

Course Outline

MATH 1229B-Methods of Matrix Algebra¹

1. Course Information

Course Information

- *Course Name:* Mathematics 1229A (Methods of Matrix Algebra)
- *Academic Term:* Winter 2024
- *Sections:* Main campus section 200 and all tutorials 002-010.
- *Tutorial Professors:* Asghar Ghorbanpour, Allen O'Hara, Sajad Sadeghi
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<i>Tutorial #</i>	<i>Day</i>	<i>Time</i>	<i>Room</i>	<i>Tutorial Professor</i>
<i>Tutorial 002</i>	Mondays	4:30-5:30	MC110	A. O'Hara
<i>Tutorial 003</i>	Wednesdays	4:30-5:30	AHB 1R40	A. O'Hara
<i>Tutorial 004</i>	Fridays	4:30-5:30	MC110	A. O'Hara
<i>Tutorial 005</i>	Mondays	12:30-1:30	MC105B	S. Sadeghi
<i>Tutorial 006</i>	Wednesdays	12:30-1:30	SSC-3022	S. Sadeghi
<i>Tutorial 007</i>	Fridays	12:30-1:30	MC105B	S. Sadeghi
<i>Tutorial 008</i>	Mondays	3:30-4:30	TC141	A. Ghorbanpour
<i>Tutorial 009</i>	Wednesdays	3:30-4:30	TC141	A. Ghorbanpour
<i>Tutorial 010</i>	Fridays	3:30-4:30	TC141	A. Ghorbanpour

List of Prerequisites

One or more of Ontario Secondary School MCF3M, MCR3U, or equivalent.

List of Antirequisites

Applied Mathematics 1411A/B, 2811B, Mathematics 1600A/B, 2120A/B, 2155F/G, 2211A/B.

Unless you have either the requisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Counselling) to enroll 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.

2. Instructor Information

Instructors	Email	Office
Dr. Asghar Ghorbanpour (Course Coordinator)	aghorba@uwo.ca	MC135
Dr. Allen O'Hara	aohara@uwo.ca	MC113
Dr. Sajad Sadeghi	ssadegh3@uwo.ca	TBA

¹ This course outline is subject to change, and any changes will be clearly communicated via the course OWL website.

Course Contact Policies

- Students must use their Western (@**uwo.ca**) email addresses when contacting their tutorial professors.
- Any email sent to the instructor MUST say Math 1229B in the subject line; Any email without proper subject line, and/or sent from an email other than a Western email, may be deleted unread.
- The primary point of contact for each student is their tutorial professor. Unless instructed otherwise, please do not contact the course coordinator with course-related questions.
- Email is not an efficient way of contact, and response times vary wildly depending on email volume (professors may be receiving tens of emails per day). Students can use office hours meeting for more urgent matters.

Office Hours Information

Each tutorial professor will hold at least two office hours weekly to provide help to the students of their tutorial. Information about days, time, location and format of the office hours will be provided on the course OWL website.

Math-Physics Accelerator

The Mathematics Department runs free in-person and virtual help centres each weekday during the semester, starting the third week of the term: Jan 22nd, 2024. The in-person help centre is located in the Math-Physics Accelerator in PAB 48/49/26 (on the lower level of the Physics and Astronomy Building.) These help centres are staffed by graduate student teaching assistants and all first-year mathematics courses are supported. No appointments are necessary.

- Information about the help centre and other departmental supports for students can be found at: https://www.math.uwo.ca/undergraduate/current_students/Help%20Centre.html
- Information about other ways to get help will be posted on the course OWL website.

3. Course Syllabus, Delivery Mode

Course Syllabus

Vectors in R^m ; Equations of lines and planes; Linear Equations; Solution of Linear Systems; Matrix Algebra; Matrix Multiplication and Inverses; Determinants.

The Course Learning Outcomes

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

- Describe m -dimensional Euclidean space and carry out the vector operations for vectors in R^m .
- Write algebraic representations (as equation in different form) for different geometric objects such as lines, planes and hyper planes, in R^m .
- Recognize linear equations, systems of linear equations (SLE), and solutions of SLEs.
- Solve SLEs using different methods: Gauss-Jordan elimination method, method of inverse matrix and Cramer's rule, if applicable.
- Perform basic matrix operations: addition/subtraction, multiplication and powers, inverse, and transpose matrices.
- State what the rank of a matrix is, find it and use it to determine the number of solutions of an SLE.
- Compute the determinant of square matrices using different methods: expansion along rows/columns and using the properties of determinant.

- Use determinant of square matrices to find the inverse of invertible matrices.

Course Delivery

This is a blended course. All students are registered in section 200 as well as in one of the tutorial sections. Tutorials, taught by a tutorial professor, meet in-person once a week. The course content, which are offered in the form of series videos accompanied by other related resources, will be released on weekly basis on the course OWL website. The tutorial professors will review the content that was released on OWL a week before the tutorial.

Contingency plan

Although the intent is for this course to be delivered in person, should any university-declared emergency require some or all of the course to be delivered online, either synchronously or asynchronously, the course will adapt accordingly. The grading scheme will **not** change. Any assessments affected will be conducted online as determined by the course instructor.

Key Sessional Dates:

- *Classes begin:* January 8, 2024
- *Last day to add:* January 16, 2024
- *Reading Week:* February 17 – 25, 2024
- *Last day to drop:* March 7, 2024
- *Good Friday:* March 29, 2024
- *Classes end:* April 8, 2024
- *Exam period:* April 11 – 30, 2024

4. Course Materials

Textbook

Second Custom Edition of Elementary Linear Algebra by S. Venit, W. Bishop and J. Brown, published by Cengage, ISBN13: 978-1-77474-365-2

or the eBook version of the textbook

University of Western Ontario Custom eBook: Elementary Linear Algebra, 2nd Edition (365 Days/One Year Access)-- SKU: CEB___CODEID=46047.*

Both versions of the textbook are available through the Western Bookstore.

Learning Management System (OWL)

Students are responsible for checking the course OWL site (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class.

All course material will be posted to OWL: <http://owl.uwo.ca>. The course OWL website contains weekly videos teaching the course material. Various useful supplemental materials, such as lecture notes and other videos series, required extra homework problems, practice tests, and solutions to the homework exercises, are posted on the OWL web site (<http://owl.uwo.ca>). As well, there are forums on which students may post questions. All students are expected to be aware of information, and make use

of materials, posted on the course web site. Important information will be posted on the Announcement tab of the website.

If students need assistance with the course OWL site, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Technical Requirements

In addition to the usual math hardware: pencil, paper, and (if you are human) an eraser, you need to have access to

- Computer or laptop able to run a recent version of web browser such as Chrome, Safari or Firefox.
- Stable high-speed internet connection.
- Working microphone and webcam. (in case of pivoting to online learning)
- Document Scanner device or App. (in case of pivoting to online learning)

What is expected of the students?

- As a blended course, students learn the course content through online materials on the course OWL website, which will be provided weekly. Following that, students should attend tutorials in which their tutorial professor will review the material covered online in the previous week.
- Students should make a serious effort to learn all course material by reviewing their course notes and the corresponding parts of the textbook after each class.
- Regular homework is an essential part of the course; it is the student's responsibility to keep up with the assigned practice problems and to seek additional help if and when it is needed.
- The student must assume responsibility for staying up to date with course content and for being aware of posted deadlines such as dates for midterm tests and deadlines for online quizzes.
- The student is responsible for being aware of all relevant information posted on the OWL web site.

Further Course Policies

- All students are expected to engage online and in-person in a professional and respectful manner. This includes all interactions with peers, as well as communication between TAs or your Professor. Failure to do so will result in academic discipline.
- Recording lectures or tutorials without the explicit consent of the Professor or TA is grounds for academic discipline.
- Course content created by a faculty member is considered the faculty member's intellectual property; it should not be distributed, shared in any public domain, or sold by a student or other third party without prior written consent of the faculty member.

5. Methods of Evaluation

The final course grade will be determined by student performance on the following course components:

Online Quizzes (6 quizzes)	10%
Midterm Test	20%
Midterm Test 2	20%
Final Exam	40%

Best of Tests and the Exam 10%

Online Quizzes

There will be six online quizzes, available through the "Online Quizzes" tab of the OWL website. Each quiz consists of eight multiple choice questions covering two sections of the textbook. Each quiz will be available for a 6-day window and students can take the quiz any time during this window with no time limit. The quiz schedule (as well as other information about the quizzes) can be found on the course OWL website. Students will have two attempts to complete each quiz; the questions in each attempt will be randomly generated from question pools and may differ from the others. Of these two attempts, the highest mark will be recorded as the student's quiz grade. The student's best five of the six online quizzes, each counted equally, will be used to calculate the grade for the Online Quizzes component.

Midterm Tests

The midterm tests will be in-person and will consist of mostly multiple-choice questions and some written-answer questions.

Each test will cover the content of four sections of the textbook.

Here is tentative schedule for the midterms²

Midterm Test 1: *Saturday, February 10, 2024, 19:00-20:30*

Midterm Test 2: *Saturday, March 9, 2024, 19:00-20:30*

The location of the test will be announced closer to the test date.

Final Exam

The final exam will cover all the course material with more focus on the last part of the course.

It will be a three-hour long exam that will take place in-person and will be scheduled by the Office of Registrars. Similar to the term tests, the final exam consists of mostly multiple choice questions and some short answer questions.

The best of the tests and the exam

The remaining 10% weight will be assigned to whichever of the midterm tests and the final exams is the student's best mark.

Remarks

- NO calculators or other electronic devices or any other aids are allowed on tests and exams.
- See Absence/Missed work policy on the next page.

6. Student Absences

If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

For work totaling 10% or more of the final course grade, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible. For further information, please consult the University's medical illness policy at

² The dates/time will be finalized after they are reviewed by the exam central.

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration.pdf

The Student Medical Certificate is available at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

Students who have a direct conflict between a test and another academic requirement (i.e. test/class/lab/tutorial), and also students for whom a test conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, should contact the Academic Counselling Office in their Faculty of Registration as soon as they become aware of the conflict and not later than two weeks before the test. Students who experience an extenuating circumstance (illness, injury or other extenuating circumstance) sufficiently significant to temporarily render them unable to complete a course component may submit a request for academic consideration to the Academic Counselling office of their Faculty of Registration.

If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

Quizzes

Medical cases:

A student who misses an online quiz due to a medical reason must contact the Academic Counseling Office of their faculty of registration immediately and request academic consideration covering the quiz closing date. If academic consideration is granted, either the quiz will be extended by 48 hours or the weight of the quiz will be transferred to other quizzes.

Non-medical cases:

Considering that each online quiz is worth only 2% (less than 10%) of your grade, the academic counseling units cannot offer academic consideration for absences due to non-medical reasons. There is no guarantee that you will be accommodated for a missed quiz for reasons other than medical due to the fact that we will drop the lowest quiz mark and the quizzes will be open for 6 days.

We will dismiss excuses like "I forgot the deadline", "my computer died last night", and "my internet disconnected half an hour before the deadline". Any other extenuating circumstances should be discussed with your tutorial professor; however, it is entirely up to your professor to decide.

Midterm Tests

If you miss a midterm test due to any circumstance, you must provide an academic consideration covering the date of the test. Makeup examinations for the midterm tests will be available to those who are granted an academic consideration.

A makeup test is anticipated to be provided in the week following the test date.

In cases where a student misses to take a midterm test and the makeup test and can provide an academic consideration for both of these absences, the weight of the test will be transferred to the final exam.

Absences from Final Examinations

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty 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., 3 or more exams in 23-hour period, 4 or more 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).

Note: Missed work can *only* be excused through one of the mechanisms above.

6. Accommodation and Accessibility

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at www.edi.uwo.ca.

Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf.

7. Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf,

the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner.

NO calculators or other electronic devices or any other aids are allowed on tests and exams.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

8. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>.

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

Western 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.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (<https://learning.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>.

Additional student-run support services are offered by the USC, <https://westernusc.ca/services/>.