

THE UNIVERSITY OF WESTERN ONTARIO
DEPARTMENT OF MATHEMATICS

Mathematics 1229A
Methods of Matrix Algebra

September - December 2017

INSTRUCTORS:

550 (Huron) - Javad Rastegari
551 (Huron) - Mohsen Mollahajiaghaei
(Course Coordinator: Vicki Olds)

CLASS SCHEDULE:

Section	Instructor	Days & Times	Location
550	J. Rastegari	MWF 8:30	HUC - W 12
551	M. Mollahajiaghaei	MWF 11:30	HUC - V 214

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

J. Rastegari (550): jrastega@uwo.ca, HUC-A2d
M. Mollahajiaghaei (551): mmollaha@uwo.ca, HUC-A2d
V. Olds (Course Coordinator): volds@uwo.ca, MC 103G, X86520

Note: Any email sent to an instructor (and especially to the course coordinator) **MUST say Math 1229A 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:

J. Rastegari (550): HUC-A2d; Monday & Wednesday 9:30-10:30
M. Mollahajiaghaei (551): HUC-A2d; Tuesday 11:00-12:00; Friday 10:00-11:00

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}^n ; 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 Gaussian elimination and Gauss-Jordan elimination; Inverse matrix method; and the Cramer's rule that is based on determinants.

COURSE WEB SITE:

Various supplemental materials, such as required extra 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 NEWS forum and/or on the class page on the web site. All students are expected to be aware of information, and make use of materials, posted on the course web site. As well, some class sections use the online quizzes on the web site as the class work component of the grade.

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", 2 Term Tests, and a Final Exam. The means of assessing the Class Work component will be determined by the instructor of each section, and may be for participation, quizzes, assignments, etc. For each class, information about how the Class Work component will be assessed, and details of the timing, will be announced in class and also posted on the appropriate "class page" on the OWL web site. (*Some sections will use Online Quizzes in OWL.*)

The 2 Term Tests, each 90 minutes in length, will be held on:

Friday October 20 2017, 7:00 - 8:30 p.m. and Friday November 17 2017, 7:00 - 8:30 p.m.

Locations of these tests will be announced in class and/or 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 December Exam Period.

Calculation of Final Grade:

Each Term Test will count for 20%, the Final Exam will count for 40% and the Class Work component will count for 10%. The remaining 10% weight will be assigned to whichever of the 3 tests/exams is the student's best mark.

Notes:

1. The Term Tests and Exam will all 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 next page.

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.

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, at the following Web site:

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

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.

ABSENCE / MISSED WORK:

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation *to your Dean's Office as soon as possible* and contact *your instructor immediately*. It is the student's responsibility to make alternative arrangements with his or her instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Dean's Office immediately. For further information concerning UWO's Policy on Accommodation for Medical Illness please refer to this policy at: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf

A student requiring academic accommodation due to illness should use the Student Medical Certificate when visiting an off-campus medical facility or request a Record's Release Form (located in the Dean's Office) for visits to Student Health Services. The form can be found here: https://studentservices.uwo.ca/secure/medical_document.pdf

A makeup will be held for each term test as well as for the final exam. Only students with prior permission from their instructor will be allowed to write the makeup for a test. Only students with a Recommendation for Special Exam from their Dean's Office will be allowed to write a makeup for the Final Exam. Any student who misses a portion of the Class Work component of the grade for any legitimate reason should contact your instructor as soon as possible. Supporting documentation may be required. In the case of missed Class Work, or if a student is unable to write the scheduled makeup for a Term Test due to a documented prolonged or recurring absence or other legitimate conflict, your instructor will decide whether to accommodate by rescheduling or by reweighting that component of the grade.

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

Week	Dates	Text Sections
Week 1	Sept. 7 – 13	Section 1.1 (3 hrs.)
Week 2	Sept. 14 – 20	Sections 1.2 (2 hrs.), 1.3 (1 hr.)
Week 3	Sept. 21 – 27	Section 1.3 (2 hrs.), Extra Ch. 1
Week 4	Sept. 28 - Oct. 4	Sections 2.1 (1 hr.), 2.2 (2 hrs.)
Week 5	Oct. 5 – 18	Section 2.3 (3 hrs.)
Week 6	Oct. 19 – 25	Review, Section 3.1 (2 hrs.)
Week 7	Oct. 26 - Nov. 1	Sections 3.1 (2 hrs.), 3.2 (1 hr.)
Week 8	Nov. 2 – 8	Sections 3.2 (1 hr.), 3.3 (2 hrs.)
Week 9	Nov. 9 – 15	Sections 3.3 (1 hr.), 4.1 (2 hrs.)
Week 10	Nov. 16 – 22	Review, Sections 4.1 (1 hr.), 4.2 (1 hr.)
Week 11	Nov. 23 – 29	Sections 4.2 (2 hr.), 4.3 (1 hrs)
Week 12	Nov. 30 - Dec. 6	Section 4.3 (2 hrs.), Review
Week 13	Dec. 7 – 8	Review

Mathematics 1229A - Suggested Exercises - Fall 2017

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

Prerequisite Information

Students are responsible for ensuring that they have successfully completed all course prerequisites. Unless you have either the requisites for this course or written special permission from your Provost and 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.

Conduct of Students in Classes, Lectures, and Seminars

Membership in the community of Huron University College and the University of Western Ontario 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 Rights and Responsibilities* at:

<http://www.huronuc.ca/CurrentStudents/StudentLifeandSupportServices/StudentDiscipline>

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.

Academic Accommodation for Medical/Non-Medical Grounds

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/?requesting_acc

(a) Medical Grounds for assignments worth 10% or more of final grade: Go Directly to Academic Advising

University Senate policy, which can be found at

http://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:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform_15JUN.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 Provost and Dean. The instructor's decision is appealable to the Provost and 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 Provost and Dean. The instructor's decision is appealable to the Provost and Dean.

(c) Non-medical Grounds: Consult 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 Provost and Dean. The instructor's decision is appealable to the Provost and Dean.

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, at the following Web site:

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

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 Provost and Dean's Office, and this record of the offence will be retained in the Provost and Dean's Office for the duration of the student's academic career at Huron University College.

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. Use of the service is

subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com.

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.

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 Needs

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/?requesting_acc

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 Provost and 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 Provost and Dean of that Faculty, the student will be debarred from taking the regular examination in the course. The Provost and Dean of the Faculty offering the course will communicate that decision to the Provost and Dean of the Faculty of registration.

Class Cancellations

In the event of a cancellation of class, every effort will be made to post that information on the Huron website, <http://www.huronuc.ca/AccessibilityInfo> (“Class Cancellations”).

Mental Health @ Western

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

Academic Advising

For advice on course selections, degree requirements, and for assistance with requests for medical accommodation [see above], students should contact an Academic Advisor in Huron’s Student Support Services (huronsss@uwo.ca). An outline of the range of services offered is found on the Huron website at: <http://www.huronuc.ca/CurrentStudents/AcademicAdvisorsandServices>

Department Chairs and Program Directors and Coordinators are also able to answer questions about their individual programs. Their contact information can be found on the Huron website at:

<http://www.huronuc.ca/Academics/FacultyofArtsandSocialScience>