Lamar University
Department of Mathematics

Syllabus, MATH 3301-05, Ordinary Differential Equations
Spring 2018, January 16 – May 8
TR 2:20-3:40, Galloway Business GB113, 3 credits

Instructor: Dr. Mohsen Maesumi
Office: L206 Lucas
Contact: 409-880-8766, maesumi@lamar.edu, maesumi@gmail.com
Office Hours: Online + Before/After each class + By Appointment
TR 1:15-2:15, MW 3:15-4:15, knock on door
Recommended Texts: Elementary Differential Equations (and Boundary Value Problems)
by W. E. Boyce & R. C. DiPrima, 10th edition,

Prerequisites: C or better in Calculus II Math 2414 or its equivalent.
Students should be comfortable with functions, differentiation, and integration.
Required Access Code WebAssign homework access code is required, for Spring 2018
Website http://www.math.lamar.edu/faculty/maesumi/syllabi.html
Preferred Prerequisites: Taking this course right with only Calculus II as prereq is not recommended.
Prerequisites: I suggest you take it after Calculus I,II,III, Physics I,II
Short To-Do list: Sign on WebAssign,
Read, print, sign, scan and email the Class Regulations Sheet
Give a hard copy + Email resume, (sign roll)
Correct “Preferred Banner email address” if instructed (notify me of correction).
Prepare binder+100 pages+4 examination Blue Book notebooks (small size).

Class Regulations:
During the last few years my courses have been redesigned to have an “open access” policy. For example, you have access to your notebook on tests. Also app-based instruction is used extensively to help students excel in their courses. As a result the grades have gone up from their historical average of 55 to well over 75. However a small group of students have taken unfair advantage of the course openness and engaged in various violations of academic honesty standards. For the grading system to be fair to all students it is essential that certain minimal and common-sense standards to be observed by all students.
To enforce these standards I will employ a “penalty schedule” for various infractions. Students are to read the class information here and online, and then sign a statement, at the latest by the census day, stating that they have read, understood, and agreed with class rules and the penalty schedule. As these will be strictly enforced you should take this seriously and if there are issues send an email and come to see me.
Please note that the first rule states: “Saying ‘I did not know’ will double the penalty.”
Catalog Description: First order equations: modeling and population dynamics, stability, existence and uniqueness theorem for nonlinear equations, Euler's method. Second order equations: nonlinear equations via reductions methods, variation of parameters, forced mechanical vibrations, resonance and beat. Laplace Transform: general forcing functions, the convolution integral. Systems of ODEs: eigenvalues and phase plane analysis. Prerequisites: Grade of C or better in MATH 2414 or its equivalent. Prepares for: Partial Differential Equations MATH 4302, and Numerical Analysis MATH 4315. Offered: Fall, Spring, Summer.

Learning Outcomes: Upon successful completion of this course, students will be able to:

1. Describe applications to sciences and engineering.
2. Sketch direction fields and interpret solution behavior from the sketch.
3. Solve first order differential equations and use them to model certain physical situations such as mixing problems, population dynamics, and falling bodies.
4. Solve homogeneous and nonhomogeneous second order differential equations and use them to investigate vibration problems.
6. Solve systems of differential equations and sketch the phase portrait for the system (if time permits)

Topics to be Covered:

1- Separable differential equations, Section 2.2
2- Method of integrating factor, Section 2.1
3- Direction fields, Section 1.1
4- Solution of Basic ODEs Section 1.2
5- Classification of ODEs, Section 1.3
6- Modeling with first order ODEs, Section 2.3
7- Differences between linear and nonlinear, Section 2.4
8- Autonomous equations, stability Section 2.5
9- Second order ODEs, Section 3.1
10- Reduction of order and repeated roots, Section 3.4
11- Complex roots of characteristic equation, Section 3.5
12- Mechanical vibrations Section 3.7
13- Resonance and forced vibrations Section 3.8
14- Laplace Transforms Section 6.1
15- IVP via Laplace Section 6.2
16- Step functions Section 6.3
17- Discontinuous forcing functions Section 6.4
18- Impulse functions Section 6.5
19- Convolution integral Section 6.6
20- Systems of ODEs Section 7.1
**Lectures/Discussions:** We will have traditional lectures augmented by online resources as found in the Course website where links to video lectures of prior years for this course and prerequisite courses may be available. The course topics, sections, and homework list will be posted on WebAssign. Additional homework problems or projects may be posted on course website.

**Reading is required!** Students should expect that they will be required to read the text. We won’t have the necessary time to explain every fact, step, prerequisite, etc.

**Homework:** This counts for 50% of your grade. Most of it is to be done on the WebAssign software, where there are buttons for “show me an example”, “ask for extension”, “ask your instructor”. Short questions can be answered online, if it is lengthy I will ask you to come and see me in office. Students should consider a homework target deadline for themselves that is 24 hours earlier than the software deadline. Time extension will not be given for Internet/electrical/financial problems. There is a substantial penalty for late submission. There is an automatic extension button if you are late less than a week. Homework from beginning of semester will lose all of its point value by the end of semester. If you download the key to homework you cannot get extension.

Course evaluation, conducted during the last few days before final, will be the last “homework” and is required. Submitting the resume and the signed Regulation Sheet is the first “homework”.

**Exams and Grading Policies: (This information is subject to change)**
*There will be three sectional tests and a cumulative final each counting for 1/8 of the total grade for the course. The other 50% comes from homework. You are to bring a “Blue Book” and DL/LU to each test.  
*Approximate exams dates: Thursdays February 8, March 8, April 12, Final Tuesday May 8, 2:00-4:30.  
*Grading scale: A>90>B>80>C>70>D>60>F.  
*In case you want your exam to be reviewed and re-graded you need to notify me within one week from the day grades are given. Two weeks after the final exam your course grade data will be discarded, unless you make a written request in person during the semester.  
*All issues that may influence your grade should be documented in an email from you to me and acknowledged in an email from me to you. At the time of the final test, and before final grades are given, send a summary email.  
*If an emergency prevents holding the final exam for the whole class, a substitute grade will be made from existing grades at the instructor’s discretion.  
*Border line cases: or, when does 89.99 become an A?  
Answer: Please make sure you attend the classes and perform ALL of the following tasks:  
  Register on WebAssign within the first week  
  Send your resume within the first week  
  Do the course evaluation (email the acknowledgement page)  
  Participate by coming to board to solve problems.

**Fair Use Policy (or how to avoid plagiarism charge on homework or project or take home exams):** Students are encouraged to try do the homework problems without seeking help. But it is OK to consult other students and resources to learn how to solve homework problems. If you want to seek help on a problem the acceptable process is the following:  
(a) Throw away whatever you have written on that problem so far  
(b) Get input from as many resources as you wish  
(c) Write the solution of the problem all by yourself without looking at any other source  
(d) If you get stuck again go back to Step (a)  
At the end you should be able to reproduce and justify the steps of the solution you submit. For example by coming to the board and explaining it.
**DRC:** Students are to arrange a meeting with me as early as possible.

**Privacy Issues:**
There may be a seating assignment. Every-other seating is preferred when possible.
Your activity on computer will be monitored.
Your papers, calculators, phone and any item on table during tests may be inspected by the instructor.
You may be asked to change your seat during a test.
If you violate the Test Code or class decorum rules you may get a public reminder in class.

**Mathematical Writing Rules:**
Students are to familiarize themselves with type-setting formulas on WebAssign. Some of the basic points of hand-writing mathematics are posted on a separate sheet available on course site.

**Test Code:**
During tests do not look sideways, you are to look at your own papers and protect them from others. Your face should be visible to the instructor.
No obstruction by sunglasses, hair, hand, caps, etc.
Bring Lamar ID to all tests.
Use of printed sheets, cell phones, advanced calculators, shared calculators or loose paper is not allowed.
Use of unauthorized websites and communication with others, is not acceptable during tests.
Do not give your WebAssign passwords to any other person for any reason.
Unauthorized logins to WebAssign may result in a grade of F for the course.
See the penalty schedule for cost of infractions.
University academic integrity rules apply (see below).

**Calculator:** You are allowed to have a basic scientific calculator on tests. These cost about $20 new and do not have the following capabilities: graphing, matrix, computer algebra, wireless, or text storage. If you do not have a proper calculator you will take your test without one. Advanced calculators (e.g. TI80), cell phone calculators or sharing is not allowed. See penalty schedule for cost of infractions.

**Curving the Grades:** The grading style already has a built-in curve by allocating 50% to homework and allowing students to use their notebooks. Asking for an additional “curve” will look very odd. However students usually want to know how to improve their grades. Here are the typical questions and answers, as well as related policies.

Q. How does doing homework improve my grade?
A. First they count as 50% of the grade. Second: Tests are open notebook and mostly based on problems you have already done.
You are allowed to have one binder of entirely handwritten notes on the tests. Your notebook may contain
(a) Complete statement of problems and their solutions, from WebAssign or the text.
(b) Lecture notes.
(c) Handwritten formula tables from trig/algebra/calculus.
(d) Table of content and an index.
Please use a binder as loose papers are not allowed. Having printed papers results in a penalty.
This is a major privilege, not a right; so please do not abuse it as it may be revoked.
Q. How does attendance improve my test grade?
A. Homework questions are similar to the problems in the text, and these are what we will practice in class. Exam questions are very similar to problems done in class so attendance becomes very important.

Q. How do I improve my exam scores?
A. Try practice tests (under time constraints) before exams. The more of these practice tests you do the higher your grade.

**How to Succeed:**
This class is designed to allow you to get a high passing grade if you consistently apply yourself from the beginning.

For your notebook to be effective it needs to be searchable (as in a well-designed website) with page numbers, index, complete statement of problems and solutions, definitions, methods, and summaries. (Without having done the homework the notebook will not be of much help. So, please do not abuse this privilege!)

Even though you do the homework on WebAssign you should consider writing each problem in your notebook in its entirety so that you can look it up during tests.

Redo each problem several times to build up speed. That is how to do well on tests.

**Items Allowed on Tests:**
You may have a single binder of entirely hand-written class notes.
You may have hand-written solutions for homework, provided that the entire problem is recorded.
You may have a table of content in your binder, with page numbers, and an index of key phrases.
You may have hand-written formula sheets in your binder (for algebra/trig/integral/derivative).
For including anything else on your notebook ask me before assuming.
You may have a basic scientific calculator (cost: about $20 new).
See penalty schedule for the cost of infractions.

**Course Evaluations:** This is the final homework, and an important and required component for the course. You will receive an email reminder through your LU account. Evaluation window is open only for a few days and closes before finals start. Once you get the reminder go to your “MyLamar/Course Evals” link to complete. To prove that you have done the evaluations and get the points you need to print the “Acknowledgement Page” that comes up once you are done with evaluations. Write your name and your course name on it. Give the sheet to me with the exam booklet of the final test. Make sure you are on a working printer before you start. The Acknowledgement Page is only available immediately after you are done with evaluations (it disappears upon second login).

Problems: Assessment Office 880-1843.

**Student Contact Info:** Students are required to have an active email registered with University which shows up on the “class email list”. A trial email will be sent and announced in class. If you do not receive it, it is your responsibility to contact the responsible university office to correct the issue. A small percentage of students do have problems with their emails. It is typically due to not selecting a “preferred email” during registration. Other issues are misspelling your email, putting parent email, or using email from a cancelled service.
If you ignore this issue, there will be no compensating recourse later. Please do not change your name or email mid semester.
**Instructor Contact Info:** Your emails to me must be signed by putting your full name (as on the class roll) and the course name. You may be contacted with some last minute course information by email. Sent to maesumi@gmail.com and maesumi@lamar.edu. If you leave a phone message for me (8766) please speak clearly and duplicate it by an email. Do not use reply button if your email is on a new topic. Please do not send zipped mail or any mail that requires additional software for viewing it.

**Absence:** Class roll may be taken. Do not sign for others. Unexcused absence beyond 10% of classes may reduce your grade by 1 point per missed class. Make up for tests requires notification on the same day and submission of verifiable written proof of emergency within one day. An individual decision will be made in each case. The final exam cannot be postponed. See penalty schedule for the results of fake emergency excuse. The grade for an excused missed test may be constructed through adjusted average of other tests or by using the final exam score.

**Buddy System:** Students are to form groups for helping each other in case of absence (for example giving each other copies of notes and the latest news), or for group study.

**No:** Tardiness, food of any type, drinks, gum, ice, chips, candy, noise, music, headsets, e-activity as in surfing, scrolling, texting in class. Please turn off and put your phones and music devices away. Same rules apply when you come for office visits. See penalty schedule for the cost of infractions.

**Teams and Half-time Breaks:** We will experiment with a 30-5-25-5-25 timing where each 5 minute period will be a break for asking questions or just walking around. Students will be divided in teams of 4 for joint in-class work. You are encouraged to bring a laptop with you to class but not for surfing.

**WebAssign Errors:** These do occur but are very rare. Typically the student has made a typo and thinks it is an error in WebAssign. Please read the syntax hints sheet that is posted online. Usually it is the issue of lower case vs upper case, Greek (alpha) vs English (a), 1(one) vs l (ell), 0 vs o, bold font vs ordinary font, [ ] vs ( ), etc. Keep a record of typical errors to remind yourself. If you think WebAssign is making a mistake let me know and I will contact the company. Check your PC for compatibility with WebAssign. You may have to update your browser or Flash or other components. Check that graphs and formulas show properly. This has to be done well in advance of any critical deadline for any assignment. Usually tablets or phones might not work as expected.

**Student Resume:** Students are required to make a resume for themselves applicable to this course. Keep it simple and limit it to one page. Items to include: an ID-type photo, detail of math courses taken, major, minor, employment, long-term career plan, responsibilities, and any specific issue I need to know about before we start. Give me one copy by the end of first week and send the same by email. If the grade for this course is especially important to you detail for me the steps you are taking from the beginning of the semester to ensure your success.

**Extension Time on Tests and Votes:** Students typically ask for extension time on tests. This requires unanimous approval of students who are present. During a test I may ask if you agree to extend the test by 0, 5, 10, 15 minutes. We will go by what is feasible and approved by all in attendance. In case of an in-class vote, if you are not in class during the vote and do not contact me within 6 hours of class vote time then you accept the result of the vote cast by others.

**Audit Students:** These students should contact me before signing on WebAssign. Uninvited students, multiple registrations, dropped students will be removed from the class list.
**Letters of Recommendations:** Students who are applying to graduate schools or scholarships are encouraged to do a project in addition to course requirements in order to get a strong letter.

**Corrections:** While I have made a sincere effort to ensure that this syllabus is correct, changes may be required. I will announce any substantive changes during a regularly scheduled class or by email. If you have suggestions or concerns feel free to bring it to my attention.

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**Important University-Wide Information for Students**

Please double check deadlines on academic calendar and Important Dates Spring 2018

Lamar University expressly prohibits intimidation and harassment of students, faculty, staff, or applicants. See [http://students.lamar.edu/academic-support/code-of-conduct.html](http://students.lamar.edu/academic-support/code-of-conduct.html)

**Drop Policy:** Please make note of the three dates indicated in this drop policy. Any drop will be your responsibility; I will not drop a student from the course.

*January 31, 2018:* (Census Date-Six Drop Rule does not apply) A student may drop or withdraw without consulting with the instructor. The Six Drop Rule does not apply to a drop before 5:00 PM.

*February 12, 2018:* (Six Drop Rule applies) A student may drop or withdraw from the course without academic penalty and receive a Q, however, the Six Drop Rule applies. The student will consult with the instructor and the Records Office to initiate a drop.

*February 19, 2018:* (Six Drop Rule applies) Last day to drop or withdraw with academic penalty; the student must be passing the course at the time of the requested drop in order to receive a Q. The drop form, including all required signatures, must arrive in the Records Office by no later than 4:00 PM. No drop is allowed after this date except in extreme extenuating circumstances. Any “late drop” must be approved by the instructor, department chair, college dean, and provost.

**Academic Integrity:** Students are expected to maintain complete honesty and integrity in their academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. Students are specifically warned against all forms of cheating and plagiarism. The *Lamar University Student Handbook* clearly reads: “Any student found guilty of academic dishonesty in any phase of academic work will be subjected to disciplinary action. Punishable offenses include, but are not limited to, cheating on an examination or academic work which is to be submitted, plagiarism, collusion, and the abuse of source materials.” One aspect of the *Handbook’s* definition of cheating includes “purchasing or otherwise acquiring and submitting as one’s own work any research paper or other writing assignment prepared by an individual or firm.” Plagiarism is defined as “the appropriation and the unacknowledged incorporation of another’s work or ideas into one’s own and submitted for credit.” Faculty members in the College of arts and Sciences investigate all cases of suspected plagiarism. Any student who is found cheating in this course will receive a course grade of F. [http://students.lamar.edu/student-handbook.html](http://students.lamar.edu/student-handbook.html)
Accommodations: Lamar University is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center (DRC) is located in the Communications building room 105. Office staff collaborate with students who have disabilities to provide and/or arrange reasonable accommodations. If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact the DRC at 409-880-8347 or drc@lamar.edu to arrange a confidential appointment with the Director of the DRC to explore possible options regarding equitable access and reasonable accommodations. If you are registered with DRC and have a current letter requesting reasonable accommodations, we encourage you to contact your instructor early in the semester to review how the accommodations will be applied in the course. http://www.lamar.edu/disability-resource-center/

Campus Closure: In the event of an announced campus closure in excess of four days due to a hurricane or other disaster, students are expected to login to Lamar University's website's homepage for instructions about continuing courses remotely. http://lamar.edu

Emergency Procedures: Many types of emergencies can occur on campus; instructions for severe weather or violence/active shooter, fire, or chemical release can be found at: http://www.lamar.edu/about-lu/administration/risk-management/index.html
Following are procedures for the first two:
Severe Weather Procedure:
• Follow the directions of the instructor or emergency personnel.
• Seek shelter in an interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside.
• If you are in a multi-story building, and you cannot get to the lowest floor, pick a hallway in the center of the building.
• Stay in the center of the room, away from exterior walls, windows, and doors.

Violence/Active Shooter Procedure:
• CALL 8311 from a campus phone (880-8311 from a cell phone). Note: Calling 9-1-1 from either a campus phone or cell phone will contact Beaumont City Police Dispatch rather than University Police.
• AVOID- If possible, self-evacuate to a safe area outside the building. Follow directions of police officers.
• DENY- Barricade the door with desks, chairs, bookcases or any other items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it is safe.
• DEFEND- Use chairs, desks, cell phones or whatever is immediately available to distract and/or defend yourself and others from attack.
**Grade of Incomplete:**
A grade of “Incomplete” may be recorded in the case of a medical emergency documented prior to the final exam and if the student is passing at the time. Such a request must be in writing and include a plan for completion of the course. No "Incomplete" will be authorized after the final exam.

From: [https://catalog.lamar.edu/general-academic-policies/index.html](https://catalog.lamar.edu/general-academic-policies/index.html)

The grade of "I" may be given when any requirement of the course, including the final examination, is not completed. Arrangements to complete deficiencies in a course should be made with the instructor prior to the end of the semester or term. Incomplete work must be finished during the next long semester or the Records Office will change the "I" to the grade of "F." While the extension may be granted by the instructor with the approval of his/her Department Chair and Academic Dean, once the "I" is changed to an "F" it cannot be changed back to an "I." In this case, either a "change of grade" procedure must be initiated or the course must then be repeated if credit is desired. The instructor may record the grade of "F" for a student who is absent from the final examinations and is not passing the course.