

Math 216 Differential Equations

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Section 103 Lecture, Tu W F 10:00am - 12:00pm, B844 EH, and
Office hours, Tu W F 12:00 - 1:00pm and by appointment, 3826 EH, by Ahmet Duran

Recitation, Th 10:00 - 11:00am, B844 EH,
Math Lab, Th 11:00am - 12:00pm, B735 EH, and
Office hours, Th 12:00 - 2:00pm and by appointment, 4072 EH, by Xinyun Sun (GSI)

Description

Math 216 is a 4 credit course on differential equations with supplementary topics in complex numbers and matrix algebra. It is intended for engineers and other scientists who need to apply the techniques in their work. The lectures are accompanied by a computer lab and recitation section where students have the opportunity to discuss problems and work through computer experiments to further develop their understanding of the concepts of the class. Most of the material will be presented in a manner consistent with the presentations in the text. Students are expected to read and study the examples and related material in the text and to write up and submit the assigned problems sets and lab projects. (The lab projects involve programming in Matlab and Maple. The use of Maple 10 is recommended for this course.) Similar problems will be used as examples during the lectures as preparation for the exams. This course also offers an Instant Feedback web-based homework component. Topics covered include some material on complex numbers and matrix algebra, first and second order linear and non-linear systems with applications, introductory numerical methods, and elementary Laplace transform techniques.

Prerequisites

MATH 116, 119, 156, 176, 186, or 296.

Text

Differential Equations: Computing and Modeling, Third Edition by *C. Henry Edwards* and *David E. Penney*, 2004, Pearson Education. This textbook has an associated [website](#) with many excellent features, including online explore-as-you-go labs, and much more. ISBN: 0-13-067337-4

Exam Information

The exam dates and times for this class are as follows:

Exam	Date and Time	Location
Test 1	Friday, May 18 10:00am - 12:00pm	B844 East Hall
Test 2	Tuesday, June 5 10:00am - 12:00pm	B844 East Hall
Final Exam	Thursday, June 21 4:00 - 6:00 pm	TBA

Calculators are not to be used on exams (they will not be necessary).

Grading Policy

The various components of your work in the course will be assigned the following portions of your total score:

Course Component	Fraction of total score
Test 1	15%
Test 2	25%
Final Exam	35%
Written Homework and Web Homework	15%
Lab Writeups	10%

Assignments

There are four types of assignments that are to be handed in periodically to your recitation instructor throughout the semester. These are:

- *Written homework assignments.* The written homework sets can be found here. These are to be written up neatly. The written homework will be spot-graded and evaluated both for mathematical correctness and clarity of explanation.
- *Instant-feedback web-based homework assignments.* Visit the website <http://www.math.lsa.umich.edu/courses/216/index.html> . Follow the Web Homework link in the menu on the left to log into the instructional technology server and complete these assignments. Each web homework assignment "closes" at a precise time, after which you may continue to work the problems and receive feedback for practice, but you cannot receive credit for working the problems.
- *Prelab assignments.* In order to be prepared for a computer lab session with your recitation instructor, you must complete some important problems. The prelab assignment problems for each lab may be found in the corresponding lab manual.
- *Lab writeups.* Visit the website <http://www.math.lsa.umich.edu/courses/216/labs.html> Each lab manual contains a list of lab problems that must be completed as part of your writeup of the lab. Each lab is to be written up neatly.

Recitation and Lab Sessions

When you registered for a lecture section, you also registered for a subsection that meets on Thursdays. Each Thursday you will meet at the designated time with a recitation instructor.

- *Recitation sessions.* These meet in the room designated for your subsection in the course listing. The purpose of these sessions is for you to be able to discuss coursework and go over recent lecture topics with your recitation instructor.
- *Lab sessions.* These meet in the computer labs in the basement of East Hall. The purpose of these sessions is to meet with your recitation instructor to carry out several lab projects in which you will learn about several different tools for using computers and modern software to study differential equations and their solutions. There are five lab sessions throughout the semester, and each has a corresponding lab manual that you can download from the menu on the left. You should read this manual before coming to your lab session. In particular, the lab manual may contain a prelab assignment that is due at the beginning of the lab session.

Practice Problems

P1	p. 8, # 15, 21 p. 9, # 33, 47 p. 16, # 10 p. 27, # 21 p. 41, # 14, 25, 27 p. 42, # 43, 44, 47, 64 p. 54, # 21, 22, 28, 30, 33 p. 86, # 4, 10, 12
P2	p. 88, # 39 p. 96, # 5, 18, 19, 20 p. 97, # 23, 29 p. 106, # 3, 9, 12, 25 p. 107, # 19, 20 p. 119, # 7 p. 129, # 7 p. 139, # 7
P3	p. 155, # 3, 5, 9, 35, 40, 48 p. 156, # 27, 41 Review of Complex Numbers: #1, 3, 8, 9, 12 p. 180, # 1, 2, 21, 23, 28-32, 43, 44, 45
P4	p. 194, # 16-20 p. 207, # 6, 9, 10, 31, 33 p. 208, # 43, 48, 49 p. 218, # 1, 3, 11, 13, 15, 17, 19 p. 251, # 3, 5, 19 p. 262, # 3, 15, 16, 19, 26, 30 p. 274, # 1

P5	<p>p. 297, # 1</p> <p>p. 298, # 6, 9, 13, 15</p> <p>p. 312, # 2, 3, 9, 11, 12, 17, 19, 24, 25, 26, 27, 29</p> <p>p. 313, # 31, 35, 38</p> <p>p. 324, # 3, 4, 9, 10, 11</p> <p>p. 375, # 1, 2</p> <p>p. 376, # 8, 13, 14, 15, 19, 20, 23, 24</p> <p>p. 389, # 13, 17, 19, 31</p> <p>p. 390, # 33</p>
P6	<p>p. 403, # 3, 4, 5, 6, 7</p> <p>p. 418, # 5, 8</p> <p>p. 419, # 12, 13, 14</p> <p>p. 444, # 1, 3, 7, 9, 10</p> <p>p. 455, # 7, 9, 11</p> <p>p. 456, # 13, 15</p> <p>p. 465, # 5, 6, 15, 30, 38</p> <p>p. 474, # 1, 3, 32, 33, 34</p> <p>p. 484, # 7, 8, 21</p> <p>p. 485, # 29, 31</p> <p>p. 495, # 2, 3, 9, 10, 14</p>

Written Homework

H1	<p>Ch 1.1: 6</p> <p>Ch 1.2: 8</p> <p>Ch 1.3: 12</p> <p>Ch 1.4: 36</p> <p>Ch 1.5: 17</p> <p>Ch 2.1: 2, 9</p>
H2	<p>Ch 2.2: 8, 10</p> <p>Ch 2.3: 4</p> <p>Ch 2.4: 2, 5</p> <p>Ch 2.5: 2, 5</p> <p>Ch 2.6: 2, 5</p> <p>Complex Number supplement: 6, 12</p>
H3	<p>Ch 3.1: 4, 8, 42</p> <p>Ch 3.3: 4, 6, 15, 27</p>
H4	<p>Ch 3.4: 4, 5, 13, 21</p> <p>Ch 3.5: 1, 2, 3, 32, 52, 56</p> <p>Ch 3.6: 2, 8, 21</p> <p>Ch 4.1: 6, 9, 10, 15, 17, 20</p> <p>Ch 4.2: 2, 4, 8, 17</p>
H5	<p>Ch 5.1: 4, 8, 10, 18, 19</p> <p>Ch 5.2: 5, 8, 13</p> <p>Ch 5.3: 7</p> <p>Ch 6.1: 16, 18</p>

H6	Ch 6.2: 6, 19 Ch 6.3: 22 Ch 6.4: 2 Ch 7.1: 14, 16, 18 Ch 7.2: 2, 3, 8 Ch 7.3: 2, 14, 21 Ch 7.4: 2, 8, 31
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Web Homework

set1 : sections 1.1-2.1 (13 problems) due 5/8/07

set2 : sections 2.2-2.6 (12 problems) due 5/15/07

set3 : sections 3.1-3.3 (12 problems) due 5/22/07

set4 : sections 3.4-4.3 (15 problems) due 5/29/07

set5 : sections 5.1-6.1 (13 problems) due **6/8/07** <- F

set6 : sections 6.2-7.1 (14 problems) due **6/13/07** <- W

set7 : sections 7.2-7.6 (11 problems) due 6/19/07

Syllabus

Some of the material covered, and some of the dates may be changed at your instructor's discretion. You will be informed if this is the case. Prelab assignments can be found in the lab manuals that may be downloaded from the course website. The review of complex numbers text supplement may also be downloaded from the website http://www.math.lsa.umich.edu/courses/216/text_supplements.html.

Tu	W	Th	F
5/1/07 Welcome to Math 216 1.1, 1.2	5/2/07 1.3, 1.4	5/3/07 Recitation Welcome to Math Lab	5/4/07 1.5, 1.6 (Substitution Methods), 2.1
5/8/07 2.2, 2.3 Web Homework Set 1	5/9/07 2.4, 2.5	5/10/07 Recitation Lab 1 Written Homework Set 1	5/11/07 2.6, Complex Numbers supplement
5/15/07 3.1, 3.2 Web Homework Set 2	5/16/07 3.3, Review for Test 1	5/17/07 Recitation Lab 2 Written Homework Set 2	5/18/07 Test 1
5/22/07 3.4, 3.5 Web Homework Set 3	5/23/07 3.6, 4.1	5/24/07 Recitation Lab 3 Written Homework Set 3	5/25/07 4.2, 4.3
5/29/07 5.1, 5.2 Web Homework Set 4	5/30/07 5.3	5/31/07 Recitation Lab 4 Written Homework Set 4	6/1/07 6.1, Review for Test 2
6/5/07 Test 2	6/6/07 6.2, 6.3, 6.4	6/7/07 Recitation Lab 5 Written Homework Set 5	6/8/07 7.1, 7.2 Web Homework Set 5
6/12/07 7.3, 7.4	6/13/07 7.5, 7.6 Web Homework Set 6	6/14/07 Recitation Written Homework Set 6	6/15/07 Review for Final Exam
6/19/07 Web Homework Set 7	6/20/07	6/21/07 Final Exam 4–6 PM	