

**MAST 214**  
Calculus and Linear Algebra  
*Fall 2014*

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- Course Content:** This course covers two distinct subjects: **Calculus** and **Linear Algebra**. The course will be given in sequence of substantial parts on each of these subjects alternating, as indicated in the course coverage plan below. There are two textbooks for the course, one for calculus and one for linear algebra.
- Text:** *Calculus of a Single Variable: Early Transcendental Functions*, by R. Larson and B.H. Edwards, 5th Edition, Brooks/Cole, 2011.  
  
*Elementary Linear Algebra*, by R. Larson and Falvo, 6th Edition, Houghton Mifflin Company, 2009.
- Assignments:** Assignments will be given once a week and shall be handed in class, on the first class of the following week. Late assignments will not be accepted. **Only the assignments in the column "Assignment" below must be handed in**, whereas the ones in the "Supplemental problems" column are for your own understanding and practicing. The solutions to the assignments will be provided after the due dates. The answers for the odd-numbered "Supplemental assignment" problems are at the end of the corresponding text books.
- Calculators:** Only calculators approved by the Department (with a sticker attached as proof of approval) are permitted in the class test(s) and final examination. The preferred calculators are the **Sharp EL 531** and the **Casio FX 300MS**, available at the Concordia Bookstore.
- Mid-Term Test:** There will be one mid-term test, **2 hours long**, given on the 7th week of classes, which will include parts both on calculus and on linear algebra based on the material learned in weeks **from 1a to 6b**, inclusively.  
It is the Departmental policy that the missed test **cannot** be made up.
- Final Examination:** Will cover **all** the topics included in this course on both subjects.
- Grading Scheme:** The final grade will be based on the higher of (a) or (b) options below:  
(a) Assignments: 10%, Mid-Term Test: 30% , Final Exam: 60%; **or**  
(b) Final Exam: 100%.
- N.B.** *Although class attendance does not formally contribute, it is strongly recommended.*

## CONTENTS

Weeks/ Lectures	Topics, book: sections	Assignments	Supplemental Problems
1a	Derivatives, Basic rules of differentiation (overview); CALC: 3.1, 3.2, 3.3, 3.4	3.1.32, 3.2.26, 3.2.62 3.3.30, 3.4.32, 3.4.98	3.1.25, 3.2.41 3.3.17, 3.4.31, 3.4.37
1b	Applications of differentiation; CALC: 4.1, 4.3, 4.4	4.1.16, 4.1.40, 4.3.6 4.3.44, 4.4.16, 4.4.66	4.1.5, 4.1.39 4.2.61, 4.1.37
2a	Optimization Problems; CALC: 4.7	4.7: 16, 18, 22, 28, 30	3, 5, 19, 23, 49
2b	Differentials; CALC: 4.8	4.8: 8, 20, 32, 36, 42	3, 17, 25, 35, 39
3a	Antiderivatives, Integrals, Fundamental Theorem of Calculus; CALC: 5.1, 5.3, 5.4	5.1: 32, 36 5.3: 40 5.4: 22, 28, 100	25, 27, 43, 69 35, 41, 47 27, 35, 99, 101
3b	Integration by Substitution, Log Functions; CALC: 5.5, 5.7	5.5: 24, 36, 62 5.7: 18, 26, 34	5, 9, 11, 63 19, 33, 51
4a	Systems of Linear Equations; LINALG: 1.1, 1.2	1.1: 8, 14, 32 1.2: 18, 24, 46	1, 5, 11, 69, 77 1, 3, 7, 43, 45
4b	Matrices, Matrix Operations LINALG: 2.1, 2.2, 2.3	2.1: 14, 22 2.2: 10, 36 2.3: 12, 28	7, 11, 21, 31 1, 3, 5, 29 11, 37, 39
5a	Elementary Matrices, Applications; LINALG: 2.4, 2.5	2.4: 10, 18, 34 2.5: 4, 16, 44	3, 5, 17, 23, 33 13, 21, 27, 41
5b	Determinants; LINALG: 3.1, 3.2, 3.3	3.1: 12, 20 3.2: 18, 26	7, 11, 15, 29, 47 1, 5, 9, 21, 31
6a	Eigenvalues; Vectors, Vector Spaces; LINALG: 3.4, 4.1, 4.2	3.4.4; 4.1.26, 4.1.30 4.2: 20, 22	3.4: 5, 9; 4.1: 1, 5 4.2: 15, 19, 29, 31
6b	Subspaces, Linear Independence; LINALG: 4.3, 4.4	4.3: 2, 16; 4.4: 2, 12	4.3: 3, 21; 4.4: 3, 7, 21
7a	Basis, Rank, Coordinates, Change of basis (in $\mathbb{R}^n$ ); LINALG: 4.5, 4.6, 4.7	4.5: 24, 44 4.6: 6, 34 4.7: 6, 18	5, 9, 29, 57 3, 5, 15, 27, 43 3, 9, 17, 29
<b>7b</b>	<b>Midterm TEST (based on Weeks 1-6)</b>		
8a	Integration: Area, Volume; CALC: 7.1, 7.2, 7.3	7.1: 14, 24; 7.2: 4, 14 7.3: 4, 22	7.1: 3, 5, 7, 79; 7.2: 5, 17 7.3: 3, 12, 13, 43
8b	Arc Length, Surface of Revolution; CALC: 7.4	7.4: 4, 6, 34, 36	7.4: 3, 5, 33, 35, 55
9a	Basic Integration Rules; CALC: 8.1	8.1: 18, 26, 32, 46	7, 17, 47, 49, 63, 93
9b	Integration by Parts; CALC: 8.2	8.2: 8, 20, 26, 50, 56	7, 13, 17, 33, 53, 59, 61
10a	Parametric Equations; CALC: 10.2, 10.3	10.2: 8, 16 10.3: 4, 16, 26	5, 9, 41, 47, 67 3, 7, 21, 47, 55
10b	Polar Coordinates; Calc: 10.5	10.5: 6, 8, 20, 38	5, 7, 15, 17, 19, 35
11a	Conic Sections and Rotation; LINALG: 4.8	4.8: 32, 40, 44	4.8: 27, 31, 47, 49
11b	Dot Product, Cross Product; LINALG: 5.1, 5.5	5.1: 12, 24, 50 5.5: 14, 18	5.1: 11, 15, 21, 31 5.5: 3, 11, 15, 23
12a	Applications of Linear Transformation; LINALG: 6.5	6.5: 6, 12, 22, 36	3, 5, 7, 11, 21, 31
12b	Eigenvalues and Eigenvectors; LINALG: 7.1, 7.2, 7.3	7.1: 14, 20; 7.2.6, 7.2.20 7.3: 22, 34	7.1: 3, 5, 11 7.3: 3, 25
13a	Application: Quadratic Forms; LINALG: 7.4	7.4: 32, 36, 38	7.4: 15, 29, 33
<b>X</b>	<b>REVIEW</b>		