

PHYS 610 “Advanced Theoretical Mechanics” Fall 2023

General information

Lectures: MWF, 1:30–2:20 PM, PHYS 201.

Instructor: Prof. Sergei Khlebnikov.

Office: PHYS 260. **Office Phone:** 494-3040. **Email:** skhleb@purdue.edu.

Office hours: TBA.

Course page in Brightspace

Items regularly updated by the instructor (such as homework) will be under “Content” with headings in ALL CAPS. Please check these often. In addition, please review University policies, statements, and links to resources in the University-provided sections of the Table of Contents.

Copyright policy

Materials posted by the instructor to the course page are subject to copyright. Please do not upload them to any websites.

Required materials/resources

1. There is a **required text**, *Classical Mechanics*, 3rd Edition, by Goldstein, Poole, and Safko (Pearson, 2001), ISBN-13: 9780201657029.
2. In addition to the University-defined minimal technology requirements (linked in the Table of Contents), this course requires
 - (a) a **webcam** and
 - (b) hardware for converting handwritten text into PDF (such as a camera, a scanner, or a tablet).

Learning outcomes

Upon successful completion of this course, a student will be able to use methods of Lagrangian and Hamiltonian mechanics in a wide variety of contexts.

Course outline

Topics include the following:

1. Variational principles of mechanics. Conservation laws.
2. Small oscillations. Parametric resonance.
3. Motion of a rigid body.
4. Canonical formalism. Hamilton-Jacobi theory.
5. Mechanics of continuous systems. Topics in classical field theory.

Assignments and grades

Your grade for PHYS 610 will be based on eight **homeworks** spaced more or less equally over the semester. The assignments will appear under HOMEWORK in Brightspace. Homework will have to be scanned and submitted electronically in Brightspace by the due date. Late homework will generally not be accepted.

Emergency preparation

In accordance with the University guidelines, in the event of a major campus emergency, course requirements, deadlines, and grading percentages are subject to changes. Information about such changes will be available from the course page in Brightspace.