

UTRGV – SMSS  
MATH 6360 – 01 & 90L (Ordinary Differential Equations)  
Syllabus for Fall 2023

**Classroom:** EMAGC 1.320    **Time:** MW 8:00pm – 9:15pm, August 28 – December 14, 2023

**Deliver Modality:** Tradition (01) and Online Synchronous (90L)

**Instructor:**

Dr. Zhijun (George) Qiao

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**Office hours:** M & W 4:30pm – 5:30pm (In Person at MAGC 3.722 or via Zoom at <https://utrgv.zoom.us/j/2824166420>) or by appointment.

**Prerequisite:**

A student must have completed and passed MATH 3349 (Differential Equations) with a grade B or better, or with the consent of instructor. The student not meeting this requirement may be asked to drop the course.

**Textbooks:** Ordinary Differential Equations & Dynamical Systems, Gerald Teschl, 2014 Version, Publisher: American Mathematical Society, ISBN-13: 9780821883280, ISBN-10: 0821883283

**Topics:**

The topics covered are the standard theorems concerning linear systems, existence and uniqueness of solutions, dependence on parameters, stability theory and some applications.

**Math Software:** Maple/Mathematica or Matlab, which is capable of performing complicated integrals and calculations (e.g. some definite integrals and series etc), is recommended to use for checking if your result is correct.

**Daily supplies:** You need to bring your Notebook, Loose leaf paper, Graph paper, Pen, Pencil etc to the class.

**Course Objectives:** This course examines existence and uniqueness of and methods for calculating solutions to systems of ordinary differential equations, the study of algebraic and qualitative properties of solutions, and iterative methods for numerical solutions of ordinary differential equations. Emphasis will be placed on the learning and understanding of definitions and abstractions in mathematics, as well as the study of the use of integration and series in real-world problems. A more detailed list of topics is given in the lessons.

**Student Learning Outcomes:** After completing this course students will

1. Master the standard theorems on the existence, uniqueness, continuation, and continuity properties of solutions that apply to a wide class of ordinary differential equations.
2. Understand the theory of linear systems of first order ordinary differential equations, the methods of their solution, and the qualitative properties of their solutions.
3. Know the stability properties of linear, almost linear, and nonlinear systems and how to identify these properties.
4. Understand the notation and language of ordinary differential equations and be able to apply the theory discussed to applied problems.

### General Grade Policy

**Homework, Quizzes, and Projects** – Homework assignment is assigned daily and will consist of problems and reading from the lecture notes and occasional handout. Quizzes and Projects are based on homework problems. There will be up to 3 quizzes. A project will be taken every 1.5 months, namely, 2 times in the whole semester. Projects will be designed in two formats: each student gives a presentation based on the homework, and the other is to solve some physical problems I will assign. It is strongly recommended that students work on all those homework problems since quizzes and projects are closely related to your homework problems. Completing the assignments is the *single most important part* of this course. You will be expected to spend, on average, about 4 hours each week completing the assignments. All students are strongly encouraged to do teamwork for their homework and projects. The assigned problems will not be collected or graded, but they will form the basis for projects and all tests and the final exam. I will use office hours and a small portion of class time to address any questions you may have about your homework problems. A homework assignment sheet will be delivered to everybody on the 1<sup>st</sup> day of class. No late homework, quizzes and projects will be accepted.

**Tests** – There will be two 75-minute tests. All tests must be taken during their scheduled times. The test time will be announced in advance (basically, a test will be given every two chapters), and a brief review will be given before each test. All students must show their work on the tests. Scores will be provided to you separately. No re-test opportunities.

**Final Exam** – The comprehensive final exam is tentatively scheduled on **Monday, December 11, 2023, 8:00pm – 9:45pm**. All students must take the final exam at the scheduled time. A summary review will be given in the class before the final exam.

**Grading** – The course grade will be based on

Homework and Quizzes	50 pts
Two projects at 25 pts each	50 pts
Test 1	100 pts
Test 2	100 pts
Comprehensive Final Exam	100 pts
<hr/> Total	<hr/> 400 pts

The course grade will be assigned according to a scale no higher than A (85-100%), B (75-84%), C (60-74%), F (below 60%).

**THERE WILL BE NO MAKE-UP EXAMS GIVEN.**

If a student is absent during a scheduled major test and quiz, the student must go by the instructor's office during the scheduled office hours to discuss the validity of the excuse. In the case of a valid excuse, the missed test grade will be replaced by the final exam grade. If a student does not have a valid excuse, the grade for the missed test is a zero and cannot be replaced. If you arrive late for a test you will not be given additional time to complete the exam. Anyone arriving at a test after somebody else who took the exam has left will not be allowed to take the exam. Students missing more than one exam may be dropped from the course. With an unexcused absence, a score of 0 will be recorded for the missed HW/Quiz or exam.

**Tutoring: you may use online resources as your own study for homework problem solving.**

**Classroom Behavior:**

- All beepers and cellular phones must be turned off before you enter the classroom.
- Once in class, a student is expected to remain in class for the duration of the class. If a student needs to leave class early, then the student needs to discuss the situation with the instructor before class begins.
- During class students are expected to be courteous to the instructor and other classmates. Examples of discourteous behavior are unnecessary talking, sleeping, tardiness, leaving class while instructor is lecturing, sharpening pencils during the lecture, etc.
- No Food Allowed In Classroom.
- Chronic tardiness and discourteous behavior will not be tolerated and is the cause for a student's dismissal from class for the remainder of the semester.

**UTRGV Policy Statements**

UTRGV requires all electronic communication between the University and students be conducted through the official University supplied systems UTRGV-Mail. Please use your UTRGV-Mail account for all correspondence with me.

**Calculators, Cell Phones, and Other Electronic Equipment**

Calculators will be permitted for use on exams. Electronic equipment such as cell phones, pocket organizers, tablet or laptop computers, or electronic writing pads or pen-input devices will not be permitted during exams. Please make sure that cell phones are turned off and stored away during class.

**MANDATORY COURSE EVALUATION PERIOD:**

Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (<https://my.utrgv.edu/home>); you will be contacted through email with further instructions. Students who complete their evaluations will have priority access to their grades. Online evaluations will be available: July 1 – 8 for summer I semester courses.

**ATTENDANCE:** Students are expected to attend all scheduled classes and may be dropped from the course for excessive absences. UTRGV's attendance policy excuses students from attending class if they are participating in officially sponsored university activities, such as athletics; for observance of religious holy days; or for military service. Students should contact the instructor in advance of the excused absence and arrange to make up missed work or examinations.

### **STUDENTS WITH DISABILITIES:**

If you have a documented disability (physical, psychological, learning, or other disability which affects your academic performance) and would like to receive academic accommodations, please inform your instructor and contact Student Accessibility Services to schedule an appointment to initiate services. It is recommended that you schedule an appointment with Student Accessibility Services before classes start. However, accommodation can be provided at any time. **Brownsville Campus:** Student Accessibility Services is located in Cortez Hall Room 129 and can be contacted by phone at (956) 882-7374 (Voice) or via email at [ability@utrgv.edu](mailto:ability@utrgv.edu). **Edinburg Campus:** Student Accessibility Services is located in 108 University Center and can be contacted by phone at (956) 665-7005 (Voice), (956) 665-3840 (Fax), or via email at [ability@utrgv.edu](mailto:ability@utrgv.edu).

### **SCHOLASTIC INTEGRITY:**

As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism, and collusion; submission for credit of any work or materials that are attributable in whole or in part to another person; taking an examination for another person; any act designed to give unfair advantage to a student; or the attempt to commit such acts. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations and UTRGV Academic Integrity Guidelines). All scholastic dishonesty incidents will be reported to the Dean of Students.

### **SEXUAL HARASSMENT, DISCRIMINATION, and VIOLENCE:**

In accordance with UT System regulations, your instructor is a “responsible employee” for reporting purposes under Title IX regulations and so must report any instance, occurring during a student’s time in college, of sexual assault, stalking, dating violence, domestic violence, or sexual harassment about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at [www.utrgv.edu/equity](http://www.utrgv.edu/equity), including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect in an environment free from sexual misconduct and discrimination.

**COURSE DROPS:** According to UTRGV policy, students may drop any class without penalty earning a grade of DR until the official drop date. Following that date, students must be assigned a letter grade and can no longer drop the class. Students considering dropping the class should be aware of the “3-peat rule” and the “6-drop” rule so they can recognize how dropped classes may affect their academic success. The 6-drop rule refers to Texas law that dictates that undergraduate students may not drop more than six courses during their undergraduate career. Courses dropped at other Texas public higher education institutions will count toward the six-course drop limit. The 3-peat rule refers to additional fees charged to students who take the same class for the third time.

### **Tentative Course Schedule:**

**Part 1: Classical Theory**

**Part 2: Dynamical Systems**

**Part 3: Chaos**



