

HURON UNIVERSITY COLLEGE
FACULTY OF ARTS AND SOCIAL SCIENCE

Mathematics 1229B-550
Methods of Matrix Algebra

January – April 2020

INSTRUCTOR:

Javad Rastegari

CLASS SCHEDULE:

Section: 550
Days & Times: Friday 8:30-11:30 am
Location: HUC-V214

INSTRUCTOR CONTACT INFORMATION: (any changes/updates will be posted in the course OWL web site)

Email: jrastega@uwo.ca
Office: HUC-Lucas Annex.

Note: Any email sent to the instructor **MUST say Math 1229B in the subject line**. Any email without this, and/or any email sent from other than a UWO email address, may be deleted unread.

INSTRUCTOR OFFICE HOURS: (any changes/updates will be posted in the course OWL web site)

Monday 3:30-5:00 p.m.

TEXTBOOK:

Custom Edition of *Elementary Linear Algebra* by S. Venit, W. Bishop and J. Brown, published by Nelson Education Ltd., ISBN: 0176559299.

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, the former 2155A/B.

COURSE OUTLINE:

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

LEARNING OBJECTIVES:

By the end of this course students will learn how to work with vectors, matrices and determinants, and apply them to solve a system of linear equations. The course starts with basic vector operations, such as dot product and cross product, as well as equations of lines and planes. Systems of linear equations will be the main theme for the rest of the course. Throughout the course, students will learn three different methods for solving systems of linear equations: Row reduction method used in Gauss-Jordan elimination; Inverse matrix method; and the Cramer's rule that is based on determinants.

COURSE WEB SITE:

Various materials, such as class notes, homework problems, practice tests, and solutions to the homework exercises, are posted on the course OWL web site. In addition, there are forums on which students may post questions. Important information will be posted on the Announcement page or forum on the web site. All students are expected to be aware of information, and make use of materials, posted on the course web site. Online quizzes on the web site will be part of the course evaluation.

WHAT IS EXPECTED OF THE STUDENT?

Students should attend all classes, make a serious effort to understand all course material, and do all the assigned homework. The student must assume responsibility for any missed classes. It is up to the student to seek out help when needed. The student is responsible for being aware of all relevant information posted on the OWL web site.

Please contact your course 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 Services for Students with Disabilities (SSD) at 661-2111 x82147 for any specific question regarding an accommodation.

EVALUATION OF STUDENT PERFORMANCE:

Students will be assessed on the basis of "Class Work", one Midterm Test, and a Final Exam. The Class Work component will be assessed by Online Quizzes. Details of the timing, will be announced in class and also posted on the OWL web site. The Midterm Test will be 2 hours in length and will be held on:

Friday February 14, 2020, 6:30 - 8:30 p.m.

Locations of the test will be announced in class and on the course web site.

The Final Exam will be 3 hours in length, covering all of the course material. This exam will be scheduled by the Registrar's Office during the April Exam Period.

Calculation of Final Grade:

The Midterm Test will count for 31%, the Final Exam will count for 49% and the Class Work component will count for 10%. The remaining 10% weight will be assigned to whichever of the 2 tests/exams is the student's best mark.

Notes:

1. The Term Tests and Exam may have some multiple choice questions and some written answer questions.
2. **NO calculators or other electronic devices or any other aids are allowed on tests and exams.**
3. See Absence / Missed Work policy on the appendix.

SUPPORT SERVICES

Office of the Registrar

UWO	http://www.registrar.uwo.ca
Brescia	http://www.brescia.uwo.ca/academics/registrar-services
Huron	http://www.huronuc.on.ca/CurrentStudents/StudentLifeandSupportServices/AcademicResources
King's	http://www.kings.uwo.ca/academics/academic-deans-office/

Student Development Services	http://www.sdc.uwo.ca/
Learning Skills Services	http://sdc.uwo.ca/learning/
USC	http://westernusc.ca/services/
Academic Calendar	http://www.westerncalendar.uwo.ca/
ITS	http://www.uwo.ca/its/helpdesk

Students who are in emotional/mental distress should refer to Mental Health @ Western via the link given below for a complete list of the options about how to obtain help: <http://www.uwo.ca/uwocom/mentalhealth/>

TENTATIVE SCHEDULE OF CLASSES

Lecture	Date	Text Sections
Lecture 1	Jan. 10	Sections 1.1, 1.2
Lecture 2	Jan. 17	Sections 1.2, 1.3
Lecture 3	Jan. 24	Sections 1.3, 2.1
Lecture 4	Jan. 31	Sections 2.2, 2.3
Lecture 5	Feb. 7	Section 2.3
Lecture 6	Feb. 14	Section 3.1, Review
Lecture 7	Feb. 28	Section 3.2
Lecture 8	Mar. 6	Section 3.3
Lecture 9	Mar. 13	Review, 4.1
Lecture 10	Mar. 20	Sections 4.1, 4.2
Lecture 11	Mar. 27	Sections 4.2, 4.3
Lecture 12	Apr. 3	Section 4.3, Review

Mathematics 1229B - Suggested Exercises – Winter 2020

Section	Page	Problems
§1.1	11	1 - 27, 37.
§1.2	20	1 - 9, 13 - 23, 34.
§1.3	29	1 - 21, 25, 27, 29.
		Extra Chapter 1 Problem Sheet. (Posted on course web site.)
§2.1	48	1 - 13, 16 - 25.
§2.2	55	1 - 15.
§2.3	69	1 - 17, 19, 21, 23 - 26, 37.
§2.2	56	19 - 24 (use Gauss-Jordan).
§3.1	96	1 - 7, 9 - 14, 17 - 27, 35 - 38.
§3.2	107	1 - 7, 9 - 19, 21, 23, 25, 30 - 33.
§3.3	116	1 - 6, 9 - 21.
§4.1	151	1 - 22, 27 - 29, 34.
§4.2	163	1 - 19, 25, 26.
§4.3	172	1, 3, 5, 7, 9, 11, 13.

Notes:

- Page numbers and text references refer to the custom-published text and are the same in the full Venit, Bishop and Brown (1st ed.) text.
- Any changes to this list will be announced on the NEWS and/or Homework forums in OWL.
- Answers to all assigned questions, and complete solutions for many, are posted on the course web site.

Appendix to Course Outlines: Academic Policies & Regulations 2019/2020

Prerequisite and Antirequisite Information

Students are responsible for ensuring that they have successfully completed all course prerequisites and that they have not completed any course antirequisites. Unless you have either the requisites for this course or written special permission from your Dean to enrol in it without them, you may be removed from this course and it will be deleted from your record. If you enrol in this course despite having already taken an antirequisite you may be removed from this course and it will be deleted from your record. Removals for these reasons 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 or for having already taken the antirequisites.

Conduct of Students in Classes, Lectures, and Seminars

Membership in the community of Huron University College and Western University implies acceptance by every student of the principle of respect for the rights, responsibilities, dignity and well-being of others and a readiness to support an environment conducive to the intellectual and personal growth of all who study, work and live within it. Upon registration, students assume the responsibilities that such registration entails. The academic and social privileges granted to each student are conditional upon the fulfillment of these responsibilities.

In the classroom, students are expected to behave in a manner that supports the learning environment of others. Students can avoid any unnecessary disruption of the class by arriving in sufficient time to be seated and ready for the start of the class, by remaining silent while the professor is speaking or another student has the floor, and by taking care of personal needs prior to the start of class. If a student is late, or knows that he/she will have to leave class early, be courteous: sit in an aisle seat and enter and leave quietly.

Please see the Code of Student Conduct at:

www.huronuc.on.ca/sites/default/files/pdfs/Code%20of%20Student%20Conduct.pdf.

Technology

It is not appropriate to use technology (such as, but not limited to, laptops, cell phones) in the classroom for non-classroom activities. Such activity is disruptive and is distracting to other students and to the instructor, and can inhibit learning. Students are expected to respect the classroom environment and to refrain from inappropriate use of technology and other electronic devices in class.

Attendance Regulations for Examinations

A student is entitled to be examined in courses in which registration is maintained, subject to the following limitations:

- 1) A student may be debarred from writing the final examination for failure to maintain satisfactory academic standing throughout the year.
- 2) 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. The Dean of the Faculty offering the course will communicate that decision to the Dean of the Faculty of registration.

Please see the policy on Attendance Regulations for Examinations here:
https://www.uwo.ca/univsec/pdf/academic_policies/exam/attendance.pdf.

Short Absences: If you miss a class due to a minor illness or other problems, check your course outline for information regarding attendance requirements and make sure you are not missing a test or assignment. Cover any readings and arrange to borrow notes from a classmate. Contact the course instructor if you have any questions.

Extended Absences: If you have an extended absence, you should contact the course instructor and an Academic Advisor. Your course instructor and Academic Advisor can discuss ways for you to catch up on missed work and arrange academic accommodations, if appropriate and warranted.

It is important to note that the Academic Dean may refuse permission to write the final examination in a course if the student has failed to maintain satisfactory academic standing throughout the year or for too frequent absence from the class or laboratory.

Class Cancellations

In the event of a cancellation of class, every effort will be made to post all relevant information on the OWL class site at: <https://owl.uwo.ca/portal>, and on the Huron website at www.huronuc.on.ca/about/accessibility .

Academic Student Support Services

For advice on course selections, degree requirements, and for assistance with requests for medical accommodation, students should email an Academic Advisor in Huron's Student Support Services at huronsss@uwo.ca. An outline of the range of services offered is found on the Huron website at: <https://huronatwestern.ca/academic-advising> .

Department Chairs, Program Directors and Coordinators are also able to answer questions about individual programs. Their contact information can be found on the Huron website at: <https://huronatwestern.ca/student-life-campus/art-social-science> and at <https://huronatwestern.ca/student-life-campus/management-and-organizational-studies> .

Adding / Dropping Courses

If you think that you are too far behind to catch up or that your work load is not manageable, you should consult your Academic Advisor. If you consider reducing your workload by dropping one or more courses, this must be done by the appropriate deadlines. Please refer to the Huron website, <https://huronatwestern.ca/academic-advising> or review the list of official Sessional Dates on the Academic Calendar, available here: <http://www.westerncalendar.uwo.ca/SessionalDates.cfm>.

You should consult with the course instructor and the Academic Advisor who can help you consider alternatives to dropping one or more courses. Note that dropping a course may affect OSAP and/or Scholarship/Bursary eligibility.

Statement on Academic Integrity

The International Centre for Academic Integrity defines academic integrity as "a commitment, even in the face of adversity, to five fundamental values: honesty, trust, fairness, respect, and responsibility. From these values flow principles of behaviour that enable academic communities to translate ideals to action." (CAI Fundamental Values Project, 1999).

A lack of academic integrity is indicated by such behaviours as the following:

- Cheating on tests;
- Fraudulent submissions online;
- Plagiarism in papers submitted (including failure to cite and piecing together unattributed sources);
- Unauthorized resubmission of course work to a different course;
- Helping someone else cheat;
- Unauthorized collaboration;
- Fabrication of results or sources;
- Purchasing work and representing it as one's own.

Academic Integrity: Importance and Impact

Being at university means engaging with a variety of communities in the pursuit and sharing of knowledge and understanding in ways that are clear, respectful, efficient, and productive. University communities have established norms of academic integrity to ensure responsible, honest, and ethical behavior in the academic work of the university, which is best done when sources of ideas are properly and fully acknowledged and when responsibility for ideas is fully and accurately represented.

In the academic sphere, unacknowledged use of another's work or ideas is not only an offence against the community of scholars and an obstacle to academic productivity. It may also be understood as fraud and may constitute an infringement of legal copyright.

A university is a place for fulfilling one's potential and challenging oneself, and this means rising to challenges rather than finding ways around them. The achievements in an individual's university studies can only be fairly evaluated quantitatively through true and honest representation of the actual learning done by the student. Equity in assessment for all students is ensured through fair representation of the efforts by each.

Acting with integrity at university constitutes a good set of practices for maintaining integrity in later life. Offences against academic integrity are therefore taken very seriously as part of the university's work in preparing students to serve, lead, and innovate in the world at large.

A university degree is a significant investment of an individual's, and the public's, time, energies, and resources in the future, and habits of academic integrity protect that investment by preserving the university's reputation and ensuring public confidence in higher education.

Students found guilty of plagiarism will suffer consequences ranging from a grade reduction to failure in the course to expulsion from the university. In addition, a formal letter documenting the offence will be filed in the Dean's Office, and this record of the offence will be retained in the Dean's Office for the duration of the student's academic career at Huron University College.

Statement on Academic Offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, as per the Academic Calendar:

http://www.westerncalendar.uwo.ca/PolicyPages.cfm?PolicyCategoryID=1&Command=showCategory&SelectedCalendar=Live&ArchiveID=#SubHeading_189 .

Turnitin.com

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for a 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. Use of the service is subject to the licensing agreement, currently between Western University and Turnitin.com.

Computer-Marked Tests/exams

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.

Clickers

Personal Response Systems (“clickers”) may be used in some classes. If clickers are to be used in a class, it is the responsibility of the student to ensure that the device is activated and functional. Students must see their instructor if they have any concerns about whether the clicker is malfunctioning. Students must use only their own clicker. If clicker records are used to compute a portion of the course grade:

- the use of somebody else’s clicker in class constitutes a scholastic offence
- the possession of a clicker belonging to another student will be interpreted as an attempt to commit a scholastic offence.

Policy on “Special” Accommodation

Students who require **special** accommodation for tests and/or other course components must make the appropriate arrangements with the Student Development Centre (SDC). Further details concerning policies and procedures may be found at: <http://www.sdc.uwo.ca/ssd/index.html> .

Academic Consideration for Missed Work

Students who are seeking academic consideration for missed work during the semester may submit a self-reported absence form online provided that the absence is 48 hours or less and the other conditions specified in the Senate policy at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf are met.

Students whose absences are expected to last longer than 48 hours, or where the other conditions detailed in the policy are not met (e.g., work is worth more than 30% of the final grade, the student has already used 2 self-reported absences, the absence is during the final exam period), may receive academic consideration by submitting a Student Medical Certificate (for illness) or other appropriate documentation (for compassionate grounds). The Student Medical Certificate is available online at

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

All students pursuing academic consideration, regardless of type, must contact their instructors no less than 24 hours following the end of the period of absence to clarify how they will be expected to fulfill the academic responsibilities missed during their absence. **Students are reminded that they should consider carefully the implications of postponing tests or midterm exams or delaying submission of work, and are encouraged to make appropriate decisions based on their specific circumstances.**

Students who have conditions for which academic accommodation is appropriate, such as disabilities or ongoing or chronic health conditions, should work with Accessible Education Services to determine appropriate forms of accommodation.

Requests for Academic Consideration Using the Self-Reported Absence Form

Students who experience an unexpected illness or injury or an extenuating circumstance (48 hours or less) that is sufficiently severe to temporarily render them unable to meet academic requirements (e.g., attending lectures or labs, writing tests or midterm exams, completing and submitting assignments, participating in presentations) should self-declare using the online Self-Reported Absence portal. This option should be used in situations where the student expects to resume academic responsibilities within 48 hours or less.

The following conditions are in place for self-reporting of medical or extenuating circumstances:

- a. students will be allowed **a maximum of two self-reported absences** between September and April and one self-reported absence between May and August;
- b. any absences in excess of the number designated in clause a above, regardless of duration, will require students to present a **Student Medical Certificate (SMC)**, signed by a licensed medical or mental health practitioner, detailing the duration and severity of illness, or appropriate documentation supporting extenuating circumstances to the Academic Counselling unit in their Faculty of registration no later than two business days after the date specified for resuming responsibilities. Please see section 4 below for more details.
- c. The duration of the excused absence will be for a maximum of 48 hours from the time the Self-Reported Absence form is completed through the online portal, or from 8:30 am the following morning if the form is submitted after 4:30 pm;
- d. The duration of the excused absence will terminate prior to the end of the 48 hour period should the student undertake significant academic responsibilities (write a test, submit a paper) during that time;
- e. The duration of an excused absence will terminate at 8:30 am on the day following the last day of classes each semester regardless of how many days of absence have elapsed;
- f. Self-reported absences will not be allowed for scheduled final examinations; for midterm examinations scheduled during the December examination period; or for final lab examinations scheduled during the final week of term;
- g. Self-reporting **may not be used** for assessments (e.g. midterm exams, tests, reports, presentations, or essays) worth more than 30% of any given course.
- h. students must be in touch with their instructors **no later than 24 hours after the end of the period covered by the Self-Reported Absence form**, to clarify how they will be expected to fulfil the academic expectations they may have missed during the absence.

Policy on “Academic” Accommodation - Medical / Non-Medical Grounds (if absence is not self-reported)

- (a) **Medical Grounds for assignments worth 10% or more of final grade: Go directly to Huron Support Services/ Academic Advising, or email huronsss@uwo.ca .**

University Senate policy, which can be found at, https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf, requires that all student requests for accommodation on medical grounds for assignments worth 10% or more of the final grade be made directly to the academic advising office of the home faculty (for Huron students, the “home faculty” is Huron), with supporting documentation in the form (minimally) of the Senate-approved Student Medical Certificate found at: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

The documentation is submitted in confidence and will not be shown to instructors. The advisors will contact the instructor when the medical documentation is received, and will outline the severity and duration of the medical challenge as expressed on the Student Medical Certificate and in any other supporting documentation. The student will be informed that the instructor has been notified of the presence of medical documentation, and will be instructed to work as quickly as possible with the instructor on an agreement for accommodation.

The instructor will not normally deny accommodation where appropriate medical documentation is in place and where the duration it describes aligns with the due date(s) of assignment(s). Before denying a request for accommodation on medical grounds, the instructor will consult with the Dean. The instructor’s decision is appealable to the Dean.

**(b) Accommodation on Medical Grounds for assignments worth *less than 10% of final grade:*
Consult Instructor Directly**

When seeking accommodation on medical grounds for assignments worth less than 10% of the final course grade, the student should contact the instructor directly. The student need only share broad outlines of the medical situation. The instructor **may** require the student to submit documentation to the academic advisors, in which case she or he will advise the student and inform the academic advisors to expect documentation. The instructor may not collect medical documentation. The advisors will contact the instructor when the medical documentation is received, and will outline the severity and duration of the medical challenge as expressed on the Student Medical Certificate and in any other supporting documentation. The student will be informed that the instructor has been notified of the presence of medical documentation, and will be instructed to work as quickly as possible with the instructor on an agreement for accommodation.

The instructor will not normally deny accommodation where appropriate medical documentation is in place and where the duration it describes aligns with the due date(s) of assignment(s). Before denying a request for accommodation on medical grounds, the instructor will consult with the Dean. The instructor’s decision is appealable to the Dean.

(c) Non-Medical Grounds: Consult your Instructor directly.

Where the grounds for seeking accommodation are not medical, the student should contact the instructor directly. Late penalties may apply at the discretion of the instructor. Apart from the exception noted below, academic advisors will not be involved in the process of accommodation for non-medical reasons.

Where a student seeks accommodation on non-medical grounds where confidentiality is a concern, the student should approach an academic advisor with any documentation available. The advisors will contact the instructor after the student’s request is received, and will outline the severity and duration of the challenge without breaching confidence. The student will be informed that the instructor has been notified that significant circumstances are affecting or have affected the student’s ability to complete work, and the student will be instructed to work as quickly as possible with the instructor on an agreement for accommodation. Before denying a request for accommodation where documentation has been submitted to an academic advisor, the instructor will consult with the Dean. The instructor’s decision is appealable to the Dean.

Mental Health & Wellness Support at Huron and at Western

Students who are stressed, emotionally distressed or in mental health crisis, please refer to:

<https://huronatwestern.ca/student-life-campus/student-services/wellness-safety> for a complete list of options about how to obtain help, or email Huronwellness@huron.uwo.ca to access your wellness staff directly.

Additional supports for Health and Wellness may be found and accessed at Western through, www.uwo.ca/uwocom/mentalhealth/.

The Student Emergency Response Team (SERT) provides medical response to 9-1-1 calls on Main, Brescia and Huron campuses which operates 24 hours a day, 7 days a week during the academic year. SERT is dispatched through the campus community Police Service (CCPS) to any medical emergency on campus at (519) 661-3300. For more information about SERT please visit: sert.uwo.ca/about-sert/about-sert/.

Important Dates and Directory at Huron and Western

For a current and up-to-date list of important dates and campus directories, please visit:

- **Huron – Important Dates:** <https://huronuc.ca/important-dates-and-deadlines>
- **Western – Academic Calendar & Sessional Dates:** <http://www.westerncalendar.uwo.ca/SessionalDates.cfm>
- **Huron Directory – Faculty, Staff and Administration:** <https://huronuc.ca/index.php/contact/contact-directory>
- **Western Directory – Faculty, Staff and Administration:** <https://www.uwo.ca/directory.html>