**MAT 275**  
**MODERN DIFFERENTIAL EQUATIONS**  
**Spring 2018**

*Important Note:* All items on this syllabus are subject to change. Any in-class announcement, verbal or written, is considered and official addendum to this syllabus. All course materials and information will be accessible through Blackboard Academic Suite (link on your “My ASU” page). Information regarding the computer labs will be accessible through the Blackboard LAB Site.

<table>
<thead>
<tr>
<th>Instructor: Richard Reynolds</th>
<th>Office: ECA 206</th>
</tr>
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<tbody>
<tr>
<td>E-Mail: <a href="mailto:rich@asu.edu">rich@asu.edu</a></td>
<td>Office Hour: Mon &amp; Wed 2:30-4:00pm, Fri 2:00-3:00pm Or by appointment</td>
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<tr>
<td>WEB PAGE: <a href="https://math.la.asu.edu/~rich">https://math.la.asu.edu/~rich</a></td>
<td>Prerequisites: MAT 266 or MAT 271 with a C or better</td>
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<td>Phone: (480) 965-7561</td>
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**Instructor:** Richard Reynolds  
**Office:** ECA 206  
**E-Mail:** rich@asu.edu  
**WEB PAGE:** https://math.la.asu.edu/~rich  
**Phone:** (480) 965-7561  
**Prerequisites:** MAT 266 or MAT 271 with a C or better

**Course Description:** Introduces differential equations, theoretical and practical solution techniques. Applications. Problem solving using MATLAB.

**Textbook:** *Elementary Differential Equations*, by Boyce and DePrima - WileyPLUS, 11th edition. There is also ASU custom edition of this textbook: *MAT275 – Modern Differential Equations*.

**Software:** Matlab will be used for lab assignments and is available for free (see below for details).

**Calculators:** A graphing calculator (e.g. TI84 or Casio CFX-9850GB Plus) is recommended. Graphing calculators which perform symbolic manipulation (e.g. TI89, TI92, Casio FX2 or 9970G) will not be allowed for tests or quizzes.

**Grading:** The grade will be computed from the Final exam (30%), 2 Midterm Tests (20% each), Labs (11.5%), WebWork(11.5%), Quizzes (7%).  
Grades: A: [90, 100]; B: [80,90); C: [70,80); D: [60,70); E: [0,60).

**Homework:** Homework will be problems from WeBWorK, an online homework system. WeBWorK can be accessed at [http://webwork.asu.edu](http://webwork.asu.edu). No late assignments will be accepted.

**Suggested Problems:** The textbook has answers for all problems. All problems, at least odd numbered problems are suggested for your exercise. Many of the test problems are similar to textbook problems and WeBWorK exercises.  
In addition, there are practice exam problems at [https://math.asu.edu/resources/math-courses/mat275](https://math.asu.edu/resources/math-courses/mat275).

**ASU Video Lessons:** The websites [https://vidman.asu.edu/index.php/menu](https://vidman.asu.edu/index.php/menu) and [https://math.la.asu.edu/~surgent/video/mat275_exp.html](https://math.la.asu.edu/~surgent/video/mat275_exp.html) contain video lessons for the course. The former website is more recently updated, while on the latter the videos are a bit better organized. You are encouraged to use this as a supplement for the lecture.

**ATTENDANCE:** Attendance is mandatory! Your instructor reserves the right to take attendance and to incorporate your attendance as part of your overall grade.

**Exams:** Two tests will be given during the semester. The best possible preparation for the exams is regular attendance and completion of assigned labs and homework. All exams will be given in the Classroom on the dates indicated on the schedule shown below. **Your calculator program memory may be randomly viewed during any exam and will be cleared if anything suspicious is written therein.**

<table>
<thead>
<tr>
<th>Exam</th>
<th>Sections</th>
<th>Test Dates</th>
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<tbody>
<tr>
<td>TEST 1</td>
<td>1.1-1.3, 2.1-2.5, 2.7, 3.1, 3.2</td>
<td>Wednesday, 2/14 in class</td>
</tr>
<tr>
<td>TEST 2</td>
<td>3.1, 3.3-3.5, 3.7, 3.8, 6.1-6.2</td>
<td>Wednesday, 3/26 in class</td>
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<tr>
<td>FINAL</td>
<td>Comprehensive, including 6.3-6.5, 7.1-7.8</td>
<td>Monday, May 1 from 4:50-6:40pm</td>
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**Final Exam:** The final exam is comprehensive and will be administered in class.

**Final Exam make up policies:** The final exam schedule listed in the Schedule of Classes (https://students.asu.edu/final-exam-schedule#Spring 2017) will be strictly followed. Make-up exams will NOT be given for reasons of a non-refundable airline tickets, vacation plans, work schedules, weddings, family reunions, and other such activities. Students should consult the final exam schedule before making end-of-semester travel plans.

**Matlab Labs:** There will be a total of six MATLAB computer labs. The weeks on which these labs are due are listed on the schedule in this syllabus. However, these dates may be subject to change. You are not required to purchase Matlab. ASU students can download Matlab for free. Go to MyASU→MyApps and then search for Matlab to download it to your computer. In addition, Matlab is installed on campus computers (NSE Library, computer labs, etc.) so you can use it there. The instructional videos for the six labs and the pdf files with the exercises are posted at https://math.la.asu.edu/~tracogna/MAT275/LAB_VIDEOS (includes instructions for downloading Matlab). Please check this site as soon as possible.

School of Math & Stat Sciences offers help on Matlab (open evening lab hours in ECA 221, usually once a week). Please check https://math.asu.edu/resources/computing-resources for the time.

The due dates for the lab reports are listed in the syllabus. Students should watch the videos on their own. A Teaching Assistant will be in ECA 221 on your scheduled lab time to provide help if needed (note that lab times do not coincide with normal lecture times).

**Quizzes (ASU clickers-TurningPoint):** Quizzes will be given almost every class and will frequently reflect material that has recently been addressed. We will be using the student response system, TurningPoint 5. Therefore, a clicker will need to be purchased, and a student account set up. To learn more, visit https://ucc.asu.edu/clickers.

**Course Policies:**
- Students are responsible for assigned material whether or not it is covered in class. Students are responsible for material covered in class whether or not it is in the text. Working regularly on assigned problems and attending class is essential to survive. Expect to spend at least 6-10 hours weekly on homework/labs. You are expected to read the text, preferably before the material is covered in class.
- Make-up exams are at the discretion of the instructor and only in case of documented emergency. In any case, no make-up exams will be given unless the student has notified the instructor before the test is given. Messages may be left at the main office (965-3951) or through email (recommended).
- Cellular phones and pagers must be turned off during class. No texting, no ipods/ipads/laptops, etc.
- Arriving late to class will not be tolerated.
- All email communication must be done from your ASU account. Emails received from other accounts will not be answered.

**Cell phones and Electronic Devices:**
Any student who accesses a phone or any internet-capable device during an exam for any reason automatically receives a score of zero on the exam. All such devices must be turned off and put away and made inaccessible during the exam.
<table>
<thead>
<tr>
<th>Week of</th>
<th>Book sections covered</th>
<th>Observations</th>
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| 1/08    | 1.1, Some Basic Models; Direction Fields  
1.2, Solutions of Some Differential Equation  
1.3, Classification of Differential Equations | *(Note: Labs are due by 11:59pm on the dates listed.)*                         |
| 1/15    | 2.1, Linear Equations; Method of Integrating Factors                                  | MLK Day; No class on Jan. 15                                                  |
| 1/22    | 2.2, Separable Equations  
2.3, Modeling with First Order Equations  
2.5, Autonomous Equations and Population Dynamics | Lab 1 due on 1/26/18                                                          |
| 1/29    | 2.7, Numerical Approximations: Euler's method  
8.2, Improvements on the Euler method  
2.4, Difference between linear and nonlinear equations |                                                                                   |
| 2/05    | 3.1, Homogeneous Equations with Constant Coefficients  
3.2, Solutions of Linear Homogeneous Equations; The Wronskian | Lab 2 due on 2/09/18                                                          |
| 2/12    | 7.1, Introduction to Linear First Order Systems  
**TEST 1 (Wednesday 2/14)** |                                                                                   |
| 2/19    | 3.3, Complex roots of the Characteristic Equation  
3.4, Repeated Roots, Reduction of Order | Lab 3 due on 2/23/18                                                          |
| 2/26    | 3.4, Repeated Roots, Reduction of Order (Cont.)  
3.5, Method of Undetermined Coefficients |                                                                                   |
| 3/05    | **Spring Break**                                                                      |                                                                                   |
| 3/12    | 3.7, Mechanical and Electrical Vibrations  
3.8, Forced Vibrations |                                                                                   |
| 3/19    | 6.1, Definition of the Laplace Transform  
6.2, Solution of Initial Value Problem | Lab 4 due on 3/23/18                                                          |
| 3/26    | **TEST 2 (Wednesday 3/28)**                                                           | Course Withdrawal Deadline: 4/01/18                                             |
| 4/02    | 6.3, Step Functions  
6.4, Differential equation w/ Discont. Forcing Functions  
6.5, Impulse Functions | Lab 5 due on 4/06/18                                                          |
| 4/09    | 7.1, Introduction to Linear First Order Systems  
7.2 Review of Matrices  
7.3, Linear Algebraic Equations; Linear Independence, Eigenvalues, Eigenvectors |                                                                                   |
| 4/16    | 7.5, Homogeneous Linear Systems with Const. Coeff.  
7.6, Complex Eigenvalues | Lab 6 due on 4/20/18                                                          |
| 4/23    | 7.8, Repeated Eigenvalues  
Review |                                                                                   |
| 5/01    | **Final Exam Week**                                                                  | Monday, April 30 from 4:50-6:40pm; room tba                                   |
Studying for the class:
While diligent, timely completion of the online homework assignments is necessary to master procedural skills, this alone is usually insufficient to gain conceptual understanding. To master the concepts, you must review and study your class notes and/or the textbook thoroughly with the goal to understand the connections between the concepts.

There is a lot of material to be covered and a lot of homework to be done. You should work continuously throughout the semester, as it is so easy to fall behind. Relying on “just in time” cramming for exams is an ineffective study technique and will virtually guarantee failure in the class.

Piazza: Our site for math discussions outside of class is at piazza.com. You should receive an email from them near the start of the semester. Partly why we use piazza is that it allows students to interact with each other and the instructor and TA, if one. Also, it has a math equation editor which most email doesn’t have. For personal issues (and issues that pertain only to you) you can email the instructor. For math questions, including webwork questions, please post your questions on piazza.

Tutoring is available at the Math Tutor Center in WEXLR 116 and at the Engineering Tutor Center, ECF 102. The math tutoring center located in WXLR 116 is open for tutoring throughout the week. Their hours of operation are

- Monday-Thursday from 8:00 AM until 8:00 PM
- Fridays from 8:00 AM until 3:00 PM
- Sundays from 1:00 PM until 6:00 PM.

The ASU Math Community Center in PSA 303 is an excellent place to get help for the class. The MCC is open Monday to Friday, 10:30am to 6:00pm.

ASU Learning Resource Center (LRC): The LRC, http://asu.edu/lrc provides counseling, tutoring in math (and many other subjects), supplemental instruction, and other types of support to students. LRC resources are available in many residence halls and in the Memorial Union, Room 14. See the LRC web page for further information.

Classroom behavior
Classroom disturbances, including but not limited to: arriving late, talking in class and using cellular devices are not tolerated. Each student is expected to show respect for every student registered in the course. An instructor may withdraw a student from a course when the student's behavior disrupts the educational process under USI 201-10 http://www.asu.edu/aad/manuals/usi/us1201-10.html

Students are required to adhere to the ABOR Student Code of Conduct:
http://www.asu.edu/studentaffairs/reslife/outreach/abor_code.htm

SoMSS and University Policies and Procedures
For semester deadlines related to enrollment, withdrawal or payments, see the academic calendar available at http://students.asu.edu/academic-calendar

- Students with Disabilities Disability Accommodations: Qualified students with disabilities who will require disability accommodations in this class are encouraged to make their requests to me at the beginning of the semester either during office hours or by appointment. Note: Prior to receiving disability accommodations, verification of eligibility from the Disability Resource Center (DRC) is required. Disability information is confidential.
- Establishing Eligibility for Disability Accommodations Students who feel they will need disability accommodations in this class but have not registered with the Disability Resource Center (DRC) should contact DRC immediately. Their office is located on the first floor of the Matthews Center Building. DRC
staff can also be reached at: 480-965-1234 (V), 480-965-9000 (TTY). For additional information, visit: www.asu.edu/studentaffairs/ed/drc. Their hours are 8:00 AM to 5:00 PM, Monday through Friday.

- **Policy on Threatening Behavior**  All incidents and allegations of violent or threatening conduct by an ASU student (whether on-or off campus) must be reported to the ASU Police Department (ASU PD) and the Office of the Dean of Students. If either office determines that the behavior poses or has posed a serious threat to personal safety or to the welfare of the campus, the student will not be permitted to return to campus or reside in any ASU residence hall until an appropriate threat assessment has been completed and, if necessary, conditions for return are imposed. ASU PD, the Office of the Dean of Students, and other appropriate offices will coordinate the assessment in light of the relevant circumstances.

- **Classroom behavior: Make sure you arrive on time for class**  Excessive tardiness will be subject to sanctions. **Under no circumstances should you allow your cell phone to ring during class.** Any disruptive behavior, which includes ringing cell phones, listening to your mp3/iPod player, text messaging, constant talking, eating food noisily, reading a newspaper will not be tolerated. The use of laptops (unless for lecture note taking), cell phones, MP3, IPOD, etc are strictly prohibited during class. Students who engage in disruptive classroom behavior may be subject to various sanctions. The procedures for initiating a disruptive behavior withdrawal can be found at https://clas.asu.edu/resources/disruptive-behavior.

- **Absences related to religious observances/practices:** If you will be absent from class due to a religious observance or practice, it is your responsibility to inform the instructor as soon as possible. Your instructor will work with you on alternative and reasonable arrangements for any time missed.

- **Absences related to university sanctioned events and activities:** If you will be absent from class due to participation in a university sanctioned event/activity, it is your responsibility to inform the instructor as soon as possible. Your instructor will work with you on alternative and reasonable arrangements for any time missed.

- **Academic Integrity:** Academic honesty is expected of all students in all examinations, papers, laboratory work, academic transactions and records. The possible sanctions include, but are not limited to, appropriate grade penalties, course failure (indicated on the transcript as a grade of E), course failure due to academic dishonesty (indicated on the transcript as a grade of XE), loss of registration privileges, disqualification and dismissal. For more information, see http://provost.asu.edu/academicintegrity. Students are expected to maintain the highest ethical standards at all times and in all dealings and interactions with fellow students, faculty, teaching assistants and staff.

**Withdrawal:** A student may withdraw from a course with a grade of W during the withdrawal period. The instructor's signature is not required. A complete withdrawal must be done in person and that it involves withdrawing from all ASU classes, not just Math 265. Students will not be withdrawn if they merely stop coming to class. It is a student's responsibility to verify whether they have in fact withdrawn from a class.

**The grade of Incomplete:** A grade of incomplete will be awarded only in the event that a documented emergency or illness prevents the student who is doing acceptable work from completing a small percentage of the course requirements. The incomplete is not a “get out of jail free” card and cannot be used as an alternative to withdrawal, or as a way to re-take the class for free. The guidelines in the current general ASU catalog regarding a grade of incomplete will be strictly followed.

*Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at https://sexualviolenceprevention.asu.edu/faqs.*

*As a mandated reporter, I am obligated to report any information I become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services, https://eoss.asu.edu/counseling, is available if you wish discuss any concerns confidentially and privately.*