Syllabus Subject to Modification

# SYLLABUS Fall 2025 PHYS. 3310.001

**Mathematical Methods in the Physical Sciences**

Dr. Yuri Rostovtsev **Lecture**: MWF 11:00 – 11:50 AM

Office: GAB 525I Physics Building Room 115

Em[ail: rost@unt.edu,](mailto:rost@unt.edu)  **Recitation:** F 1:00-2:50 PM

Phone: 565-3281 Physics Room 115

Office hours: F 12:00 p.m. to 1:00 p.m. or by appointment.

**Text:** *Essential Mathematical Methods for Physicists*, Hans J. Weber and George B. Arfken, Elsevier, Academic Press, 2004, ISBN: 0-12-059877-9

**Course Content:** 3 hours Application of advanced mathematical techniques to the solution of problems in physics. Vector spaces, complex analysis, matrices, linear transformations, vector calculus, Fourier series and integrals, the Laplace transformation, and special functions.

**Course Objectives:** To learn from this course, and other mathematics courses, mathematical tools that are needed in the upper-division physics courses. To learn techniques for orthogonal polynomials.

**Attendance:** Attendance of all lectures and recitations is strongly encouraged. Please inform the professor if you are unable to attend class meetings because you are ill, in mindfulness of the health and safety of everyone in our community.

**Exams:** There will be three exams during the semester and a comprehensive final exam. Exams will be delivered in recitation class. Exam questions will be based on material covered in the lecture, contained in the text, and in the homework assignments. Corrected solutions for exams may be submitted to recover up to half of missed credit.

**Make-up:** There will be no makeup exams.

**Homework:** Homework sets will be assigned each week. Each completed assignment will be submitted through Canvas, in the form of either image files, a scanned file, or a typeset electronic document. If images or scanned files are submitted of handwritten work, the solutions must be legible. Solutions must be complete to receive full credit.

**Grading:**

Exam I, Exam II, Exam III 15 %, 15%, 15%

Homework 15 %

Comprehensive final exam 40 %

Bonus problems

100%

(A: 90-100; B: 80-89; C: 70-79; D: 60-69; F: less than 60)

*The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time, however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information see the Office of Disability Accommodation website at* [*http://www.unt.edu/oda.*](http://www.unt.edu/oda) *You may also contact them by phone at 940.565.4323.*

UNT’s policy on Academic Dishonesty can be found at: <http://www.vpaa.unt.edu/academic-integrity.htm>

**Key dates**: <https://registrar.unt.edu/registration/fall-registration-guide>

**SPOT Evaluation:** Student feedback is important and an essential part of participation in this course. The student evaluation of instruction is a requirement for all organized classes at UNT. The survey will be made available during weeks 13, 14 and 15 of the semester to provide students with an opportunity to evaluate how this course is taught.

# Students will receive an email from "UNT SPOT Course Evaluations via IASystem Notification" (no- [reply@iasystem.org)](mailto:reply@iasystem.org) with the survey link. Students should look for the email in their UNT email inbox. Simply click on the link and complete the survey. Once students complete the survey they will receive a confirmation email that the survey has been submitted. For additional information, please visit the [SPOT website](http://spot.unt.edu/) (<http://spot.unt.edu/)> or email [spot@unt.edu.](mailto:spot@unt.edu)

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| --- | --- | --- | --- | --- |
| 1-1 | M | Aug. 18 | Chp. 1 | Vector Analysis |
| 1-2 | W | Aug. 20 | Chp. 1 | Vector Analysis |
| 1-3 | F | Aug. 22 | Chp. 1 | Vector Analysis |
| 2 | M | Aug. 25 | Chp. 1 | Vector Analysis |
| 2-4 | W | Aug. 27 | Chp. 1 | Vector Analysis |
| 2-6 | F | Aug. 29 | Chp. 1 | Vector Analysis |
| 3-6 | M | Sept. 1 | Chp. 1 | Labor Day |
| 3-7 | W | Sept. 3 | Chp. 1 | Vector Analysis |
| 3-8 | F | Sept. 5 | Chp. 1 | Vetor Analysis |
| 4-9 | M | Sept. 8 | Chp. 1 | Vector Analysis |
| 4-10 | W | Sept. 10 | Chp. 1 | Vector Analysis |
| 4-11 | F | Sept. 12 | Chp. 1 | Vector Analysis |
| 5-12 | M | Sept. 15 | Chp. 2 | Vector Analysis in Curved Coordinates |
| 5-13 | W | Sept. 17 | Chp. 2 | Vector Analysis in Curved Coordinates |
| 5-14 | F | Sept. 19 | **Exam I** | Chps. 1 & 2 |
| 6-15 | M | Sept. 22 | Chp. 2 | Vector Analysis in Curved Coordinates |
| 6-16 | W | Sept. 24 | Chp. 2 | Vector Analysis in Curved Coordinates |
| 6-17 | F | Sept. 26 | Chp. 2 | Vector Analysis in Curved Coordinates |
| 7-18 | M | Sept. 29 | Chp. 2 | Vector Analysis in Curved Coordinates |
| 7-19 | W | Oct. 1 | Chp. 2 | Vector Analysis in Curved Coordinates |
| 7-20 | F | Oct. 3 | Chp. 2 | Vector Analysis in Curved Coordinates |
| 8-21 | M | Oct. 6 | Chp. 3 | Determinants and Matrices |
| 8-22 | W | Oct. 8 | Chp. 3 | Determinants and Matrices |
| 8-23 | F | Oct. 10 | Chp. 3 | Determinants and Matrices |
| 9-24 | M | Oct. 13 | Chp. 3 | Determinants and Matrices |
| 9-25 | W | Oct. 15 | Chp. 3 | Determinants and Matrices |
| 9-26 | F | Oct. 17 | **Exam II** | Chps. 2 & 3 |

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| 10-26 | M | Oct. 20 | Chp. 14 | Fourier Series |
| 10-26 | W | Oct. 22 | Chp. 14 | Fourier Series |
| 10-28 | F | Oct. 24 | Chp. 14 | Fourier Series |
| 11-29 | M | Oct. 27 | Chp. 14 | Fourier Series |
| 11-30 | W | Oct. 29 | Chp. 14 | Fourier Series |
| 11-31 | F | Oct. 31 | Chp. 14 | Fourier Series |
| 12-32 | M | Nov. 3 | Chp. 15 | Integral Transforms |
| 12-33 | W | Nov. 5 | Chp. 15 | Integral Transforms |
| 12-34 | F | Nov. 7 | Chp. 11 | Legendre Polynomials |
| 13-35 | M | Nov. 10 | Chp. 11 | Legendre Polynomials |
| 13 | W | Nov. 12 | Chp. 11 | Legendre Polynomials |
| 13 | F | Nov. 14 | Chp. 11 | Legendre Polynomials |
| 14-36 | M | Nov. 17 | Chp. 11 | Legendre Polynomials |
| 14-37 | W | Nov. 19 | Chp. 7 | Complex Analysis |
| 14-38 | F | Nov. 21 | **Exam III** | Chps. 11, 14 & 15 |
| 15-39 | M | Nov. 24 | Thanksgiving |  |
| 15-40 | W | Nov. 26 | Thanksgiving |  |
| 15-41 | F | Nov. 28 | Thanksgiving |  |
| 15-42 | M | Dec. 1 | Chp. 7 | Complex Analysis |
| 15-43 | W | Dec. 3 | Review |  |
|  | M | Dec. 8 | Final exam | 10:30 a.m - 12:30 p.m. |