Course Outline
Mathematics 1229A-Methods of Matrix Algebra[1]
Fall 2022

1 Course Information:

- **Course Information:**

  - *Course Name*: Mathematics 1229A (Methods of Matrix Algebra)

  - *Academic Term*: Fall 2022

  - *Sections*: Main campus section 200 and all tutorials 002-019.

  - *Instructors*: M. Cizek, A. Ghorbanpour, M. Mollahajiaghaei, K. Nguyen, A. O'Hara, S. Zapata Ceballos. (*See Tutorial Schedule and instructors' contact information on following pages.*)

- **Prerequisites:**
  One or more of Ontario Secondary School MCF3M, MCR3U, or equivalent.

- **Antirequisites:**
  Applied Mathematics 1411A/B, 2811B, Mathematics 1600A/B, 2120A/B, 2155F/G, 2211A/B.

  SENATE POLICY ON PREREQUISITES: Prerequisite checking is the student's responsibility. Unless you have either the prerequisites for this course or written special permission from your Dean 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 Instructors Information:

Instructors	Tutorials	Email	Office
Dr. Michal Cizek	013, 016, 019	mcizek2@uwo.ca	MC 214
Dr. Asghar Ghorbanpour (**Course Coordinator**)	005, 006, 007	aghorba@uwo.ca	MC 135
Dr. Mohsen Mollahajiaghaei	002, 003, 004	mmollaha@uwo.ca	MC 128
Dr. Khoa Nguyen	014, 015, 017	knguyen@uwo.ca	MC 282
Dr. Allen O'Hara	008, 009, 010	aohara@uwo.ca	MC 113
Dr. Sergio Zapata Ceballos	011, 012, 018	szapatac@uwo.ca	MC 286

- **Course Contact Policies**:

  - Students must use their Western (@uwo.ca) email addresses when contacting their instructors.

  - Any email sent to an instructor (and especially to the course coordinator) MUST say Math 1229A 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.

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

- The primary point of contact for each student is their tutorial instructor. 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 (instructors may be receiving tens of emails per day). Students can use office hours meeting for more urgent matters.

- **Office Hours Information**: Each tutorial instructor 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.

Information about other ways to get help from will be posted on the course OWL website.

3   Course Syllabus, Schedule, Delivery Mode

- **Course Syllabus:** Vectors in $\mathbb{R}^m$; 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 $\mathbb{R}^m$.
  - Write algebraic representations (as equation in different form) for different geometric objects such as lines, planes and hyper planes, in $\mathbb{R}^m$.
  - 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 instructor, 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 instructors will review the content that was released on OWL a week before the tutorial.

    Contingency plan for an in-person class pivoting to 100% online learning In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, affected course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will not change. Any remaining assessments will also be conducted online as determined by the course instructor.

- **Key Sessional Dates**:

  - Classes begin: September 8, 2022.
  - Reading Week: October 31-November 6, 2022.
  - Last day to withdraw: November 12, 2022.
  - Classes end: December 8, 2022.

Section	Day	Time	Room	Instructor
002	Monday	9:30-10:30	UCC-41	M. Mollahajiaghaei
003	Wednesday	9:30-10:30	UCC-41	M. Mollahajiaghaei
004	Friday	9:30-10:30	UCC-37	M. Mollahajiaghaei
005	Monday	12:30-13:30	UCC-41	A. Ghorbanpour
006	Wednesday	12:30-13:30	UCC-41	A. Ghorbanpour
007	Friday	12:30-13:30	PAB-106	A. Ghorbanpour
008	Monday	13:30-14:30	UCC-41	A. O'Hara
009	Wednesday	13:30-14:30	PAB-148	A. O'Hara
010	Friday	13:30-14:30	UCC-41	A. O'Hara
011	Monday	8:30-9:30	UCC-41	S. Zapata Ceballos
012	Wednesday	8:30-9:30	UCC-41	S. Zapata Ceballos
013	Friday	8:30-9:30	UCC-41	M. Cizek
014	Monday	15:30-16:30	UCC-41	K. Nguyen
015	Wednesday	15:30-16:30	UCC-37	K. Nguyen
016	Friday	15:30-16:30	UCC-41	M. Cizek
017	Monday	16:30-17:30	UCC-41	K. Nguyen
018	Wednesday	16:30-17:30	UCC-41	S. Zapata Ceballos
019	Friday	14:30-15:30	UCC-41	M. Cizek

- **Tutorial Schedule**:

- **Math-Physics Accelerator**:

  The Mathematics Department runs free in-person and virtual help centres each week day during the semester, starting Monday September 19th. 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.uwo.ca/math/undergraduate/current_students/Help%20Centre.html

4 Course Materials

- **Textbook:** Custom Edition of Elementary Linear Algebra by S. Venit, W. Bishop and J. Brown, published by Cengage, ISBN: 0176559299, or the e-book SKU: CEB_CODEID=34452. Both available from the UWO Book Store.

- **Course OWL Website:** Various useful supplemental materials, such as lecture notes and videos of lectures, 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.

  Please contact your tutorial instructor if you require 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 for any specific question regarding an accommodation: http://academicsupport.uwo.ca/accessible_education.

- **What is expected of the Students?**

  It is expected that students attend all tutorials and have thoroughly read the material for the week, using the resources provided on OWL website, before attending. 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.

- **Technical Requirements:**

  - 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.
  - Document Scanner device or App. (in case of pivoting to online learning)

  This is in addition to the usual math hardware you will need: pencil, paper, and (if you are human) an eraser.

- **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 of 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 overall course grade will be calculated as listed below:

Online Quizzes (6 quizzes)	10%
Midterm Test 1	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 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 term tests 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 are the schedule for the midterms:

  - *Term Test 1*: Saturday, October 15, 2022, 18:00-19:30.
  - *Term Test 2*: Saturday, November 12, 2022, 18:00-19:30.

  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 hours 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 consist of mostly multiple choice questions and some written-answer questions.

- **The best of the tests and the exam**:
  The remaining 10% weight will be assigned to whichever of the 3 tests/exams is the student's best mark.

Remarks:

- Tests and examinations in this course will be in-person and handwritten on paper, if possible.

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

- See Absence/Missed Work policy on next page.

  In the event of a health lockdown, tests and examinations in this course will be conducted using a remote proctoring service. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide personal information (including some biometric data) and the session will be recorded. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at: https://remoteproctoring.uwo.ca.

6 Student Absences

For work totalling 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
    https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.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**: A student who needs a makeup for an online quiz should submit an academic consideration and email the instructor right away. Only the academic considerations that covers the closing date of an online quiz will be accepted as an excuse for missing the quiz.

  If we receive the confirmation from academic counseling before the release of solutions of the quiz, an extension of maximum of 48 hours will be given for this particular quiz. In cases where an extension cannot be granted, e.g. if an academic consideration is granted for the closing date of the last quiz or if the confirmation from the academic counseling unit is received after the release of the solutions of a quiz, the weight of the quiz will be transferred to other quizzes.

- **Term Tests**: If you missed a term test due to any circumstance list above, you must provide an academic consideration covering the date of the test. Makeup examinations for the term tests will be available to those who gain accommodation. A makeup test is anticipated to be provided in the week following the term test.

  In cases where a student misses to take a term test and the makeup test and can provide an academic consideration for both of these absences, the weight of that term 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., more than 2 exams in 23-hour period, 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).

  Note: missed work can only be excused through one of the mechanisms above. Being asked not to attend an in-person course requirement due to potential COVID-19 symptoms is not sufficient on its own.

7 Accommodation and Accessibility

- **Accommodation Policies**: Students with disabilities work with Accessible Education (formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The Academic Accommodation for Students with Disabilities policy can be found at:

  https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation_disabilities.pdf

- **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

  https://multiculturalcalendar.com/ecal/index.php?s=c-univwo.

8 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.

Remark: No electronic devices (or any other memory aid) will not be permitted on tests and exams.

Scholastic offences:

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.

Remote Proctoring Software may be used in this course in the event of health lock-down. Tests and examinations in this course will be conducted using a remote proctoring service. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide personal information (including some biometric data) and the session will be recorded. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at: https://remoteproctoring.uwo.ca.

9   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/.