



## BIT 1001-A: MATHEMATICS II FOR NET (LINEAR ALGEBRA)

Winter 2021

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<b>Instructor:</b> Dr. Fares Said	<b>Lecture:</b> Posted weekly; accessible at any time
<b>Email:</b> <a href="mailto:fares.said@carleton.ca">fares.said@carleton.ca</a>	<b>Place:</b> Online via CuLearn
<b>Office:</b> Zoom, Facetime or other medium	<b>Office Hours:</b> Online Appointment request by email or call 6138751206 after 4pm

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### Course Pages:

1. <https://www.carleton.ca/culearn/>

**Objectives:** Tailored for students in the Network Technology program, this course covers systems of linear equations, vector space of n-tuples, subspaces and bases, matrix transformations, kernel, range, matrix algebra and determinants, inner products and orthogonality, eigenvalues, diagonalization and applications.

**Precludes** additional credit for BIT 1101, BIT 1201, ECON 1401, ECON 1402, MATH 1104, MATH 1107, MATH 1119, MATH 1401, MATH 1402.

**Prerequisite:** restricted to students in the B.I.T. degree program.

**Blended course:** Mixture of synchronous and asynchronous activities: Lectures are pre-recorded. Tutorials are live. scheduled time will be used for tests and quizzes.

**Textbook:** *Linear Algebra and Its Applications, 6<sup>th</sup> edition, by David C. Lay, Steven R. Lay and Judi J. McDonald.*

For this course, we are also using the resource from Pearson called MyLab.

For information on how to purchase the textbook and MyLab, visit the course web site on CuLearn.

**Reference Text:** *Linear Algebra and Its Applications, 3<sup>rd</sup> edition, by Mohammad R. Sadeghi and Jabir M. Abdulrahman.* **Publisher:** Carleton University, School of Mathematics and Statistics.

**Lectures:** Lecture notes and pre-recorded lectures will be uploaded weekly on CuLearn. The first lecture will be uploaded on **Monday January 11, 2021.**

**Tutorials:** Weekly tutorials via BigBlueButton (BBB) will be held on Mondays from 16:05 to 16:55. Tutorials will start on **Monday January 25, 2021.** The following table gives more details:

Tutorial	TA name	TA email	Time	Virtual
A1	Seyed Soroush Kazemi	soroushkazemi@cmail.carleton.ca	Mon: 16:05 to 16:55	BBB1
A2	Arogya Dahal	arogyadahal@cmail.carleton.ca	Mon: 16:05 to 16:55	BBB2

**Tests:** **There will be three tests held on February 1, March 1, and March 22 during the tutorial times.** Students are expected to take all three tests. **There are no make up tests!**

**Quizzes:** There will be a 20-minute online quiz (maximum of two attempts) open for completion during the Wednesday lecture timeslot every week (excluding the weeks in which you have tests). More information on topics covered available via CuLearn. **There are no make up quizzes!**

**Note:** If you miss a test or quiz and provide a self-declaration form within three business days of the missed test or quiz, the assigned weight will be added to your final exam; otherwise a mark of zero is assigned. If you choose to submit a medical note, make sure to also fill out and submit the form “Consent to Release Information to a Third Party” (available via CuLearn).

**Final:** The final exam will be an online, e-proctored, three-hour closed book exam to be held during the period of April 16-27, 2021 (including Saturdays and Sundays). Please check the link provided on CuLearn to confirm the exact date and time of the final exam as that period approaches. Students who wish to review their final examination must do so within one week from the release of final grades. This privilege is for educational purposes and not an opportunity to request grade changes. **Please note, your tests and final exam will be proctored using e-proctoring.**

**E-proctoring:** Please note that tests and examinations in this course will use a remote proctoring service provided by Scheduling and Examination Services. You can find more information at <https://carleton.ca/ses/e-proctoring/>. The minimum computing requirements for this service are as follows:

- **Hardware:** Desktop, or Laptop
- **OS:** Windows 10, Mac OS 10.14, Linux Ubuntu 18.04
- **Internet Browser:** Google Chrome, Mozilla Firefox, Apple Safari, or Microsoft Edge
- **Internet Connection:** High-Speed Internet Connection Recommended
- **Webcam:** HD resolution recommended

*Note: Tablets, Chromebooks and Smartphones are not supported at this time. Windows-based tablets are not supported at this time.*

#### Grading Scheme:

- *Forum participation (5%)*
- *Quizzes (20%).*
- *Tests (30%) - 3 Tests*
- *Final Examination (45%).*

**Tutorial Centre:** 3422 HP (near the Science Student Success Centre): This is a drop-in centre where students in elementary courses can get one-on-one help in mathematics and statistics, on a 'first come first serve' basis. For more information, including hours of operation, see: <http://www5.carleton.ca/math/math-tutorial-centre/>

**MS-LAP:** Online support is available for this course through MS-LAP. You should automatically be registered in MS-LAP via CuLearn. You have access to online tutorial videos free of charge. For more information and tutorials on how to access MS-LAP, please see: <https://carleton.ca/math/math-learning-assistance-program/>

#### Policies

**Academic Integrity:** All tests, assignments, quizzes, and exams are to be done independently. Any instance of suspected cheating or plagiarism will not be tolerated. Suspected cheating will be reported to the Dean, according to the policies stated in General Regulations. For more information, please consult: <http://www.carleton.ca/cu0607uc/regulations/acadregsuniv14.html>

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

*Pregnancy or 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 visit the Equity Services website <http://www2.carleton.ca/equity/accommodation/>

*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 +1613-520-6608 or [pmc@carleton.ca](mailto: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).

*Accommodation for Student Activities:* Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor 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. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

**Tentative Course Outline:** The weekly coverage might change as it depends on the progress of the class. However, you must keep up with the reading assignments.

Week	Content
Week 1 January 11, 13	<ul style="list-style-type: none"> <li>• 1.1 Systems of Linear Equations</li> <li>• 1.2 Row Reduction and Echelon Forms</li> </ul>
Week 2 January 18, 20	<ul style="list-style-type: none"> <li>• 1.2 Row Reduction and Echelon Forms</li> <li>• 1.3 Vector Equations</li> </ul>
Week 3 January 25, 27	<ul style="list-style-type: none"> <li>• 1.3 Vector Equations</li> <li>• 1.4 The Matrix Equation</li> <li>• 1.5 Solution Sets of Linear Systems</li> </ul>
Week 4 February 1, 3	<ul style="list-style-type: none"> <li>• 1.6 Applications of Linear systems</li> <li>• 1.7 Linear Independence</li> </ul>
Week 5 February 8, 10	<ul style="list-style-type: none"> <li>• 1.8 Introduction to Linear Transformations</li> <li>• 1.9 The Matrix of Linear Transformations</li> <li>• 2.1 Matrix Operations</li> </ul>
Week 6 February 15, 17	<ul style="list-style-type: none"> <li>• <b>WINTER BREAK</b></li> </ul>
Week 7 February 22, 24	<ul style="list-style-type: none"> <li>• 2.2 The Inverse of a Matrix</li> <li>• 2.3 Characterizations of Invertible Matrices</li> <li>• 2.8 Subspaces</li> <li>• 2.9 Dimension and Rank</li> </ul>
Week 8 March 1, 3	<ul style="list-style-type: none"> <li>• 3.1 Introduction to Determinants</li> <li>• 3.2 Properties of Determinants</li> </ul>
Week 9 March 8, 10	<ul style="list-style-type: none"> <li>• 3.3 Cramer's Rule, Volume</li> <li>• 5.1 Eigenvectors and Eigenvalues</li> </ul>
Week 10 March 15, 17	<ul style="list-style-type: none"> <li>• 5.2 The Characteristic Equation</li> <li>• 5.3 Diagonalization</li> </ul>
Week 11 March 22, 24	<ul style="list-style-type: none"> <li>• 5.5 Complex Eigenvalues</li> <li>• Appendix B Complex Numbers</li> </ul>
Week 12 March 29, 31	<ul style="list-style-type: none"> <li>• 6.1 Inner Product, Length and Orthogonality</li> <li>• 6.2 Orthogonal Sets</li> </ul>
Week 13 April 5, 7	<ul style="list-style-type: none"> <li>• 6.3 Orthogonal Projections</li> <li>• 6.4 Gram-Schmidt Process</li> </ul>
Week 14 April 12, 14	<ul style="list-style-type: none"> <li>• 6.5 Least Squares Problems</li> <li>• Review and Exam prep</li> </ul>

**Important Dates:**

January 11 ..... First class  
 January 25 ..... Last day for registration  
 January 31 ..... Last day to withdraw from winter term with full fee adjustment  
 February 1 ..... Test 1  
 February 15 ..... Statutory holiday  
 February 15-19 ..... Winter break. Classes are suspended  
 March 1 ..... Test 2  
 March 19 ..... Exam accommodation request  
 March 22 ..... Test 3  
 April 14 ..... Last day to withdraw from the course  
 April 14 ..... Last day of classes  
 April 16-27 ..... Final Exam

For more information please visit

<http://carleton.ca/registrar/registration/dates-and-deadlines/>