

Advanced Mathematics for Mechanical Engineers -II **Course Syllabus – Spring 2024**

Course Information

Course Number/Section MECH 7393.001
Lecture time TT 11:30 a.m. – 12:45 p.m.
Lecture classroom FO 3.222

Professor Contact Information

Professor Yanwen Xu
Office Phone 972-883-6909
Email Address yanwen.xu@utdallas.edu (course in subject line, complete sentences, basic email etiquette is expected)
Office Location ECSW 3.150 G
Online Office Hours **Thursdays, 8:00 a.m. – 9:00 a.m.**

Course Description

In this course, which is the second part of a one-year long Advanced Mathematics course, we will study a wide range of mathematical methods to solve engineering problems. The topics of this course (part II) includes: Power/Fourier series, Laplace/Fourier transforms, complex functions, analytical (possibly numerical) solutions of important PDEs, vector integral calculus, and high-dimensional PDEs. Many of these topics overlap with undergraduate Mathematics courses, but we will dig deeper into each topic.

Course Learning Objectives/Outcomes

Mathematical proficiency is a foundation for a mechanical engineer, regardless of his/her specific major. This course promises that, assuming you will fulfill your responsibility (e.g., attend most classes, be attentive, read the assigned materials and complete homework on time), you should be able to achieve the following goals by the end of the semester:

- You will be able to understand how major concepts and techniques in the fields of differential equations and linear algebra were developed, and how they are relevant to real world problems.
- You will also develop your skills to apply noted concepts and techniques to solve various engineering problems.

Required Textbook

Advanced Engineering Mathematics, 2nd edition, M. D. Greenberg, Prentice Hall, New Jersey, ISBN-13: 978-0133214314

Textbooks and some other bookstore materials can be ordered online or purchased at the [UT Dallas Bookstore](#).

Course content/schedule (tentative)

COURSE CONTENT, COURSE SCHEDULE	Linear algebra & vector space	
	Linear differential equations	HW 1
	Laplace transform	HW 2
	Midterm#1 – 2/22 (11:30 – 12:45 p.m.)	
	Fourier series	
	Fourier transform	HW 3
	Diffusion equation	
	Heat equation	HW 4
	Midterm# 2 – 4/4 (11:30 – 12:45 p.m.)	
	Wave equation	HW 5
Laplace's equation		
Higher-dimensional PDEs	HW 6	
Final Exam – TBA		

Important dates:

Midterm#1: **2/22/24** - tentative

Midterm#2: **4/4/24**- tentative

Last day of class: **5/2/24**;

Final exam (TBA)

Grading Policy

Two midterm tests : 50%

Final Exam : 25%

Homework : 25%

Course Mechanics

- Homework:
 - Homework (assigned via elearning) has to be submitted on eLearning.
 - Homework solutions will have to be a pdf document. Handwritten solutions can be scanned using the app of your choice but before you upload ensure that the document is **readable**.
 - Homework will not be accepted after the due date.
 - **On the last page of each HW solution set, the following honesty statement with your signature must to be included.**
 I attest that the work I am submitting is my own and include only those collaborations permitted by the instructor. I further attest that I have not copied these solutions from other sources.

Signature _____

Course Policies

Make-up exams

Make-up test/exam will be given only for special situations (upon verifying documentation).

Extra Credit

Instructor may include special assignment(s) to complement any of the above grade components.

If needed, instructor may consider curve points to the overall score.

Late Work

- If due to an unavoidable circumstance (health, family & other emergencies) a student has to turn-in work after it is due, upon verifying supporting documents that attest such an emergency, the instructor may waive the penalty for late work. It will be dealt with on a case by case basis by the instructor.
- Late work will be considered only for special situations.
- Missed tests due to health reasons or family/other emergencies have to be supported by acceptable documentation to be considered for make-up arrangements. It will be dealt with on a case by case basis by the instructor.

Classroom Citizenship

Do not hesitate to ask questions during lectures if you have to get any of the details clarified.

Please note that to accommodate few students who are participating remotely lectures and discussions might be recorded!!

Academic Honesty

Refrain from getting solutions from sources not permitted by the instructor. When in doubt ask if it is allowed. <https://www.utdallas.edu/conduct/integrity/>

You can discuss with your peers on HW problems, but do not copy their solutions.

Academic dishonesty will be handled per the guidance provided in this link <https://www.utdallas.edu/conduct/manage-dishonesty/>

Class Materials

The Instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course, however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

Class Attendance

The University's attendance policy requirement is that individual faculty set their course attendance requirements. Regular and punctual class attendance is expected. Students who fail to attend class regularly are inviting scholastic difficulty. In some courses, instructors may have special attendance requirements; these should be made known to students during the first week of classes. Faculty have the discretion to set an attendance policy for their in-person meetings, but the absences due to COVID-19 cannot be counted against a quarantined student.

Class Participation

Regular class participation is expected. Students who fail to participate in class regularly are inviting scholastic difficulty. A portion of the grade for this course is directly tied to your participation in this class. It also includes engaging in group or other activities during class that solicit your feedback on homework assignments, readings, or materials covered in the lectures (and/or labs). Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

Class Recordings

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the Office of Student AccessAbility has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the [Student Code of Conduct](#).

The instructor may record meetings of this course. These recordings will be made available to all students registered for this class if the intent is to supplement the classroom experience. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

“As a Comet, I pledge honesty, integrity, and service in all that I do.”

Academic Support Resources

The information contained in the following link lists the University’s academic support resources for all students.

Please go to [Academic Support Resources](#) webpage for these policies.

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University’s policies and procedures segment of the course syllabus. Please review the catalog sections regarding the [credit/no credit](#) or [pass/fail](#) grading option and withdrawal from class.

Please go to [UT Dallas Syllabus Policies](#) webpage for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.