

**Mathematics 3304 (formerly 204) Policies and Syllabus**  
**Elementary Differential Equations**  
Spring 2016

**Instructor:** Elvan AKIN  
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**Office Hours:** 12PM-1PM MWF or by appointment

**Prerequisite:** Mathematics 2222 (Calculus with Analytic Geometry III) with a grade of “C” or better.

**Textbook:** *Elementary Differential Equations* (ninth edition), Boyce and DiPrima, John Wiley & Sons, 2009. Also, a suggested reference is *Schaum’s Outline of Differential Equations* (third edition), Bronson and Costa, McGraw-Hill, 2006.

**Topics to be covered:**

Chapter 1	Introduction
Chapter 2	First Order Differential Equations
Chapter 3	Second Order Linear Equations
Chapter 4	Higher Order Linear Equations
Section 5.4	Euler Equations
Chapter 6	The Laplace Transform
Chapter 7	Systems of First Order Linear Equations

**Attendance and Drop Policy:** You are expected to attend every class period. If you know in advance that you will not be able to attend, please check with me ahead of time to determine what work you will miss. If you miss a class, it is your responsibility to find out what you missed, pick up any handouts, returned exams or homework, etc. If you incur three unexcused absences, you will receive an academic alert from me and you will be required to meet with me in my office to discuss your lack of attendance and its causes. If you accumulate six unexcused absences you can expect to be dropped from the course.

**Homework:** You should make it a practice to do your homework promptly (i.e. daily) and you are expected to turn in homework regularly. Approximately 13 weekly homework sets will be collected, graded, and returned during this course. Quizzes might be given as I deem necessary. Your top 10 scores among homework and quizzes will be used to determine your 100-point homework grade. **Homework assignments are due at the beginning of every Friday class. No late homework will be accepted.** If you are having trouble with certain concepts or homework problems, be sure to get help from a classmate, LEAD, the mathematics tutoring room, or the instructor. *If you can’t make my office hours, please feel free to contact me to arrange another time to meet.* Solutions to selected homework problems will be posted at <http://web.mst.edu/~akine>.

**Hour Exams:** We will have three **common** fifty minute exams worth 100 points each from **5:00 to 5:50 PM** on three **Thursdays** this semester: **February 25, March 24, and April 28.** Please realize that these three Thursday evening examinations are regularly scheduled classes published in the 2016 fall semester class offerings at the Registrar’s Office website. It is the responsibility of each student to ensure that he or she is not enrolled in two or more regularly scheduled classes at the same time slot. In particular, student attendance is required at these three Thursday evening Math 3304 hour exams

**Hour Exams (cont.):** and **no alternate exam times will be provided for students who claim a conflict with another regularly scheduled S&T class.** No calculator is allowed in all Math 3304 exams. Your lowest hour exam score will be replaced by your percentage score on the final exam provided this improves your point total in the course. Samples of past Math 3304 (204) exams, with solutions, can be found at the Math 3304 electronic reserve files at the S&T library:

<http://web.mst.edu/~lib-circ/files/math/math.htm>

**Final Exam:** The 200-point **common comprehensive** Math 3304 final exam will be given on May 11<sup>th</sup> from 7:30AM to 9:30AM in a room to be announced later.

**Grading:** On all your papers (homework, hour exams, and final exam), you are expected to show your work clearly and completely. You will be graded on your work as well as your answers. In particular, **an answer that is unsupported by your work will not receive credit.** Your grade will be determined as follows: There will be 600 total points – 300 in hour exams, 200 for the final exam, and 100 in homework and quizzes. You will need at least 540 points (90%) to receive an A, 480 points (80%) to receive a B, 420 points (70%) to receive a C, and 360 points (60%) to receive a D. If you earn less than 360 points you can expect to receive an F.

**Question/Concern Resolution:** If you ever have a question, problem, or concern about anything in this course, please come see me first. However, if this does not resolve it, you should next speak with the Math 3304 Course Coordinator, Dr. Elvan Akin, in room 310 of the Rolla Building. If your concern still is unresolved then consult our Department Chair, Dr. Stephen Clark, in room 202 of the Rolla Building.

**Disability Support Services:** If you have a documented disability and anticipate needing accommodations in this course, please meet with me early in the semester. Before I can arrange for your accommodations, you will need to provide written documentation from the Disabilities Services staff in 204 Norwood Hall (dss@mst.edu, 341-4211) verifying your disability and specifying the accommodations you will require.

**AcademicHonesty:** <http://stuco.mst.edu/about/honor.shtml>,  
<http://registrar.mst.edu/academicregs/index.html>

Page 30 of the Student Academic Regulations handbook describes the student standard of conduct relative to the System's Collected Rules and Regulations section 200.010, and offers descriptions of academic dishonesty including cheating, plagiarism or sabotage. Additional guidance, including the University's Academic Dishonesty Procedures, is available on-line at <http://ugs.mst.edu>. You are strongly encouraged to discuss homework assignments and form study groups. Academic dishonesty will not be tolerated and will result in a penalty of at least an F on the affected assignment or exam.

**Emergency Egress Route:** In case of an emergency, the egress route for evacuation of our classroom is posted at this web address: <http://designconstruction.mst.edu/floorplan>

**LEAD Sessions:** The Learning Enhancement Across Disciplines (LEAD) program sponsors free learning assistance in a wide range of courses for students who wish to increase their understanding and improve their skills. LEAD assistance starts no later than the third week of classes. For more information see the online schedule at <http://lead.mst.edu/assist>, contact the LEAD office at 341-4608, or email [lead@mst.edu](mailto:lead@mst.edu).

**Mathematics Learning Center:** The Mathematics and Statistics Department sponsors a free math learning center in 105 Centennial Hall. Some Mathematics and Statistics Department graduate teaching assistants who staff the learning center are current or former teachers of Math 3304 (204) and are well-qualified to assist students with their homework problems in the subject.

**Title IX:** Title IX information can be found at <http://titleix.mst.edu/>

## Tentative Spring 2016 Math 3304 Course Outline

<u>Date</u>	<u>Section and Topic / Homework Assignment</u>
Jan 20 W	1.1 Some Basic Mathematical Models; Direction Fields p. 7: # 1,5,7,10,11,15,21,22,25,31 1.2 Solutions of Some Differential Equations p. 15: # 1,3,7,9,12,13,17,18
22 F	1.2 (cont.) Solutions of Some Differential Equations 1.3 Classification of Differential Equations p. 24: # 1,4,5,7,11,14,15,17,19,29
25 M	2.1 Linear Equations; Method of Integrating Factors p. 39: # 1,4,7,15,17,21,28,31,34,36
27 W	2.2 Separable Equations p. 47: # 1,4,7,11,19,21,25,30,33
29 F	2.3 Modeling with First Order Equations p. 59: # 1,4,7,9,12,13,16,23,27,31
Feb 1 M	2.4 Differences between Linear and Nonlinear Equations p. 75: # 1,4,11,15,17,21,23,27,30,33
<b>Monday, February 1 is the last day to change to pass/fail grading option.</b>	
Feb 3 W	2.5 Autonomous Equations and Population Dynamics p. 88: # 1,3,7,9,12,15,20,22,28
5 F	3.1 Homogeneous Equations with Constant Coefficients p. 144: # 1,5,11,12,17,19,21,23,28
8 M	3.2 Solutions of Linear Homogeneous Equations; the Wronskian p. 155: # 1,4,5,7,10,13,17,22,24,31
10 W	3.3 Complex Roots of the Characteristic Equation p. 163: # 1,4,5,7,12,16,17,19,23,25,34,35,38
12 F	3.4 Repeated Roots; Reduction of Order p. 171: # 1,5,6,9,11,15,25,28,38,41
15 M	3.5 Nonhomogeneous Equations; Method of Undetermined Coefficients p. 183: # 1,4,6,9,15,19,29,33,36,37
17 W	3.5 (cont.) Nonhomogeneous Equations; Method of Undetermined Coefficients 3.6 Variation of Parameters p. 189: # 1,5,9,10,13,18,21,22,23

**Date                      Section and Topic / Homework Assignment**

- Feb. 19 F 3.6 (cont.) Variation of Parameters
- 22 M 3.7 Mechanical and Electrical Vibrations  
p. 202: # 1,5,7,9,12,18,27,31
- 24 W Review (Class attendance on this day is optional.)
- Feb 25 Th **Exam I** (at **5:00-5:50PM** in Schrenk G3)
- 26 F 3.8 Forced Vibrations  
p. 215: # 1,5,7,9,11,16,18. Include 18(c): Find and plot the solution  $u$  when  $\omega = 1$ .

**Monday, February 29 is the last day to drop a course without a WD showing on your transcript. It is also the last day to change to HEARER status in a course.**

- Feb 29 M 4.1 General Theory of  $n^{\text{th}}$  Order Linear Equations  
p. 224: # 3,7,11,13,15,17,19
- March 2 W 4.2 Homogeneous Equations with Constant Coefficients  
p. 231: # 1,3,5,8,11,15,18,22,29,37,39
- 4 F 4.3 The Method of Undetermined Coefficients  
p. 237: # 1,2,8,11,13,15
- 7 M 4.4 The Method of Variation of Parameters  
p. 242: # 1 (on  $-\pi/2 < t < \pi/2$ ),4,7,9,13
- 9 W 5.4 Euler Equations  
p. 276: # 1,5,6,7,12,14,35,40
- 11 F 6.1 Definition of the Laplace Transform  
p. 311: # 1,5,6,11,15,21,26,27
- 14 M 6.2 Solution of Initial Value Problems  
p. 320: # 1,3,5,8
- 16 W 6.2 (cont.) Solution of Initial Value Problems  
p. 320: # 11,15,19,20,24

**Thursday, March 17-18, Spring Recess. There are no Missouri S&T classes then.**

- March 21 M 6.3 Step Functions  
p. 328: # 1,11,13,16,19,20,21,24,33,34,35
- 23 W Review (Class attendance on this day is optional.)

**Date                      Section and Topic / Homework Assignment**

24 Th **Exam II** (at 5:00-5:50 PM in Schrenk G3)

25 F 6.4 Differential Equations with Discontinuous Forcing Functions  
p. 336: # 1,4,5,7,16,19

**March 27-April 3, Spring Break. There are no Missouri S&T classes then.**

Apr. 4 M 6.5 Impulse Functions  
p. 343: # 1,4,7,9,16

6 W 6.5 (cont.) Impulse Functions  
6.6 The Convolution Integral  
p. 350: # 3,4,5,9,14,16,19,21,22,25,27

8 F 6.6 (cont.) The Convolution Integral

11 M 7.1 Introduction (to Systems of First Order Linear Equations)  
p. 359: # 1,4,7,11,12,17,19,21,22

13 W 7.2 Review of Matrices  
p. 371: # 1,3,4,6,8,10,14,18,21,22,23,25

15 F 7.3 Systems of Algebraic Equations; Linear Independence, Eigenvalues, Eigenvectors  
p. 383: # 1,3,7,8,12,13,15,16,17,23

**Friday, April 15 is the last day for dropping a course.**

Apr 18 M 7.4 Basic Theory of Systems of First Order Linear Equations  
p. 389: # 1,2,3,6

20 W 7.5 Homogeneous Linear Systems with Constant Coefficients  
p. 398: # 1,5,7,11,15,19,20,24,30,32

22 F 7.6 Complex Eigenvalues  
p. 409: # 1,3,7,9,11,13,21,23,25,28,29

25 M 7.7 Fundamental Matrices  
p. 420: # 3,6,11,12,15,16

27 W Review (Class attendance on this day is optional.)

28 Th **Exam III** (at 5:00-5:50 PM in Schrenk G3)

29 F 7.8 Repeated Eigenvalues  
p. 428: # 1,5,7,13,15,16,17

May 2 M 7.9 Nonhomogeneous Linear Systems  
p. 439: # 1,5,12,13,17

4 M and 6 W Review

May 11 W **Final Exam** (from 7:30AM to 9:30AM in a room to be announced)

