Syllabus Subject to Modification

# SYLLABUS PHYS 3210

**Mechanics, Fall 2025**

Dr. Yuri Rostovtsev **Lecture**: MWF 10:00 – 10:50 AM

Office: GAB 525I Physics Building Room 115

Email: rost@unt.edu,  **Recitation:** M 1:00-2:50 PM

Phone: 565-3281 Physics Room 115

Office Hours: M 12:00pm-1:00pm or by appointment.

**Text:** *Classical Mechanics*, by John R. Taylor, University Science Books, Mills Valley, CA 2005

**Topics and General Information:** This course will cover the motion of a particle in one, two, and three dimensions, conservation laws, mechanical oscillations, Lagrange’s equations, central forces, noninertial reference frames, and rotation of rigid bodies.

**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) 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/)](http://spot.unt.edu/%29) or email spot@unt.edu.

# Fall 2024, Physics 3210.001

# Tentative Lecture Schedule

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| --- | --- | --- | --- |
| **Session** | **Date** | **Day** | **Chapter, Lecture Topic** |
| 1 | Aug. 18 | M | Ch. 1, Fundamentals |
| 2 | Aug. 20 | W | Ch. 1, Newton’s laws |
| 3 | Aug. 22 | F | Ch. 1, Coordinate systems |
| 4 | Aug. 25 | M | Ch. 2, Projectile motion with air resistance |
| 5 | Aug. 27 | W | Ch. 2, Projectile motion with air resistance, cont’d. |
| 6 | Aug. 29 | F | Ch. 2, Charged particle motion in a magnetic field |
| --- | Sept. 1 | M | *No class Monday, Sept. 2 – Labor Day* |
| 7 | Sept. 3 | W | Ch. 3, Conservation of linear momentum, center of mass |
| 8 | Sept. 5 | F | Ch. 3, Angular momentum, moment of inertia |
| 9 | Sept. 8 | M | Ch. 4, Kinetic and potential energy |
| 10 | Sept. 10 | W | Ch. 4, Force from potential energy; test for conservative force |
| 11 | Sept. 12 | F | Ch. 4, Energy in one-dimensional systems |
| 12 | Sept. 15 | M | Ch. 4, Central forces; energy in multiparticle systems**Exam 1—Chapters 1***–***4.4** |
| 13 | Sept. 17 | W | Ch. 4, Simple harmonic motion |
| 14 | Sept. 19 | F | Ch. 5, Simple harmonic motion |
| 15 | Sept. 22 | M | Ch. 5, Damped oscillations |
| 16 | Sept. 24 | W | Ch. 5, Driven oscillations, resonance |
| 17 | Sept. 26 | F | Ch. 5, Fourier series |
| 18 | Sept. 29 | M | Ch. 6, Calculus of variations and the Euler-Lagrange equation |
| 19 | Oct. 1 | W | Ch. 6, Applications of the Euler-Lagrange equation |
| 20 | Oct. 3 | F | Ch. 7, Lagrange’s equations for unconstrained motion |
| 21 | Oct. 6 | M | Ch. 7, Lagrange’s equations for constrained motion |
| 22 | Oct. 8 | W | Ch. 7, Examples of Lagrange’s equations |
| 23 | Oct. 10 | F | Ch. 8, Two-body central-force problem – basics |
| 24 | Oct. 13 | M | Ch. 8, Equation of orbit; Kepler orbits**Exam 2—Chapters 4.6***–***7** |
| 25 | Oct. 15 | W | Ch. 8, Kepler orbits, cont’d. |
| 26 | Oct. 17 | F | Ch. 8, Kepler orbits, cont’d. |
| 27 | Oct. 20 | M | Ch. 9, Linearly accelerating frames; tides |
| 28 | Oct. 22 | W | Ch. 9, Time derivatives and Newton’s 2nd law in rotating frames |
| 29 | Oct. 24 | F | Ch. 9, Fictitious forces in rotating frames |
| 30 | Oct. 27 | M | Ch. 10, Rotation of a rigid body about a fixed axis |
| 31 | Oct. 29 | W | Ch. 10, Rotation of a rigid body about an arbitrary axis |
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| 32 | Oct. 31 | F | Ch. 10, Principal axes of inertia |
| 33 | Nov. 3 | M | Ch. 10, Euler’s equations |
| 34 | Nov. 5 | W | Ch. 11, Spring-coupled masses; normal modes of oscillation |
| 35 | Nov. 7 | F | Ch. 11, Weakly-coupled masses; Lagrangian approach |
| 36 | Nov. 10 | M | Ch. 11, Lagrangian approach, cont’d.**Exam 3—Chapters 8***–***10** |
| 37 | Nov. 12 | W | Ch. 12, Nonlinearity and chaos |
| 38 | Nov. 14 | F | Ch. 12, Nonlinearity and chaos |
| 39 | Nov. 17 | M | Ch. 12, Driven damped pendulum example |
| 40 | Nov. 19 | W | Ch. 12, Sensitivity to initial conditions |
| 41 | Nov. 21 | F | Ch. 13, Hamilton’s equations |
| --- | Nov 24-28 | M-F | *No class – Thanksgiving Break* |
| 41 | Dec. 1 | M | Ch. 13, Hamiltonian mechanics, cont’d. |
| 42 | Dec. 3 | W | Last day of class—Review |

**FINAL EXAM—Comprehensive—Saturday, Dec. 6, 08:00 a.m-10:00 p.m.**