# Advanced Engineering Mathematics Syllabus – Fall 2024

#### Course Information

| Course Number/Section | ENGR 3300.008                                       |
|-----------------------|---|
| Term                  | Fall 2024   |
| Lecture/Lab time      | Lec: MW 1 p.m. – 2:15 p.m; Lab M 3 p.m. – 3:50 p.m. |
| Lecture/Lab classroom | Lec : ECSN 2.112; Lab : GR 3.606                    |

#### Professor/Teaching Assistant (TA) Contact Information

| Professor          | P.L. Stephan Thamban   |
|--------------------|--|
| Office Phone       | 972-883-4687   |
| Office             | ECSW 2.150E  |
| Email Address      | stephan@utdallas.edu (course in subject line, complete sentences, basic email etiquette is expected) |
| Office Hours       | Tuesdays (11:00 a.m. – 12:00 p.m.)   |
| ТА                 | ТВА  |
| TA's Email Address | ТВА  |
| TA Office          | ТВА  |
| TA Office Hours    | TBD  |

Prerequisites: MATH 2415 or MATH 2419 and ENGR 2300. Corequisites: MATH 2420.

# **Course Description**

Survey of advanced mathematics topics needed in the study of engineering. Topics include use of complex numbers, properties of complex-valued functions, scalar and vector fields, introduction to partial differential equations, and Fourier series. Examples are provided from electromagnetics, fluid mechanics, thermodynamics, and engineered systems. This course includes a required laboratory.

# Student Learning Objectives/Outcomes

**CLO 1:** Demonstrate the ability to solve advanced vector calculus problems

**CLO2:** Demonstrate the ability to solve Fourier Analysis problems.

**CLO3:** Demonstrate the ability to solve partial differential equation problems.

**CLO4:** Demonstrate the ability to solve complex variable problems.

#### **Required Textbooks and Materials**

# *Required textbook:* Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition (Wiley, 2011).

Textbooks for reference (not required)

1. Vector Analysis (2nd edition) Murray Spiegel, Seymour Lipschutz, and Dennis Spellman, Schaum's outlines, ISBN-13: 978-0071615457 ISBN-10: 0071615458

2. Schaum's Outline of Advanced Calculus, Third Edition (Schaum's Outlines) Robert Wrede and Murray Spiegel ISBN-13: 978-0071623667 ISBN-10: 0071623663

Textbooks and some other bookstore materials can be ordered online or purchased at the UT Dallas Bookstore.

### Tentative schedule

| Week #                     | Course Material                              | Chapter | Sections  |  |  |
|----------------------------|--|---------|-----------|--|--|
| First day of class 8/19/24 |  |         |           |  |  |
| 1,2                        | Complex numbers                              | 13      | 1-2       |  |  |
| 2-3                        | Vectors, Vector algebra,<br>Vector operators | 9       | 1-3, 7-9  |  |  |
| 4-8                        | Vector calculus                              | 10      | 1, 6-8, 9 |  |  |
| 9,10                       | Fourier Analysis                             | 11      | 1-2       |  |  |
| 11-12                      | Partial differential equations (PDEs)        | 12      | 1-3, 5-6  |  |  |
| 12                         | Complex analysis                             | 13      | 3-6       |  |  |
| 13,14                      | Complex integration                          | 14      | 1-4       |  |  |
| 14                         | Power series, Taylor series                  | 15      | 1-3       |  |  |
| 15                         | Laurent Series, Residues                     | 16      | 1-3       |  |  |
| Last day of class 12/5/24  |  |         |           |  |  |

# **Grading Policy**

| Two midterm tests: 50% |               | Tentative schedule<br>First Midterm test: Sep 25 <sup>th</sup> (in class)<br>Second Midterm test: Oct 30 <sup>th</sup> (in class) |
|------------------------|---------------|---|
| Final Exam             | : 25%         | TBA (Dec 7 <sup>th</sup> – 13 <sup>th</sup> )   |
| Homework<br>Quizzes    | : 20%<br>: 5% |   |

Notes:

- There will be two midterm tests during the semester and a final exam.
- Quizzes will be conducted using eLearning.
- Specific details regarding tests/exam will be given as we get closer to the test/exam date.
- Instructor reserves the right to flex the grade range slightly to accommodate "borderline" students who have demonstrated efforts towards success in the course to the next higher grade.
- After the final exam, no remedial measures can be given to improve the grade. Students are expected to monitor their progress to assess where they stand in the course based on the grading policy above. Instructor may include curve points.

#### Grade components

- 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**.
  - <u>The order of your homework solutions must be in the order of the HW</u> <u>questions.</u>
  - 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
  - Solutions for homework problems will be available with the instructor/TA.
- Quizzes:
  - Quizzes will be made available the entire day (12:00 am 11:59 pm) on eLearning. Students can take it anytime during that period.
  - Relevant information about the quiz will be available before your start the quiz.

#### **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.

#### Late Work Policy

- 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.

#### **Class Participation**

Students will have to attend lecture/lab sessions (attendance will be taken). Tests/exam may include material exclusively (not in the textbook) covered during lectures. During a lecture, the instructor will assume that students had been

present for previous lectures as it relates to continuity of discussions. Students are expected to be present for lectures <u>on time</u> (**1:00 p.m.**). Proper classroom behaviour (electronic devices can only be used for taking notes, class activities) is expected.

# Suggestion for success

Do not skip attending lectures. Course ramps up on a weekly basis. So, develop a habit of keeping up on a weekly basis - there is no room for getting "left behind" and "catching up". If you have difficulties, identify them early and bring it to the attention of the instructor immediately so remedial measures can be suggested. Lot of practice is required to have a higher success percentage in problem-solving given the time frame you will operate in tests/exams. So, it is highly recommended that students work on problems beside the ones assigned for homework.

# Academic Honesty

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

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 <u>https://www.utdallas.edu/conduct/manage-dishonesty/</u>

# **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 <u>Student Code of Conduct</u>.

# Class Attendance

Attendance is mandatory for the lecture and lab portion of this course. Students who fail to attend class regularly are inviting scholastic difficulty.

# **Class Participation**

Regular class participation is expected. Students who fail to participate in class regularly are inviting scholastic difficulty. 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 <u>Student</u> <u>Code of Conduct</u>.

# 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 & course documents such as HW sets, tests, exams 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 <u>Student Code of Conduct</u>.

#### 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 see http://go.utdallas.edu/academic-support-resources.

# **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 <u>credit/no credit</u> or <u>pass/fail</u> grading option and withdrawal from class.

Please go to http://go.utdallas.edu/syllabus-policies for these policies.

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