

## AM9564b Course Outline --- January-April 2026

### 1. Course Information

#### Course Information

AM 9564b Computational Linear Algebra

Prerequisites: Courses in undergraduate linear algebra

Note: Material on numerical analysis, computer algebra, Matlab, Maple not assumed.

Unless you have either the prerequisites for this course or written special permission from the Department of Mathematics to enroll in it, you may be removed and withdrawn from this course in accordance with university policy. This may be done after the add/drop deadline of the academic term, and the course will be marked as withdrawn (WDN) on your academic record. This decision may not be appealed.

### 2. Instructor Information

Instructors	Email	Office	Phone	Office Hours
David Jeffrey	djeffrey@uwo.ca			TBA

Students must use their Western (@uwo.ca) email addresses when contacting the instructor by email. For office hours, two hours per week will be determined after discussing with the class to maximize the accessibility. Extra meeting times other than the office hours can be scheduled by appointment.

### 3. Course Syllabus, Schedule, Delivery Mode

Course topics: This course is divided into two parts. In part 1, basic numerical analysis is surveyed. It is understood that many undergraduate programs in mathematics do not require numerical analysis. Material required for part 1 will not replace a course on numerical analysis, but will focus on essentials for linear algebra. Computational methods taught in undergraduate programs do not scale up to real-world problems. We shall revisit the 3 fundamental topics of linear system solving, orthogonalization and eigenvalue computation in a numerical context.

In part 2, exact computation with integer or polynomial matrices will be considered. Matrix factorization, leading to constructions such as fraction-free LU, Hermite normal form (HNF) and Smith normal form (SNF) will be defined and studied.

Learning outcomes: Students will be able to use (not program) scientific software while being aware of its strengths and limitations. Students will understand the basics of numerical approximation in a linear-

algebra context. Students will understand the specialized concepts that are used in the context of exact computations, both in the sense of integer arithmetic and polynomial arithmetic.

Classes and exams will all be in-person. In addition, computer laboratory sessions will be arranged so that rudimentary use of Matlab and Maple are enabled. Alternative scientific software, such as Python, Julia, Mathematica, can be substituted for Matlab and Maple.

### **Relevant Key Sessional Dates**

Classes begin: 5 January 2026

Spring Reading Week: 14 – 9 February 2026

Classes end: 9 April 2026

Exam period: 12-30 April 2026

## **4. Course Materials**

**Textbook:** Owing to the course being a combination of usually different topics, no single text covers the material.

(A) L.N. Trefethen & D. Bau, Numerical linear algebra. Siam publishing 1997. \$71.00. Siam members get a discount, so consult with me before buying.

(B) Morris Newman, Integral matrices. Academic press, 1972. Available from the library.

(C) R.M. Corless & N. Fillion, Graduate introduction to numerical methods. Springer 2013. PDF free from library.

(D) Additional material, such as lecture notes and papers from the literature will be posted.

Students are responsible for checking the course OWL site (<https://westernu.brightspace.com/>) regularly for announcements and updates. This is the primary method by which information will be disseminated to all students in the class.

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

## **5. Methods of Evaluation**

### **Grading Scheme and Assessment Dates**

The overall course grade will be calculated as listed below:

Midterm Test 1      25%

Midterm Test 2      25%

Presentation      10%

Final Exam      40%

The presentation will be a brief exposition of a topic in the course.

## General information about missed coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs*, posted on the Academic Calendar: [https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/academic\\_consideration\\_Sep24.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf),

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult [Accessible Education](#).

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage:

[https://registrar.uwo.ca/academics/academic\\_considerations/](https://registrar.uwo.ca/academics/academic_considerations/)

All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation:

- Final Examinations scheduled during official examination periods (Defined by policy)
- Midterm Test (Designated by the instructor as the one assessment that always requires documentation when requesting Academic Consideration)

When a student mistakenly submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those in the **Coursework with Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

## Evaluation Scheme for Missed Assessments

If a student misses a **midterm**, they need to follow the procedure stated above to request for Academic Consideration. If their request is approved, they can either write a make-up within 48 hours, or allocate the 27% weight of the missed midterm to the other midterm and the final exam which will be cumulative, in the following proportions: 9% to the other midterm and 18% to the final.

When a student misses the Final Exam and their Academic Considerations been granted, they will be allowed to write the Special Examination (the name given by the University to a makeup Final Exam). See the Academic Calendar for details (under [Special Examinations](#)), especially for those who miss multiple final exams within one examination period.

## 6. Additional Statements

### 6.1 Religious Accommodation

When conflicts arise with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing to the course instructor and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible, but not later than two weeks prior to the writing of the examination (or one week prior to the writing of the test).

Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays - <https://www.edi.uwo.ca>

## **6.2 Academic 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](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf).

## **6.3 General Academic Policies**

The website for Registrar Services is <https://www.registrar.uwo.ca/>.

**Use of @uwo.ca email:** In accordance with policy,

[https://www.uwo.ca/univsec/pdf/policies\\_procedures/section1/mapp113.pdf](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 email address. It is the responsibility of the account holder to ensure that emails received from the University at their official university address are attended to in a timely manner.

**Requests for Relief** (formally known as "appeals")

Policy on Request for Relief from Academic Decision:

[https://uwo.ca/univsec//pdf/academic\\_policies/appeals/requests\\_for\\_relief\\_from\\_academic\\_decisions.pdf](https://uwo.ca/univsec//pdf/academic_policies/appeals/requests_for_relief_from_academic_decisions.pdf)

Procedures on Request for Relief from Academic Decision (Undergraduate):

[https://uwo.ca/univsec//pdf/academic\\_policies/appeals/undergrad\\_requests\\_for\\_relief\\_procedure.pdf](https://uwo.ca/univsec//pdf/academic_policies/appeals/undergrad_requests_for_relief_procedure.pdf)

Procedures on Request for Relief from Academic Decision (Graduate):

[https://uwo.ca/univsec//pdf/academic\\_policies/appeals/graduate\\_requests\\_for\\_relief\\_procedure.pdf](https://uwo.ca/univsec//pdf/academic_policies/appeals/graduate_requests_for_relief_procedure.pdf)

## **6.4 Scholastic Offences**

Policy on Scholastic Offences:

[https://uwo.ca/univsec//pdf/academic\\_policies/appeals/scholastic\\_offences.pdf](https://uwo.ca/univsec//pdf/academic_policies/appeals/scholastic_offences.pdf)

Procedures on Scholastic Offences:

[https://uwo.ca/univsec//pdf/academic\\_policies/appeals/undergrad\\_scholastic\\_offence\\_procedure.pdf](https://uwo.ca/univsec//pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf)

## **Use of Electronic Devices During Assessments**

In courses offered by the Faculty of Science, the possession of unauthorized electronic devices during any in-person assessment (such as tests, midterms, and final examinations) is strictly prohibited. This includes, but is not limited to: mobile phones, smart watches, smart glasses, and wireless earbuds or headphones.

Unless explicitly stated otherwise in advance by the instructor, *the presence of any such device at your desk, on your purse/pocket, or within reach during an assessment will be treated as a scholastic offence, even if the device is not in use.*

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is your responsibility to review and comply with these expectations.

## Use of Generative AI Tools

Unless otherwise stated, the use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, or similar platforms) is **not permitted** in the completion of any course assessments, including but not limited to: assignments, lab reports, presentations, tests, and final examinations.

Using such tools for content generation, code writing, problem solving, translation, or summarization, will be treated as a **scholastic offence**.

## 6.5 Support Services

Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, requests for relief, 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](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](mailto: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. If you have any questions regarding accommodations, you may also wish to contact Accessible Education at

[http://academicsupport.uwo.ca/accessible\\_education/index.html](http://academicsupport.uwo.ca/accessible_education/index.html)

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