

Syllabus for MATH 2341, Differential Equations and Linear Algebra for Engineering, Section 02

Northeastern University, Fall 2015

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Office hours: Wednesdays 10.45 am – 12.15 pm and 3 pm – 4 pm

Thursdays 10.45 am – 12.15 pm

Meeting times and location: MWR, 9.15 am – 10.20 am at Behrakis Health Sciences Center 310.

Textbook: *Worldwide Differential Equations and Linear Algebra* by Robert McOwen, available in PDF and printed format from the website:

<http://www.centerofmathematics.com/wwcomstore/index.php/diffeqns.html>

The PDF version costs \$9.95 and contains free links to videos and online resources. But you can alternately order a printed version for \$29.95.

Course Description: This course introduces separable differential equations with a main focus on first and second order linear differential equations with constant coefficients-both homogeneous and nonhomogeneous. Various methods for obtaining the solution will be studied including undetermined coefficients and the Laplace transform. Applications include cooling problems, velocity problems, mixing problems and spring problems. In addition, basic topics from linear algebra will be applied to obtain the solution to systems of equations and systems of linear differential equations.

Web Materials: All class announcements, material, and grades will be posted on Blackboard.

Homework and Quizzes: Homework will NOT be collected. An in-class quiz will be given on every Thursday starting from the second week, except for the two weeks when we have the mid-term exams. It is strongly advised that you do all of assigned homework since the quizzes will closely resemble the homework problems. The lowest quiz score will be dropped. A missed quiz will be counted in the dropped lowest score; there will be NO make-up quizzes.

Tests and Final exam:

There will be two mid-term exams, and a cumulative final exam in this course. The mid-term exams are 65-minute in-class exams. There will be NO make-up mid-term exams.

The final exam date is to be determined. **Check for exam schedule conflicts before Oct. 1.**

Only two finals at the same time or three in one day is a University recognized legitimate reason to be excused from taking the final at the scheduled time. Students with such a conflict should complete a final exam conflict form, available on the registrar's website.

Notes: On the mid-term exams and on the final exam you will be allowed one side of an 8.5 x 11 in. sheet of notes.

Snow days: If classes are cancelled due to snow, or for other official reasons, any scheduled quiz or test will occur on the next class meeting.

Grading: The course grade will be determined as follows:

Final exam: 40%

Tests: 40% (20% each)

Quizzes: 20%

Letter grades are determined numerically:

Final Average	Grade for Course
93-100	A
90-92	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
73-76	C
70-72	C-
67-69	D+
63-66	D
60-62	D-
0-59	F

The grade I (Incomplete) will be given only if you have a good attendance record, have missed the final exam for a good reason, and otherwise are doing passing work. An incomplete is given at the discretion of the instructor.

COURSE TAs:

TBA

ADDITIONAL RESOURCES:

The Mathematics Department Tutoring Center is in Room 540B, Nightingale Hall. This peer tutoring is free. Peer Tutoring appointments can be booked via MyNEU under TUTORING. Although you can walk in, it is really best to sign up in advance. Tutoring requests are scheduled by students in real-time and confirmed by email. Next-day appointments must be booked by 9:00 pm the previous day. It is expected that tutoring services in the Mathematics Department Tutoring Center will begin shortly after the start of classes. See <http://www.northeastern.edu/csastutoring/setting-up-appointments/> For more information about peer tutoring.

Issues with the course/instructor: If you have any issues with this course and/or instructor which you are not comfortable discussing with your instructor, you should contact either Prof. Don King (Undergraduate Director) in 447 Lake Hall or Prof. Sol Jekel in 525 Lake Hall.

Academic Honesty: Collaboration on quizzes, tests and final exam is not allowed. From Student Code of Conduct (see <http://www.northeastern.edu/osccr/academicintegrity>): "A necessary prerequisite to the attainment of the goals of the University is maintaining complete honesty in all academic work. Students are expected to present as their own only that which is clearly their own work in tests and in any material submitted for credit. Students may not assist others in presenting work that is not their own. ... Offenders are subject to disciplinary action." For more on Academic Integrity see: <http://www.northeastern.edu/registrar/courses/cat1213-univ-proc.pdf>

Note the Following Dates:

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|----------------------------|-------------------------------------------------------------|
| 1. Wednesday, September 9: | Fall classes begin |
| 2. Tuesday, September 29: | Last day to drop a Fall class without a "W" grade |
| 3. Thursday, October 1: | Last day to file a Fall Final Exam conflict form |
| 4. Monday, October 12: | Columbus Day, no classes |
| 5. Wednesday, November 11: | Veteran's Day, no classes |
| 6. Wed Nov 25- Sun Nov 29: | Thanksgiving Recess, no classes |
| 7. Wednesday, December 9: | Last day of Fall classes |
| 8. Thursday, December 10: | Reading Day /Last day to drop a Fall class with a "W" grade |
| 9. December 11- 18: | Final Exam Period |

Important:

- 1) Any student with a disability is encouraged to meet with the instructor during the first week of classes to discuss accommodations. The student must bring a current Memorandum of Accommodations from the Disability Resource Center (DRC).
- 2) If you are an athlete and have conflicts with an important class activity (quiz, mid-term, or final), you should let your instructor know before the end of second week of classes. You should also bring an official letter from the Office of Athletics.
- 3) All electronic devices (mobile phones, laptops etc.) should be turned off during class time, quizzes, tests and final exam.

Syllabus: Syllabus is subject to change. It is your responsibility to be aware of any changes the instructor may make to the syllabus as they are announced in class. Students are responsible for all information given when they are absent.

TRACE: Please complete the TRACE evaluations at the end of the course.

Schedule of Topics and Suggested Homework Exercises

TOPIC	HOMEWORK
Chapter One: First Order Equations	
1.3 Separable Equations & Applications	#1(a,b,c,e,f), 2(a,c), 8, 9
1.4 Linear Equations & Applications	#1(b,c,d,f), 2(a,b), 3, 5
Chapter Two: Second Order Equations	
2.1 Introduction	#1(a,b)
2.2 General Solutions	#2, 3, 5-8
2.3 Constant Coefficients	#1(a,b), 2, 3
2.4 Free Mechanical Vibrations	#1-7
2.5 Nonhomogeneous Equations	#1, 2
2.6 Forced Mechanical Vibrations	#1, 2, 3(resonance only), 6(a,b), 7a
Chapter Three: The Laplace Transform	
3.1 Laplace Transform & Its Inverse	#4(a,d), 5(b,c,f), 6(a,b), 7, 8(a,c)
3.2 Transforms of Derivatives and IVPs	#2(b,c), 3(b,c,d), 4
3.3 Shifting Theorems	#1(a,b,c,d), 3, 4, 5, 6
3.4 Discontinuous Inputs	#1, 2b, 3(b,c), 4b, 5(b,c), 6, 8
----- EXAM ONE -----	
Chapter Four: Systems of Equations and Matrices	
4.1 Introduction to Systems and Matrices	#2, 3, 4
4.2 Gaussian Elimination	#1-4
4.3 Row-Echelon Form and Rank	#1, 2(a,b,d,e), 3(a,b,d,e), 4(a,d), 5
4.4 Inverse of a Square Matrix	#4, 5(a,c), 6(a,c)
4.6 Cofactor Expansions	#1(a-e)
Chapter Five: Vector Spaces	
5.1 Vectors in R^n	#1-7
5.2 General Vector Spaces	#3
5.3 Subspaces	#1(a,b), 2(a,b), 3(a,b,c), 4(a,b), 5(a,b), 6(a,c), 7b
5.4 Linear Independence	#1(a-e), 2c, 3(a,c), 4a
5.5 Bases and Dimension	#1, 3(a,b,c), 4(a,c)
----- EXAM TWO -----	
Chapter Six: Linear Transformations and Eigenvalues	
6.1 Eigenvalues and Eigenvectors	#1(a,c,d,e,f), 2(a,b)
Chapter Seven: Systems of Differential Equations	
7.2 First Order Linear Systems	#1(a,b,c), 5(a,c)
7.3 Eigenvalue Method for Linear Systems	#1(a,b,c,d), 2a
Review	

Friday, Dec. 11- Friday, Dec 18: final exams