

Fall 2024 TAMU-Commerce Math 2320 – Differential Equations

This is the syllabus for Math 2320-Diff. Eqs, Section 02E for Fall 2024. Please read it carefully. You will be responsible for all information given in the syllabus, and for any modification to it that may be announced in classes.

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Office hours: MW: 11am-12pm, W:1-2pm, TR: 3:30-4:30pm, or by appointment.

Class schedule and room: TR 11:00am -12:15pm, Binn. 302

Text & Course Material: Elementary Differential Equations with Boundary Value Problems, by William F. Trench, Publisher: Brooks Cole, 1 edition (January 17, 2001); eBook (December, 2013). Tentatively, chapters 1, 2, 3, 4, 5 and 9 of the text will be covered. If time permits, some topics from chapters 6, 7 and 10 will also be covered.

Course Description: First order differential equations, higher order differential equations, series solutions, the Laplace transformations, systems of first order linear equations, initial-value problems.

Prerequisite: Math 2414.

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

1. Classify differential equations into partial differential equations and ordinary differential equations, linear or nonlinear, homogeneous or nonhomogenous, first order, second order or higher order differential equations.
2. Explain a general solution and a particular solution, an initial-value problem, the Existence and Uniqueness Theorem; Wronskian Determinants and fundamental set of solutions; Explain Growth-Decay Model and the Spring Motion Model that use differential equations to model real-world problems.
3. Use methods such as Separating Variables, Variation of parameters, Finding a Potential Function, Substitution and Euler's Method to solve 1st order differential equations for explicit solutions and approximation solutions.

4. Explain the solution structure of higher order linear differential equations and solve some higher order linear differential equations with constant coefficients, some second order linear differential equations with general coefficients, and some system of first order linear differential equations.

Instruction: Instruction will include lecture, demonstration and models, and some group work, based on time available.

Attendance: Attendance will be checked and it is your responsibility to sign the daily roll sheet. It is your benefit to attend the class.

Tests: There will be two midterm tests and a final exam for this course. The tentative schedules for the exams are:

Test 1: Sept. 26, Thursday 11:00am-12:15pm.

Test 2: Nov. 7, Thursday 11:00am-12:15pm

Final exam: The comprehensive final exam is scheduled on
Dec. 10, Tuesday, 10:30am-12:30pm.

Homework & Projects: Homework are assigned on a weekly basis. You are strongly recommended to work out homework assignments on a regular basis since **No one can learn mathematics without doing it!** The assigned homework problems will be collected to grade **once every two weeks** (See the last page for detailed homework due information). Some homework problems or the similar ones may be used as test questions.

Course grades: The course grade consists of
Homework & Quizzes: 20%
Two tests : 50%
Final exam: 30%.

The letter grades will be assigned using the following scale:

A: 90-100% B: 80-89% C: 70-79% D: 60-69% F: 0-59%

Withdrawal Policy: Concerning the deadlines and consequences of withdrawals please check on

<https://inside.tamuc.edu/admissions/registrar/academicCalendars/>

Tutoring & Help : A better way to learn math is to keep progress and leave no gaps in one's study. So please get help as soon as you need it and do not wait until it is too late. You are welcome to come to me or go to Math Skills Center located in **Bin 328** where you can find free tutors for help. The tutoring hours of Math Skills Center for the current semester are:

MTWR 10am – 6pm, and F 10am – 2pm

Academic Integrity: I have a **NO TOLERANCE** policy for cheating and if you are caught cheating you will fail this course. Cheating in this course includes the following:

- Giving or receiving answers during an exam or quiz.
- Viewing the exam or quiz answers of others.
- Having notes/practice work available during quizzes or tests.
- Possession or access to test items before the test is given.
- Deception in getting an excused absence to obtain the undeserved opportunity to make-up work.
- Use of cell phones or text messaging technology during exams or quizzes. You may not use the calculator on your cell phones.
- Improper citations in written works, or using another person's ideas and words as your own without giving proper credit.
- **Any** method, no matter how well rationalized or accepted, which improves a person's grade by any means other than study and skillful performances on exams and/or other assignments.

Students found guilty of an act of academic dishonesty in this course will be subject to receiving an "F" in this course.

Classroom Behavior: "All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment" (See Student's Guidebook). A&M-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

AI use policy: Texas A&M University-Commerce acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources.

13.99.99.R0.03 Undergraduate Academic Dishonesty
13.99.99.R0.10 Graduate Student Academic Dishonesty

The information for students with disability: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact: Office of Student Disability Resources and Services, Texas A&M University-Commerce, Gee Library, Room 132, Phone (903) 886-5150 or (903) 886-5835, Fax (903) 468-8148, email: StudentDisabilityServices@tamuc.edu

Counselling & Help: The Counseling Center at A&M-Commerce, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit www.tamuc.edu/counsel

Campus Concealed Carry Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations. For a list of locations, please refer to (<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>) and/or consult your event organizer). Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

Homework assignments

Section 1.2: 1, 2(a), (b)(g), 3(a), (f), 4(a), (i), 5(a), (b).

Section 2.1: 2, 3, 6, 10, 14, 15, 25, 28, 42.

Section 2.2: 1, 2, 4, 6, 12, 21.

Section 2.3: 1, 4, 17, 19.

Section 2.5: 2, 3, 11, 14, 18, 20, 33

Section 2.4: 5, 8, 17, 22, 28.

Section 1.3: 1, 7, 11, and use MATHEMATICA (in a computer in Math Skill Center-BinB 328 to generate the direction fields of 12, 15, 19, 20.

Section 3.1: 2, 6, 15.

Section 4.1: 2, 3, 6, 14.

Section 4.2: 1, 2, 4, 6.

Section 5.1: 1, 3, 5 (a), (c), (d), 42(a), 44(a).

Section 5.2: 2, 4, 6, 14, 16.

Section 5.3: 2, 4, 6, 11, 18.

Section 5.4: 2, 4, 9, 12, 18, 23.

Section 5.5: 1, 2, 5, 24, 32.

Section 5.6: 2, 5, 7, 24, 31.

Section 5.7: 3, 7, 25, 31.

Section-Extra: Cauchy-Euler equations (see the Lecture Note-20 for the problems)

Section 9.1: 1(a), (d) (f), 2, 4, 6 (a), (b), (g), 10 (a), (b), (d)

Section 9.2: 2, 6, 10, 16, 20, 28 (a), (c), (d), (f), 44, 45.

Section 9.3: 1, 3, 5, 29, 33.

To be continued