

Fall 2018

MATH 5346: Advanced Topics in Applied Mathematics I

Location: Math 108

Professor: Dr. Aminur (Amin) Rahman; Office: Math 222; Email: amin.rahman@ttu.edu

Office hours: W: 1pm – 3pm, F: 1pm – 2pm + by appointment

Course website: <http://myweb.ttu.edu/aminrahm>

Prerequisites: Knowledge of differential equations, linear algebra, and programming

Textbook: Mathematics Applied to Deterministic Problems in the Natural Sciences by C. C. Lin and L. A. Segel

Tentative Schedule:

	Topics	Optional Exercises
Week 1 (8/27, 8/29, 8/31)	Intro, Sec. 1.2	
Week 2 (9/5, 9/7)	Sec. 1.3, DS review	Phase Planes
Week 3 (9/10, 9/12, 9/14)	DS review, Sec. 11.3	
Week 4 (9/17, 9/19, 9/21)	Sec. 11.3, Phase Planes, Sec. 2.2	Perturbation Methods
Week 5 (9/24, 9/26, 9/28)	Sec. 2.2, Chaos,	
Week 6 (10/1, 10/3, 10/5)	Maps, fractals	
Week 7 (10/8, 10/10, 10/12)	Fractals, Sec. 3.2	
Week 8 (10/15, 10/17, 10/19)	Sec. 3.2, 4.1	
Week 9 (10/22, 10/24, 10/26)	Sec. 4.1, 4.2, 4.3, 5.1, 5.2	
Week 10 (10/29, 10/31, 11/2)	Sec. 5.3, 5.4, 6.1	
Week 11 (11/5, 11/7, 11/9)	Sec. 6.2, 6.3, 7.1	
Week 12 (11/12, 11/14, 11/16)	Sec. 7.2, 9.1, 9.2	
Week 13 (11/19)	TBD	
Week 14 (11/26, 11/27, 11/29)	Sec. 10.1, 10.2, Sec. 16.1	
Week 15 (12/3, 12/5)	Sec. 16.2, 16.3	

No mandatory homeworks, but I will give optional problems and make answer sheets for them.

Course Grade: Three or four small projects + peer review (on 1 – 4 scale, 0 if not submitted)

Note: I will grade everything, and won't be subject to peer review. Peer review is purely for practice writing reviews.

Tentative Curve: A: > 3, B: > 2, C: > 1, D: = 1, F: < 1

Expected Learning Outcomes: Students will conduct independent research based on topics of applied mathematics covered in the relevant lectures. They will also participate in double-blind peer reviews of each other's works.

Methods of Assessment of Learning Outcomes: Continuous assessment of the progress of the course occurs through ongoing communication between the instructor and the students. Students

are encouraged to ask questions during class and to seek the instructor's help outside of class when needed. Formal assessment occurs through small independent projects, which are then subject to peer review. See descriptions below.

Other important information

Projects: In certain special circumstances an extension may be given after the student follows all university protocol.

Programming: You will be expected to write programs in a language you are comfortable with for certain projects.

Attendance: TTU considers attendance mandatory, and you may have no more than three unexcused absences during the semester, which I will enforce if your average falls below a C.

Important dates and university policies

1. September 3: Labor Day – university closed
2. September 12: Last day for student initiated drop without academic penalty
3. October 29: Last day for student initiated drop with academic penalty
4. November 21 – 25: Thanksgiving (No class Wednesday and Friday)
5. December 5: Last day of class
6. **Civility in the classroom:** Texas Tech University is a community of faculty, students, and staff that enjoys an expectation of cooperation, professionalism, and civility during the conduct of all forms of university business, including the conduct of student–student and student–faculty interactions in and out of the classroom. The classroom is a setting in which an exchange of ideas and creative thinking are encouraged and where intellectual growth and development are fostered. Students who disrupt this classroom mission by rude, sarcastic, threatening, abusive or obscene language and/or behavior are subject to appropriate sanctions according to university policy.
7. **Academic integrity:** It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension. Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act.
8. **Observance of religious holy day:** “Religious holy day” means a holy day observed by a religion whose places of worship are exempt from property taxation under Texas Tax Code 11.20. A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time

after the absence. A student who is excused may not be penalized for the absence; however, the instructor may respond appropriately if the student fails to complete the assignment satisfactorily.

9. **Accommodation of students with disabilities:** Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructors office hours. Please note: instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, please contact Student Disability Services in West Hall or call 806-742-2405.