

**MAT 485**  
**Differential Equations and Matrix Algebra for Engineers**  
**Spring 2011**

**Classes:**       Section 001   MW 12:45 – 2:05     313 Carnegie  
                  Section 002   MW 3:45 – 5:05     208 Carnegie

**Instructor:** Prof. Vincent Fatica, 224 Carnegie, 443-1587, [vefatica@syr.edu](mailto:vefatica@syr.edu)

**Office hours:** MW 2:15 – 3:30, TTh 1:00 – 1:45

**Course supervisor:** Prof. Vincent Fatica (see above)

**Text:** “Differential Equations and Linear Algebra” by J. Farlow, J. Hall, J. McDill, B. West, Pearson 2007, 2<sup>nd</sup> edition.

**Prerequisites:** MAT 397 (Credit cannot be given for both MAT 485 and MAT 514, nor for both MAT 485 and MAT 331. MAT 485 does not count towards a mathematics major).

**Course Description:** We will discuss solutions of first order ordinary differential equations, second order linear differential equations, vector spaces, matrix algebra, linear systems, eigenvalues and eigenvectors, and Laplace transforms. We expect to cover Chapters 1-8 with some omissions. See (below) the tentative and approximate schedule of sections to be covered (with each section’s assigned exercises).

**Learning Goals:** This course introduces students to ordinary differential equations and linear algebra. In particular, we shall cover the following topics: first order ODEs, separable equations, second order ODEs, higher order linear ODEs, systems of ODEs, determinants, linear systems, inverse of a matrix, eigenvalues & eigenvectors.

**Exams, Quizzes:** There will be 2 exams (and a final). Quizzes may be given (with or without warning). Exam dates:

Exam 1: Wed 23 Feb

Exam 2: Wed 13 Apr

**Final Exam:**   Section 001: Fri 6 May       10:15 – 12:15       Carnegie 313  
                  Section 002: Tue 10 May   10:15 – 12:15       Carnegie 208

**Course Grades:** Course grades will be determined by: 2 exams: 50% (25% each), final exam: 30%, quizzes and homework: 20%. There will be no make-up exams or quizzes for any reason. A missed exam counts as zero unless a valid excuse is presented with documentation. In the case of an excused missed exam, a student’s grade on the final exam (or the pertinent parts thereof) will be used to fill the missing grade. Everyone is required to take the final exam.

**Homework:** You will be regularly asked to hand in a specified subset of the recommended exercises; they will be graded. As much as time allows, we can discuss homework exercises in class, before they are due. It is imperative that you attempt all assigned problems. The best way to learn this material is to do problems.

**Students with Disabilities:** If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), <http://disabilityservices.syr.edu>, located in Room 309 of 804 University Avenue, or call (315) 443-4498 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue students with documented disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible. You are also welcome to contact me privately to discuss your academic needs although I cannot arrange for disability-related accommodations. Making arrangements with ODS takes time. Do not wait until just before the first test.

**Academic Integrity:** The Syracuse University Academic Integrity Policy holds students accountable for the integrity of the work they submit. Students should be familiar with the Policy and know that it is their responsibility to learn about instructor and general academic expectations with regard to proper citation of sources in written work. The policy also governs the integrity of work submitted in exams and assignments as well as the veracity of signatures on attendance sheets and other verifications of participation in class activities. Serious sanctions can result from academic dishonesty of any sort. For more information and the complete policy, see <http://academic integrity.syr.edu>

### Schedule (approximate and tentative)

<b>Week</b>	<b>Sections</b>	<b>Homework Problems</b>
<b>1/19</b>	(1.1), 1.2	3, 5, 7
	1.3	11, 13, 18, 25, 33, 41, 43, 57
	1.4, (1.5)	1a, 16
<b>1/24 – 1/26</b>	2.1	1, 3, 5, 27
	2.2	3, 5, 7, 11, 15, 17, 19, 34
	2.3	1, 2, 7, 11, 13
	2.4	3, 5, 7, 15, 21
<b>1/31 – 2/2</b>	2.5	13, 14, 16
	2.6	1, 3
	2.1	1, 3, 7, 11, 12, 23, 34, 39, 41, 42, 77, 79
<b>2/7 – 2/9</b>	3.2	1, 11, 13, 25, 31, 33, 44, 62, 64
	3.3	5, 6, 8, 9, 12, 20, 40, 50
	3.4	1, 3, 4, 15, 16, 23, 37, 39, 41
<b>2/14 – 2/16</b>	3.5	1, 5, 11, 13, 15, 19, 20, 22, 50, 51, 53, 54
	3.6	1, 2, 7, 9, 10
<b>2/21 – 2/23</b>	Review 1 Exam 1	
<b>2/28 – 3/2</b>	4.1	1, 3, 14, 17, 19, 21, 25, 46, 58
	4.2	1, 3, 5, 8, 15, 17, 56, 59
	4.3	1, 3, 5, 11, 13, 62, 64
<b>3/7 – 3/9</b>	4.4	1, 2, 3, 7, 9, 10, 20, 25, 45, 49
	4.5	1, 3, 4, 7, 13
	5.1	1, 2, 7, 21, 23, 33, 34, 38
<b>3/21 – 3/23</b>	5.2	3, 5, 13, 25, 31, 68, 70, 72, 78
	5.3	1, 2, 3, 19, 21, 37, 42
	5.4	25, 26, 35, 49
<b>3/28 – 3/30</b>	6.1	1, 2, 5, 6
	6.2	9, 11, 21, 23, 25, 29, 31
	6.3	1, 3, 5, 13, 30, 31
<b>4/4 – 4/6</b>	6.4	1, 2, 3, 4, 5, 6, 7, 8
	6.5	1, 3, 11, 13
	7.1	31, 32, 34
	7.2	1, 3, 5, 7, 9, 11, 12, 15
	Review 2 Exam 2	
<b>4/11 – 4/13</b>	8.1	1, 2, 5, 9, 11, 41, 45, 49
	8.2	3, 9, 11, 16
	8.3	3, 11, 17, 20, 24
<b>4/25 – 4/27</b>	8.3	28, 30, 33, 34, 36
<b>5/2</b>	Review for final	