**

Accessibility, Counselling and Student Development at King’s University College:

<https://www.kings.uwo.ca/current-students/student-services/>

Students experiencing emotional or mental health distress can access services at King’s University College: <http://www.kings.uwo.ca/current-students/campus-services/student-support-services/personal-counselling/>

Good2talk is a good online and phone 24/7 resource for students and is available in English, Mandarin, and French: <https://good2talk.ca>, 1-866-925-5454

MentalHealth@Western provides a complete list of options about how to obtain help:

[https://www.uwo.ca/health/mental\\_wellbeing/](https://www.uwo.ca/health/mental_wellbeing/)

Academic Support Services at King’s University College:

<https://www.kings.uwo.ca/current-students/academic-resources/>

### **GBSV Support:**

King’s is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at:

<https://www.kings.uwo.ca/about-kings/safe-campus/gender-and-sexual-violence/>

You can reach someone supports at Kings by emailing [Care@kings.uwo.ca](mailto:Care@kings.uwo.ca) or calling 519-930-4640 to reach a social worker who can offer help.

You can also reach Western’s Gender-Based Violence & Survivor Support Case Manager by [email](#) or by calling 519-661-3568.

Further supports can be found on this website: <https://www.kings.uwo.ca/about-kings/safe-campus/gender-and-sexual-violence/>

See also [https://www.uwo.ca/health/student\\_support/survivor\\_support/get-help.html](https://www.uwo.ca/health/student_support/survivor_support/get-help.html)

University Students' Council offers many valuable support services for students, including the health insurance plan: <http://westernusc.ca/services/>

### 3. Statement on Use of Electronic Devices

**Use of Electronic Devices:** Unless explicitly stated otherwise, you are not allowed to have a cell phone, or any other electronic device, with you during tests or examinations. Unauthorized possession of such a device during a test or examination constitutes an academic offence.

**Use of Laptops, Tablets, and Smartphones in the Classroom:** King's University College at Western University acknowledges the integration of new technologies and learning methods into the curriculum. The use of electronic devices such as laptop computers, tablets, or smartphones can contribute to student engagement and effective learning. At the same time, King's recognizes that instructors and students share jointly the responsibility to establish and maintain a respectful classroom environment conducive to learning.

The use of electronic devices by students during lectures, seminars, labs, etc., shall be for matters related to the course at hand only. Students found to be using electronic devices for purposes not directly related to the class may be subject to sanctions under the Student Code of Conduct; see <https://www.kings.uwo.ca/current-students/student-affairs/code-of-student-conduct1/>

Inappropriate use of electronics (e.g., laptops, tablets, smartphones) during lectures, seminars, labs, etc., creates a significant disruption. As a consequence, instructors may choose to limit the use of electronic devices in these settings. In addition, in order to provide a safe classroom environment, students attending in-person class sessions are strongly advised to operate laptops with batteries rather than power cords.

### 4. Statement on Academic Offences

King's is committed to academic integrity. Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, is posted at

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf)

It is expected that students will submit work that is truly their own, completed without external assistance (human or artificial) except as explicitly permitted by the course instructor. Check with your instructor on what tools, including generative AI (ChatGPT, translation tools, grammar-checking tools) are permitted in the course. Because a tool is permitted in one course, that does not mean it is permitted in other courses.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system; see <https://elearningtoolkit.uwo.ca/tools/Originality Reports - TurnItIn.html>.

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

### **5. Copyright of Course Material**

Lectures and course materials, including PowerPoint presentations, tests, outlines, and similar materials are protected by copyright. Faculty members are the exclusive owner of copyright in those materials they create. Students may take notes and make copies for their own use. Students may not allow others to reproduce or distribute lecture notes and course materials publicly (whether or not a fee is charged) without the express written consent of a faculty member. Unauthorized sharing of class content is subject to academic discipline.

Similarly, students own copyright in their own original papers and exam essays. If a faculty member wishes to post a student's answers or papers on the course website, they should ask for the student's written permission.

### **6. Use of Recordings**

Participants in this course are not permitted to record the sessions, except where recording is an approved accommodation and/or the participant has the prior written permission of the instructor. Unauthorized recording and/or sharing of class content is subject to academic discipline.

### **7. Policy on Attendance**

Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course, will be reported to the Dean of the Faculty offering the course, after due warning has been given. On the recommendation of the department concerned, and with the permission of the Dean of that Faculty, the student will be debarred from taking the regular examination in the course.