Applied Mathematics

2811B Linear Algebra II

Course outline for Winter 2021

Although this academic year might be different, Western University is committed to a **thriving campus**. We encourage you to check out the Digital Student Experience website to manage your academics and well-being. Additionally, the following link provides available resources to support students on and off campus: https://www.uwo.ca/health/.

1. Technical Requirements:

Stable internet connection

Laptop or computer

Working microphone

Working webcam

2. Course Overview and Important Dates

Delivery Mode

Lectures: asynchronous

Tutorials: synchronous

*Details about design and delivery of the course are listed below in Section 4

Classes Start	Reading Week	Classes End	Study day	Exam Period
January 11	February 13 - 21	April 12	April 13	April 14 - 30

*March 7, 2021: Last day to drop a second-term half course or a second-term full course without penalty

3. Contact Information

Instructor
Francesca Vidotto *(she/her)*

fvidotto@uwo.ca
https://westernuniversity.zoom.us/my/fvidotto

Teaching Assistant
Indrani Das *(she/her)*

idas2@uwo.ca

4. Course Description and Design

Content: Abstract vector spaces, Diagonalization, Best Approximation and Least Squares, Linear Transformations and their matrices, Orthogonality, QR Factorization, Singular Value Decomposition, Complex Matrices, Change of Basis, Inner Products, Norms, Gram-Schmidt process.

These topics are covered in the Chapters 5-10 of the book "Linear Algebra with Applications" by W. Keith Nicholson, see Sections 6 and 11.

Prerequisites: Applied Mathematics 1413 or Calculus 1301A/B or Calculus 1501A/B and a minimum mark of 60% in Mathematics 1600A/B or the former Linear Algebra 1600A/B, or Applied Mathematics 1411A/B.

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will 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.

Mode	Dates	Time	Frequency
Virtual asynchronous lectures	M		weekly
Virtual synchronous tutorials	W	**1 hour**	weekly
Periodic online diagnostics	T		weekly

- Asynchronous lectures are recorded and uploaded in OWL
- Closed captioning will be provided on video recordings
- Attendance at synchronous tutorial is strongly recommended
- Synchronous sessions will not be recorded
- Attendance of online diagnostic is mandatory
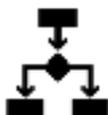
All course material will be posted to OWL: http://owl.uwo.ca.
Any changes will be indicated on the OWL site.

If students need assistance, 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.

Google Chrome or Mozilla Firefox are the preferred browsers to optimally use OWL; upyou're your browsers frequently. Students interested in evaluating their internet speed, please click here.

5. Learning Outcomes

Upon successful completion of this course, students will be able to:
- understand the structure and the properties of an abstract vector space
- view $\mathbb{R}^n$ as an abstract vector space, and identify its key properties
- understand the concepts of span, independence and dimension
- define linear transformations between two vector spaces, and determine to what extent two vector spaces are mathematically "the same"
- use different tools to solve linear problems

6. Course Content and Tentative Timeline

Week	Dates	Topic
1	Jan 11 – 17	Chapter 5: Vector Spaces in $\mathbb{R}^n$
2	Jan 18 – 12	
3	Jan 25 – 31	
4	Feb 1 – 7	Chapter 6: Vector Spaces and Applications
5	Feb 8 – 14	
6	Reading Week	
7	Feb 22 – 28	Chapter 7: Linear Transformations
8	Mar 1 – 7	Chapter 8: Orthogonality
9	Mar 8 – 14	
10	Mar 15 – 21	
11	Mar 22 – 28	Chapter 9: Change of Basis
12	Mar 29 – Apr 4	Chapter 10: Inner Product Spaces
13	Apr 5 – 11	
14	Apr 12	

7. Online Participation and Engagement

- Students are expected to engage with content as much as possible
- Lectures are delivered asynchronously, tutorials/tests are in 'live' sessions
- Students are strongly encouraged to attend the synchronous sessions and take part in the proposed activities
- Students can also participate by interacting in the forums with their peers and instructors

8. Evaluation

Below is the tentative evaluation breakdown for the course. Any deviations will be communicated.

Assessment	Format	Weighting	Due Date
Quizzes	Online Multiple Choice & Long Answer	best 8 out of 10 40%	Weekly
Midterm Examination	Online Multiple Choice & Long Answer	20%	TBA
Final Examination	Online Multiple Choice & Long Answer	40%	TBA

All evaluations will be done using OWL, complemented by WebWorks or Lyryx interfaces. Each student will receive a unique quiz or exam. We will not be using Proctor Track
Dates for evaluations are posted in the Course Calendar on OWL.

- All assignments are due at 11:55 pm EST unless otherwise specified

- For multiple-choice tests and/or exams: Use may be made of software to check for unusual coincidences in answer patterns that may indicate cheating

- Rubrics will be used to evaluate assessments and will be posted with the instructions

- After an assessment is returned, students should wait 24 hours to digest feedback before contacting their evaluator; to ensure a timely response, reach out within 7 days

Click here for a detailed and comprehensive set of policies and regulations concerning examinations and grading. The table below outlines the University-wide grade descriptors.

A+	90-100	One could scarcely expect better from a student at this level
A	80-89	Superior work which is clearly above average
B	70-79	Good work, meeting all requirements, and eminently satisfactory
C	60-69	Competent work, meeting requirements
D	50-59	Fair work, minimally acceptable
F	below 50	Fail

Information about late or missed evaluations:

Requests for academic accommodation for examination must be made through the Academic Counsellors housed in the Dean's Office of the student's Faculty. The Academic Counsellors for students in the Faculty of Science can be found in NCB 280 (Tel. 519 661 3040, Email scibmasac@uwo.ca).

Missing a quiz will result a grade of zero for that quiz, except when permission is granted from Student Services. If permission is granted, a prorated mark will be assigned. There will be no make up for quizzes.

9. Communication:

- Students should check the OWL site every 24 – 48 hours
- A weekly update will be provided on the OWL announcements

- Emails are monitored daily; students can expect a response in 24 - 48 hours
- Always use your account @uwo for communication. Emails outside @uwo domain are likely to be filtered as Spam. Please use "2811" in the subject of your messages. Students can also email their instructor and teaching assistant using OWL messages.

- This course will use the OWL forum for discussions
- Students should post all course-related content on the discussion forum so that everyone can access answers to questions
- The discussion forums will be monitored by instructors or teaching assistants

10. Office Hours:

Office hours will be held remotely using Zoom on Mondays 9:00-11:00am

Students must sign up in advance for an appointment using Sign Up on OWL

11. Resources

All resources will be posted in OWL

Textbook: the course covers the Chapters 5-10 of the book

Linear Algebra with Applications by W. Keith Nicholson
(Open Access Text, Version 2019 Revision A)
Full Text available at: Nicholson-OpenLAWA-2019A.pdf

12. Professionalism & Privacy:

Western students are expected to follow the Student Code of Conduct. Additionally, the following expectations and professional conduct apply to this course:

- Students are expected to follow online etiquette expectations provided on OWL
- All course materials created by the instructor(s) are copyrighted and cannot be sold/ shared
- Recordings are not permitted (audio or video) without explicit permission
- Permitted recordings are not to be distributed
- Students will be expected to take an academic integrity pledge before some assessments
- All recorded sessions will remain within the course site or unlisted if streamed

13. How to Be Successful in this Class:

Students enrolled in this class should understand the level of autonomy and self-discipline required to be successful.

1. Invest in a planner or application to keep track of your courses. Populate all your deadlines at the start of the term and schedule time at the start of each week to get organized and manage your time.
2. Make it a daily habit to log onto OWL to ensure you have seen everything posted to help you succeed in this class.
3. Follow weekly checklists created on OWL or create your own to help you stay on track.
4. Take notes as you go through the lesson material. Treat this course as you would a face-to-face course. Keeping handwritten notes or even notes on a regular Word document will help you learn more effectively than just reading or watching the videos.
5. Connect with others. Try forming an online study group and try meeting on a weekly basis for study and peer support.
6. **Do not be afraid to ask questions. If you are struggling with a topic, check the online discussion boards or contact your instructor(s) and or teaching assistant(s).**
7. Reward yourself for successes. It seems easier to motivate ourselves knowing that there is something waiting for us at the end of the task.

14. Western Academic Policies and Statements

Absence from Course Commitments

Policy on Academic Consideration for Student Absences

In the interest of the health and safety of students and health care providers, you are no longer required to seek a medical note for absences this term. If you are unable to meet a course requirement due to illness you should use the Illness Reporting Tool. This tool takes the place of the need to submit a medical note and the Self-Reported Absence System formally used by undergraduate students.

You are required to self-report every day that you are ill and unable to complete course commitments. Details about when you should submit missed work, the format of the missed work can be found in the Section 7. Evaluation above. Students should communicate promptly with their instructor and use this tool with integrity.

Accommodation for Religious Holidays

The policy on Accommodation for Religious Holidays can be viewed here.

Special Examinations

A Special Examination is any examination other than the regular examination, and it may be offered only with the permission of the Dean of the Faculty in which the student is registered, in consultation with the instructor and Department Chair. Permission to write a Special Examination may be given on the basis of compassionate or medical grounds with appropriate supporting documents. To provide an opportunity for students to recover from the circumstances resulting in a Special Examination, the University has implemented Special Examinations dates. These dates as well as other important information about examinations and academic standing can be found here.

Academic Offenses

"Scholastic offences are taken seriously, and students are directed here to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence.

Accessibility Statement

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Accessible Education (AE) at 661-2111 x 82147 for any specific question regarding an accommodation or review The policy on Accommodation for Students with Disabilities.

Correspondence Statement

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 his/her official university address is attended to in a timely manner. You can read about the privacy and security of the UWO email accounts here.

Turnitin and other similarity review software

All assignments will be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. Students will be able to view their results before the final submission. 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.

15. BMSUE Academic Policies and Statements

Copyright and Audio/Video Recording Statement

Course material produced by faculty is copyrighted and to reproduce this material for any purposes other than your own educational use contravenes Canadian Copyright Laws. You must always ask permission to record another individual and you should never share or distribute recordings. In particular, participants in this course are not permitted to record the synchronous sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.

Rounding of Marks Statement

Across the Basic Medical Sciences Undergraduate Education programs, we strive to maintain high standards that reflect the effort that both students and faculty put into the teaching and learning experience during this course. All students will be treated equally and evaluated based only on their actual achievement. **Final grades** on this course, irrespective of the number of decimal places used in marking individual assignments and tests, will be calculated to one decimal place and rounded to the nearest integer, e.g., 74.4 becomes 74, and 74.5 becomes 75. Marks WILL NOT be bumped to the next grade or GPA, e.g. a 79 will NOT be bumped up to an 80, an 84 WILL NOT be bumped up to an 85, etc. The mark attained is the mark you achieved, and the mark assigned; requests for mark "bumping" will be denied.

16. Support Services

The following links provide information about support services at Western University.
Academic Counselling (Science and Basic Medical Sciences)
Appeal Procedures
Registrarial Services
Student Development Services
Student Health Services