Course ID:	Course Title:	Fall 2021	
MA 111	Linear Algebra	Prerequisite: Math 30	
		Credits:	3

	Class Information		Instructor Information		Important Dates	
Delivery:	In-Class	**Instructor:**	John Wiest, M.Sc., B.Sc, B.Mus.	**First Day of Classes:**	September 8, 2021
Days:	Tue/Thu	**Email:**	jwiest@ambrose.edu	**Last Day to Add/Drop:**	September 19, 2021
Time:	8:15AM – 9:30AM	**Phone:**	(403) 410-6915	**Last Day to Withdraw:**	November 22, 2021
Room:	A1085-2	**Office:**	L2115	**Last Day to Apply for Extension:**	November 23, 2021
Lab/ Tutorial:	Mon: 9:00AM – 10:15AM, A1085-1	**Office Hours:**	Tuesdays, 10AM – Noon, or pop by	**Last Day of Classes:**	December 13, 2021
Final Exam:	Thu, Dec. 16, 2021, 9AM – 12 PM, A1085 – 2				

Important Dates and Information

For a list of all important dates and information regarding participating in classes at Ambrose University, please refer to the Academic Calendar at https://ambrose.edu/academic-calendar .

Sept. 20: **Quiz1**
Oct. 4: **Quiz 2**
Oct. 18: **Quiz 3**
Oct 28: **Midterm Exam**
Nov. 22: **Quiz 4**
Dec. 6: **Quiz 5**

Course Description

This course teaches linear equations, matrices, and vectors with elements and applications to coordinate geometry.

Expected Learning Outcomes

It is the aim of the course that students should

1. Understand and be able to utilize the Gaussian algorithm to solve many different problems relating to systems of linear equations.

2. Develop fluidity in matrix algebra and understand its relation to Markov Chains, linear recursions, and other mathematical models.
3. Be able to compute eigenvalues, eigenvectors, and diagonalized forms of matrices.
4. Be able to apply matrix operations to linear recurrences
5. Be able to apply the concepts of linear algebra to the R^3 vector space.

Textbooks

Linear Algebra With Applications (Open Ed.)
Base Textbook(Version 2019 – Revision A)
Volume 1: Ch 1-5 & Appendices
W. Keith Nicholson

This textbook is an open educational resource and is available for purchase at https://www.amazon.ca/Linear-Algebra-Applications-1-5-Appendices/dp/1717015220/ref=sr_1_6?keywords=Keith+Nicholson&qid=1567547696&s=gateway&sr=8-6. The cost is $12.71.

You can find a PDF version of the book at https://lila1.lyryx.com/textbooks/OPEN_LAWA_1/marketing/Nicholson-OpenLAWA-2021A.pdf

Course Schedule
The following list of topics will be the order we cover things, specific timing will vary and be discussed throughout the semester:

1. Systems of Linear Equations:
   • Gaussian Elimination
   • Homogeneous Systems and numbers of solutions
   • Applications

2. Matrix Algebra
   • Addition, Scalar Multiplication, Transposition
   • Matrix-Vector Multiplication
   • Matrix Multiplication
   • Matrix Inverses
   • Applications

3. Determinants and Diagonalization
   • Determinants and Matrix Inverses
   • Diagonalization and Eigenvalues

- Linear Recurrences
  - Markov Chains
  - Recursions

4. Vector Geometry
   - R^3
   - Lines in R^3
   - Projections, Planes, and intersections
   - The cross product

Requirements:

Having a good scientific calculator or graphing calculator is highly recommended. This class involves many, many basic calculations, often involving either fractions or decimals, and having such a tool can only be helpful to you.

Attendance:

Students are expected to attend all lectures and labs to ensure success on exams, and quizzes. Students not attending lectures may find themselves missing information not covered in the textbook. Students who have scheduling conflicts with exams or quizzes are expected to speak with the professor as soon as possible to make other invigilating arrangements. If a student misses a quiz or exam without making arrangements with the professor to make up the marks, said marks will be left as a 0 and affect their GPA accordingly.

Grade Summary:

The course will include the following:

Online Assignments: 30%
Quizzes (best 4 out of 5):   20%
Midterm Exam: 22%
Final Exam: 28%

The Online Assignments will be accessed through the website *login.lyryx.com*. These assignments will all be quite short (on the order of one or two questions each), but there will be a number of them covering the skills you will learn in class. The quizzes will all be delivered during our Monday tutorials. These will also be relatively short, containing at most 2 or three questions, and will generally be aimed at making sure students are keeping up with the materials covered in class.

The available letters for course grades are as follows:

Grade	Interpretation	Percentage	Grade Points
A+	Excellent	96 to 100	4.00
A		91 to 95	4.00
A-		87-90	3.70
B+	Good	83 to 86	3.30
B		79 to 82	3.00
B-		73 to 78	2.70
C+	Satisfactory	69 to 72	2.30
C		64 to 68	2.00
C-		59 to 63	1.70
D+	Poor	55 to 58	1.30
D	Minimal Pass	50 to 54	1.0
F	Failure	0 to 49	0.00
P	Pass		No Grade Points

Because of the nature of the Alpha 4.00 system, there can be no uniform University-wide conversion scale. The relationship between raw scores (e.g. percentages) and the resultant letter grade will depend on the nature of the course and the instructor's assessment of the level of each class, compared to similar classes taught previously.

Please note that final grades will be available on student registration system. Printed grade sheets are not mailed out.

Other:

The course will be following the first four chapters of the textbook, beginning with Chapter 1. Students wishing to study in advance should begin reading the first section of the textbook (Chapter 1, section 1.1). Sections of the book that are not covered in class will be discussed as the class proceeds.

Instructor notes for this class will be given by hand. While students may endeavor to write notes via their laptops, they are warned that much of the course content is rather difficult to typeset with typical word processing software. It is suggested that students utilize pen and paper for their notes as much as possible.

Calculator use for this class is allowed: students may utilize any calculators they wish to aid them in basic calculations on quizzes and exams provided it is not connected to any online services (i.e. not on their phones, laptops, etc.). If students wish to use a calculator, they are responsible for understanding the functions of the calculator they use, either by searching out its use on their own or talking to the instructor.

Ambrose University Important Information:

Communication

All students have received an Ambrose e-mail account upon registration. It is the student's responsibility to check this account regularly as the Ambrose email system will be the professor's instrument for notifying students of important matters (cancelled class sessions, extensions, requested appointments, etc.) between class sessions.

Exam Scheduling

Students who find a conflict in their exam schedule must submit a Revised Examination Request form to the Registrar's Office by the deadline date; please consult the Academic Calendar. Requests will be considered for the following reasons only: 1) the scheduled final examination slot conflicts with another exam; 2) the student has three final exams within three consecutive exam time blocks; 3) the scheduled final exam slot conflicts with an exam at another institution; 4) extenuating circumstances. Travel is not considered a valid excuse for re-scheduling or missing a final exam.

Standards of Behaviour in the Classroom Setting

Learning is an active and interactive process, a joint venture between student and instructor and between student and student. Some topics covered within a class may lead to strong reactions and opinions. It is important that Students understand that they are entitled to hold contradictory beliefs and that they should be encouraged to engage with these topics in a critical manner. Committing to this type of "active learning" significantly increases the learning experience for both teacher and student, and reflects the Christian imperative to pursue truth, which lies at the heart of the Ambrose educational experience. However, active discussion of controversial topics will be undertaken with respect and empathy, which are the foundations of civil discourse in the Classroom Setting. Primary responsibility for managing the classroom rests with the instructor. The instructor may direct a student to leave the class if the student engages in any behaviour that disrupts the classroom setting. If necessary, Ambrose security will be contacted to escort the student from class. Please refer to your professor regarding their electronic etiquette expectations.

Academic Integrity

We are committed to fostering personal integrity and will not overlook breaches of integrity such as plagiarism and cheating. Academic dishonesty is taken seriously at Ambrose University as it undermines our academic standards and affects the integrity of each member of our learning community. Any attempt to obtain credit for academic work through fraudulent, deceptive, or dishonest means is academic dishonesty. Plagiarism involves presenting someone else's ideas, words, or work as one's own. Plagiarism is fraud and theft, but plagiarism can also occur by accident when a student fails or forgets to acknowledge to another person's ideas or words. Plagiarism and cheating can result in a failing grade for an assignment, for the course, or immediate dismissal from the university. Students are expected to be familiar with the policies in the current Academic Calendar that deal with plagiarism, cheating, and the penalties and procedures for dealing with these matters. All cases of academic dishonesty are reported to the Academic Dean and become part of the student's permanent record.

Academic Policies

It is the responsibility of all students to become familiar with and adhere to academic policies as stated in the Academic Calendar. The academic calendar can be found at https://ambrose.edu/content/academic-calendar-2.

Privacy

Personal information (information about an individual that may be used to identify that individual) may be required as part of taking this class. Any information collected will only be used and disclosed for the purpose for which the collection was intended. For further information contact the Privacy Compliance Officer at privacy@ambrose.edu.

Coursework Extensions

Should a request for a time extension on coursework exceed the end of the term, a *Coursework Extension Application* must be completed and submitted to the Office of the Registrar. The extension (if granted) will be recorded on the student record. Extensions are granted at the discretion of the instructor and are normally granted for 30 days beyond the last day of the term.

Normally, Course Extension Applications will be considered only when all of the following conditions are met:

- the quality of prior course work has been satisfactory;
- circumstances beyond your control, such as an extended illness or death of a family member, make it impossible for you to complete the course work on time; and
- you submit *Coursework Extension Application* to the Office of the Registrar on or before the deadline specified in the Academic Schedule.

If granted, time extensions do not excuse you from a final examination where one has been scheduled for the course.

A temporary grade of TX will be assigned until a final grade is submitted in accordance with the new deadline. A final grade of F will apply to:

- all course work submitted after the end of the semester unless a coursework extension has been granted; and all course work submitted after the revised due date provided by an approved extension to coursework.

Academic Success and Supports

Accessibility Services

Academic accommodation is provided to Ambrose students with disabilities in accordance with the Alberta Human Rights Act and the Canadian Charter of Rights and Freedoms. Provision of academic accommodation does not lower the academic standards of the university nor remove the need for evaluation and the need to meet essential learning outcomes. Reasonable accommodations are tailored to the individual student, are flexible, and are determined by considering the barriers within the unique environment of a

postsecondary institution. It can take time to organize academic accommodations and funding for disability-related services. Students with a disability who wish to have an academic accommodation are encouraged to contact Accessibility Services as early as possible to ensure appropriate planning for any needs that may include accommodations. Staff can then meet with students to determine areas to facilitate success, and if accommodations are required, ensure those accommodations are put in place by working with faculty.

Ambrose Writing Services

Ambrose Writing services provides academic support in the four foundational literacy skills—listening, speaking, reading, and writing. It also assists students with critical thinking and the research process. Throughout the academic year, students can meet with a writing tutor for personalized support, or they can attend a variety of workshops offered by Academic Success. These services are free to students enrolled at Ambrose University. Academic Success serves all students in all disciplines and at all levels, from history to biology and from theatre to theology. To learn more, please visit https://ambrose.edu/writingcentre

Ambrose Tutoring Services

Ambrose Tutoring Services provides support in specific disciplinary knowledge, especially in high-demand areas such as chemistry, philosophy, math and statistics, and religious studies. These tutors also coach students in general study skills, including listening and note-taking. During the academic year, Ambrose Tutoring Services offers drop-in tutoring for courses with high demand; for other courses, students can book a one-to-one appointment with a tutor in their discipline. These services are free to students enrolled at Ambrose University. To learn more, please visit https://ambrose.edu/tutoring.

Mental Health Support

All of us need a support system. We encourage students to build mental health supports and to reach out when help is needed.

On Campus:
- Counselling Services: ambrose.edu/counselling
- Peer Supportive Listening: One-to-one support in Student Life office. Hours posted at ambrose.edu/wellness.
- For immediate crisis support, there are staff on campus who are trained in Suicide Intervention and Mental Health First Aid. See ambrose.edu/crisissupport for a list of staff members.

Off Campus:
- Distress Centre - 403-266-4357
- Sheldon Chumir Health Care Centre - 403-955-6200
- Emergency - 911

Sexual Violence Support

All staff, faculty, and Residence student leaders have received *Sexual Violence Response to Disclosure* training. We will support you and help you find the resources you need. There is a website with on and off campus supports – ambrose.edu/sexual-violence-response-and-awareness.

Off Campus:
- Clinic: Sheldon Chumir Health Centre - 403-955-6200
- Calgary Communities Against Sexual Abuse - 403-237-5888

Note: Students are strongly advised to retain this syllabus for their records.