MATH 2107A [0.5 Credit] Linear Algebra II Summer 2020

Basic Information:

Class Schedule:	Pre-recorded videos posted in CuLearn
Tutorial Schedule:	Mondays: 19:05-19:55 starting May 11, 2020.
Course Instructor:	Kyle Harvey
Email:	kharvey@math.carleton.ca

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 pre-recorded videos with corresponding Powerpoint Presentations posted on CuLearn. It is highly recommended that you print the slides or have them available through other means to use in conjugation with the watching the videos.

Calculators: It is recommended that you utilize an online RREF calculator online. Other calculators are permitted as well. Here is a link to a good RREF calculator: https://matrix.reshish.com/gauss-jordanElimination.php

Additional Practice: There will be additional homework documents with final answers (for parts 1 and 2) posted in CuLearn. It would be wise to tackle these questions in addition to the online assignments to ensure that you practice the material well enough to prepare you in this course and future courses in linear algebra. This homework will not be graded formally, but it will help solidify concepts.

Tutorials/Office Hours: Tutorial times will be utilized as office hours to give you a chance to ask questions about the assignment due the next day with your TA (Assignments will be due on Tuesdays). There will also be additional office hours held by the TAs on Tuesdays. Details will be posted in CuLearn as soon as they become available. I will also be hosting office hours in the Virtual Math Tutorial Centre on Mondays – Thursdays from 2pm – 4pm.

Assessment:

Assignments (50%): There will be 12 online assignments due on Tuesdays at 11:59 pm. The due dates of the assignments can be found below. The best 10 out of 12 assignments will be used to calculate your final grade (assignments are weighted equally at 5% each). Note that the last assignment is due during the exam period, but it is an optional assignment as only 10 out of 12 assignments will be counted. In addition, assignment 12 will be available in advance (as will with all assignments as soon as they are created and verified) sot that you can be complete the assignment in advance if you wish to not have additional work during the exam period.

Due Date	Assignment	Lessons of Focus for the Assignment
May 19	1	1, 2, 3
May 26	2	4, 5, 6
Jun 2	3	7, 8
Jun 9	4	9, 10
Jun 16	5	11, 12
Jul 7	6	13, 14
Jul 14	7	15, 16
Jul 21	8	17, 18
Jul 28	9	19, 20
Aug 4	10	21, 22
Aug 11	11	23, 24
Aug 18	12	25, 26

Assignments will be run through WebWork. More details will be posted in CuLearn as to how to access the assignments.

Final Exam (50%): The final exam will be a three-hour open book online exam using WebWork. The date and time will be decided by the university and I will post the information in CuLearn once it becomes available. You will not be permitted to post solutions on forums, Chegg, or other such sites. These places will be checked and offenders who are caught will be directed to the Deans office which could have dire consequences up to and including expulsion from the university. You are also not permitted to discuss the exam with anyone else (you are required to do the exam individually).

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