MTH 244: Differential Equations

Fall 2018

University of Rhode Island, Department of Mathematics

INSTRUCTOR:	**Jonathan A. Chávez Casillas**
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LECTURE TIMES:	Tuesday and Thursday, 9:30 - 10:45. Lippitt Room 204
OFFICE:	Lippitt Hall 200A
OFFICE HOURS:	Wednesday 11 am - 2pm (Or by appointment)[1]

Course Objectives and Goals: This is a typical introductory course in differential equations. It lays its foundations in the general theory of ODEs, provides a survey of methods and techniques, and discusses some of the applications of differential equations. At the end of the course the student should be able to use numerical, graphical, analytic techniques to analyze and/or solve scalar and systems of differential equations, and to apply these concepts in the study of basic mathematical models.

Brief Course Description: The course will be divided mainly in three parts:

- **Theoretical solutions to differential equations:** Become familiar with the operations and techniques used for solving exactly differential equations ranging from first order, second order, higher order, homogeneous and non-homogeneous.

- **Numerical solutions to differential equations:** Understand in which cases one cannot expect to have an exact formula for the solution and how to approximate the solution at any point of interest with the aid of a calculator (computer).

- **Applications of Differential Equations** Understand how to set up different problems involving differential equations and discover how does some natural and physical phenomena can be studied and how we can predict the future outcomes with just the information we know today.

[1] The student should supply a reason why he/she cannot attend the regular office hours

Textbook: "Elementary Differential Equations". William F Trench. This is an open source textbook.

Open source textbook. Click in the image above to get a copy of it.

Grade Description: There will be two Midterms and a *Cumulative* Final Exam. There are no make-up quizzes or exams. If you need to be absent from a class or test for valid reasons, you should notify the instructor with anticipation and the weight will be sent to the final examination. For reference see section 8.51 of the University Manual. The grade will be computed as follows:

Exam 1:	20%	October 11th
Exam 2:	20%	November 20th
Quizzes:	15%	Usually, one per lecture
Homework:	15%	Once every lecture.
***Cumulative* Final Exam:**	30%	TBA

- **Exams:** Both midterms (Exam 1 and Exam 2) and the *Cumulative* Final Exam will be a combination of true/false, multiple choice and open answer questions. There is no partial credit for the true/false and multiple choice questions; however, there will be partial credit in the open answer questions. **There are no make-up exams**. If, for any **valid** reason (up to the discretion of the instructor), you cannot attend any of the midterms, the weight will be shifted towards the final exam.

- **Grade distribution**[2]**:**

92.00 - 100	A		68.00 - 70.99	C
87.00 - 91.99	A-		64.00 - 67.99	C-
82.00 - 86.99	B+		60.00 - 63.99	D+
78.00 - 81.99	B		55.00 - 59.99	D
75.00 - 77.99	B-		0.0 - 54.99	F
71.00 - 74.99	C+			

- **Quizzes:** Quizzes will be given at the consideration of the instructor. Usually, there will be one quiz per lecture, but some weeks there may be none. The questions at the quizzes will be slight modifications of the Homework (See below). At the end of the semester, the lowest 2 quizzes will be dropped. Since the lowest 2 quizzes will be dropped, there is no

[2]Different grades may be given for borderline cases, to the discretion of the instructor.

re-weighting of quizzes. If you miss a quiz (even with a valid reason) it will count towards those 2 dropped quizzes. A re-weighting of quizzes may be given only in the event that you have missed more than 2 quizzes, all with valid reasons.

- **Homework:** Homework will be assigned at the end of each lecture. It is the student's responsibility to complete all the assigned exercises and to go to office hours or ask in class if there are questions. There are two main components in the grading of the homework. A first component is that all problems were done (completion). A second component is that up to three, randomly assigned, problems from each homework will be graded. Both components will be considered for assigning a grade for the homework. However, making the homework as consciously as possible becomes of vital importance since the quizzes' content and most of the test content will be primarily generated from the homework questions.

Attendance and Course Expectations: The student is expected to attend all the lectures even-though there is no official "roll call". **This is a very demanding course** and it is expected hard work from the students. Students are responsible for all missed work, regardless of the reason for absence. It is also the student's responsibility to get all missing notes and material covered within that missed lecture. Moreover, the student is expected to:

- **Clear Writing:** All the student work presented to the instructor (quizzes, exams, homework questions) should be legible and clean. No steps should be skipped when doing a rational deduction.

- **Homework:** Do all the homework assigned even-though it is not graded. The fast pace of the class require that the student perform work out of class.

- **Prepare for lecture:** The student is expected to read the material of the class prior to attending. The different topics and fast pace require that the student reads the textbook before coming to class.

- **Ask for questions:** If the student does not understand some points of the lecture, the student is expected and encouraged to ask questions in lectures and attend office hours if needed.

- **Standards of behavior:** Students are responsible for being familiar with and adhering to the "Community Standards of Behavior: University Policies and Regulations" (found at `web.uri.edu/studentconduct/university-student-handbook`). If the student arrives late to class, he/she should not disrupt the class. All cell phones or any electronic devices must be turned off.

Make up policy: As mentioned above, there are no make-up exams or quizzes. If there is a valid reason for missing a test, the weight will be redistributed towards the final exam. For quizzes, since the lowest 2 grades are dropped, no weight will be re-distributed for the first 2 missed quizzes (even-thought there is a valid reason). For more than 3 justified absences, a re-weighting can be done.

- **Electronic Devices and other policies:** No electronic devices are allowed, except for note-taking devices (and being used for taking notes) and other particular electronic devices that the instructor allows.

- **Academic Honesty Policy:** Cheating is defined in the University Manual section 8.27.10 as the claiming of credit for work not done independently without giving credit for aid received, or any unauthorized communication during examinations. Students are expected to be honest in all academic work. Consequences for any charge of cheating or plagiarism will follow the guideline established in the University Manual 8.27.10-8.27.21, `http://web.uri.edu/manual/chapter-8/chapter-8-2/`.

- **Special Needs:** Students with disabilities should contact the instructor at the beginning of the semester so that he/she is provided reasonable accommodations. Students must also contact Disability Services for Students: Office of Student Life, 330 Memorial Union, 874-2098 to determine the appropriate accommodations.

- **Academic Enhancement Center (AEC):** In addition to lecture and office hours, the Academic Enhancement Center (AEC) offers extra academic help. For more information on AEC services, study tips, and SI session, visit the AEC website at `http://web.uri.edu/aec/`.

- **Religious holidays:** Per policy of the University of Rhode Island, on an individual basis, the student has the opportunity to observe their traditional religious holidays. However, a written notification to each instructor is required.

- **Tentative Course Outline:** The weekly coverage might change as it depends on the progress of the class.

Date	Section Number	Homework
Sept. 6	1.2-1.3	**1.2:** 2,5,6,9
Sept. 11	2.1	**2.1:** 3,5,10,11,18,21,35,36,45
Sept. 13	2.2-2.3	**2.2:** 4,11,23,24,25,29,36,37; **2.3:** 12,13,17
Sept. 18	2.4	**2.4:** 4,9,16,27,33,34,46,47,51,55,57,58
Sept. 20	2.5-2.6	**2.5:** 5,8,13,17,21,33,38; **2.6:** 10,11,15,21,22
Sept. 25	4.1-4.2	**4.1:** 3,8,10,17,18,19; **4.2:** 4,7,9,10,14,15,18,19
Sept. 27	4.3	**4.3.** 1,3,6,8,10,11,17,19,20
Oct. 2	5.1-5.2	**5.1:** 7,9,19,22,27,34,35; **5.2:** 14,15,17
Oct. 4	5.2-5.3	**5.2:** 22,25,26,29,31; **5.3:** 2,11,17,22,34
Oct. 9	5.4	**5.4:** 5,6,17,18,27,35,36
Oct. 11	Review	
Oct. 16	Midterm	
Oct. 18	5.5	**5.5:** 3,4,7,14,15,24,25,30,31
Oct. 23	5.6-5.7	**5.6:** 5,16,25,31,37,38a,39d; **5.7:** 6,13,16,30,31
Oct. 25	6.1-6.2	**6.1:** 2,7,13,18,19,20; **6.2:** 4,7,17,20
Oct. 30	6.3-6.4	**6.3:** 1,4,7,8,12; **6.4:** 4,5,6
Nov. 1	3.1	**3.1:** 1,4,6,14,17,21,22
Nov. 6	3.2	**3.2:** 2,8,12,18,23,26,29,30
Nov. 8	3.3	**3.3:** 1,4,9,17,21,27
Nov. 13	8.1	**8.1:** 1,2,3,6,8,10,11,12,13,15
Nov. 15	Review	
Nov. 20	Midterm	
Nov. 27	8.2-8.3	**8.2:** 1f, 2d, 3b, 4d,5b,6f,7d,8c; **8.3:** 1,5,8,10,19,25,28
Nov. 29	8.4	**8.4:** 1,6,7,12,19,24,27
Dec. 4	8.5	**8.5:** 1,2,7,12,14,20,21
Dec. 6	8.6-8.7	**8.6:** 1f,2g,3a,4c,5d,11; **8.7:** 3,14,19,
Dec. 11	Final Review	