MATH 2107B [0.5 Credit] Linear Algebra II Winter 2020

Basic Information:

Class Schedule:	Tuesdays and Thursdays: 19:35-20:55 starting Jan 7, 2020
Tutorial Schedule:	Tuesdays: 21:05-21:55 starting Jan 21, 2020.
Course Instructor:	Kyle Harvey
Email:	kharvey@math.carleton.ca
Office Hours:	I can also be found in the MTC (HP 3422) Monday – Thursday from 1030am – 1230pm

Course Webpage: All course material will be made available through CuLearn. Please check CuLearn regularly for updates on the course.

Course Information:

Prerequisites: MATH 1104 or MATH 1107 and a grade of C- or higher in MATH 1007 or equivalent, or permission of the School.

Textbook: Linear Algebra and Its Applications, by D. Lay, S. Lay and J. Mc-Donald, fifth edition.

Course Overview: Finite-dimensional vector spaces (over R and C), subspaces, linear independence and bases. Linear transformations and matrices. Inner product spaces (over R and C); Orthonormal bases. Eigenvalues and diagonalization. Bilinear and quadratic forms; principal axis theorem. Precludes additional credit for MATH 1102.

Classes: All lectures will have Powerpoint Presentations posted on CuLearn. It is highly recommended that you print the slides and bring them in as we will be discussing all of the content presented in the slides. Remember, it is crucial for your learning to understand the material **as well as practice the material.** Keeping up with the homework assignments will be key to your success in this course.

Calculators: Non-programmable calculators will be permitted on tests and on the final exam.

Assessment:

Tutorials (10%): Tutorials is a time to practice the material. You will be working in teams of 3-4 students in the tutorial practicing problems that will be given to you. You should be practicing the recommended problem sets at home and working with you TA and fellow classmates in tutorial to make sure you are comfortable with the concepts. **Practice makes perfect!** To obtain your mark for the tutorial, you must answer at least 3 of the 6 questions correctly. Only the final answer will count, so make sure to check your work. Full solutions will be provided to you so that you may determine your errors (if any are made). Any request to review your grade for your tutorial must be done within two weeks of receiving the grade.

Tests (40%): There will be 3 tests to be taken place in the tutorials. Provided that you maintain at least 30% on every test, the lowest test will be dropped. Each test will be weighted equally.

There will be no make up tests. If you provide adequate documentation (doctor's note, etc...), then I will adjust the weight of each test accordingly, otherwise a mark of 0 will be given for the test. You must bring your student card to each test and exam and place it on your desk where it is visible. **The dates of the tests will be: Feb 4, Mar 3, & Mar 24.** Any request to review your grade for your test must be done within two weeks of receiving the grade.

Final Exam (50%): The final exam will be a three hour closed book exam to be held during the exam period set by Carleton University. The questions will be similar to those seen on the tests, and in the homework. Students who wish to review their final examination paper must do so within two weeks from the release of final grades. This privilege is for educational purposes and not an opportunity to argue about the marking.

Policies:

Academic Integrity:
Be sure that you know that academic integrity standards at Carleton which can be found here.

Academic Accommodation:
You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

Pregnancy obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see the Student Guide

Religious obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see the Student Guide

Academic Accommodations for Students with Disabilities: The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable).

Course Progression:

The following topics will be covered in this course:

Topic	**Chapter**
Spaces and Vector Spaces ($R^n, C^n, M_{mn}, P_n,$)	4.1
Subspaces	4.1
Linear Combinations and Span	4.2 + 4.3
Linear Independence	4.3
Basis and Dimension	4.3 + 4.5
Col Space, Row Space, Nul Space, Rank, and Nullity	4.2 + 4.6
Coordinate Vectors	4.4
Change of Basis Matrix	4.7
Eigenvalues and Eigenvectors	5.1
Characteristic Equation and Algebraic Multiplicity	5.2
Eigenspaces and Geometric Multiplicity	5.2
Diagonalization and Fast Matrix Multiplication	5.3 + 5.5
Linear Transformations	4.2 + 5.4
Kernel and Range of Transformations	4.2 + 5.4
Transformation Matrix Representation	5.4
Injective, Surjective, and Inverse Linear Transformations	5.4
Dot Products, Norm, Distance, and Angles Between Vectors	6.1
Orthogonal Vectors, Sets, and Complements, and Orthonormal Matrices	6.2
Orthogonal Projections and Decompositions	6.3
Gram Schmidt Process and QR Factorization	6.4
Least Squares Problem and Linear Models	6.5 + 6.6
Inner Product Spaces	6.7
Diagonalization of Symmetric Matrices and The Spectral Theorem	7.1
Quadratic Forms	7.2
Principle Axis Theorem	7.3