Math 2R3 – Linear Algebra II

Fall 2019

Description: Linear algebra is a core subject in mathematics and makes its appearance in many diverse places such as multivariate calculus, differential equations and quantum mechanics. This course is a continuation of Linear Algebra I, Math 1B3 and will focus on real and complex vector spaces, inner product spaces and key spectral theorems which are building blocks for many of the uses of linear algebra. Applications such as Fourier series, data compression, modelling of the ear canal, Lesli matrices and applications to population modelling will be considered. As time permits, topics such as Jordan canonical form and singular value decomposition are included. The course follows Anton and Rorres, Elementary Linear Algebra with applications, Chapters 6 - 8 with review from Chapters 4 and 5, and applications chosen from Chapters 9 and 10.

Instructor:

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Course meeting time: MW 2:30 and F 4:30 in TSH B128. Check your schedule for your tutorial.

Course text: Elementary Linear Algebra, applications version, 11th edition by Anton and Rorres

Course webpage: www.math.mcmaster.ca/~bradd/courses/math2r3; a tentative weekly breakdown of the topics to be covered can be found here as well as course announcements and other material.

Test dates: There will be three in-class tests; the dates are Wednesdays Oct. 9, Nov. 6 and Nov. 27. The McMaster standard calculator is allowed on all tests.

Assignments: We are using childsmath for online assignments; consult the website for exact details.

Course evaluation

	Option 1	Option 2
Assignments	10%	10%
Term tests/ best 2 of 3	45%	30%
Final	45%	60%

Tentative class schedule

- Week 1, Sept. 4 - 6
  Review material: Complex numbers - appendix B and supplementary material
- Week 2, Sept. 9 - 13
  Chapter 4 - 5: Review of vector spaces and introduction to complex vector spaces
- Week 3, Sept. 16 - 20
  Chapter 5: sections 5.1, 5.2, review of eigenvalues and eigenvectors; chapter 6, inner product spaces
- Week 4, Sept. 23 - 27
  Chapter 6; inner product spaces, sections 6.1, 6.2, cont'd
- Week 5, Sept. 30 - Oct. 4
  Inner product spaces, cont'd Sections 6.2 - 6.3
- Week 6, Oct. 7 - 11; first test on Oct. 9
- Week 7, Oct. 21 - 25
  Section 6.4, Fourier series, Linear transformations, section 8.1
- Week 8, Oct. 28 - Nov. 1
  Linear transformations cont'd, Sections 8.2 - 8.3
- Week 9, Nov. 4 - 8 second test, Nov. 6
- Week 10, Nov. 11 - 15
  Chapter 7, orthogonal diagonalization, section 7.1 - 7.2, 7.5
- Week 11, Nov. 18 - 22
  Normal and hermitian diagonalization, section 7.3 - 7.5
- Week 12, Nov. 25 - Dec. 4; third test, Nov. 27
  Optimization of quadratic forms and canonical forms, section 7.4; section 9.4

Academic Integrity

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at http://www.mcmaster.ca/academicintegrity

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

Important Proviso

I reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites during the term and to note any changes.

Requests for Relief for Missed Academic Term Work

For absences from classes lasting up to 3 days: Using the McMaster student absence form (MSAF) on-line, self-reporting tool, undergraduate students may report absences lasting up to 3 days and may also request relief for missed academic work. The submission of medical or other types of supporting documentation is normally not required. Students may use this tool to submit one request for relief of missed academic work per term. Students must immediately follow up with their course instructors regarding the nature of the relief. Failure to do so may negate the opportunity for relief. It is the prerogative of the instructor of the course to determine the appropriate relief for missed term work in his/her course.

For absences from classes lasting more than 3 days:
Students who are absent more than 3 days cannot use the on-line, self-reporting tool to request relief. They MUST report to their Faculty Office to discuss their situation and may be required to provide appropriate supporting documentation. If warranted, students will be approved to use a discretionary version of the MSAF on-line, self-reporting tool.