

PHY 4222: Mechanics II
Spring Term 2024
Syllabus

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Instructor: Konstantin Matchev
Office number: NPB 2055
e-mail: matchev@ufl.edu

Synopsis

This is the second of a two-semester sequence on classical mechanics. We will cover (not necessarily in order, and to various degrees of detail) the remaining Chapters 8-16 of the textbook by John R. Taylor. Topics include: Central forces and the two-body problem (Chapter 8); Mechanics in noninertial reference frames (Chapter 9); Rotational motion of rigid bodies (Chapter 10); Coupled oscillations and normal modes (Chapter 11); Nonlinear mechanics and chaos (Chapter 12); Hamiltonian mechanics (Chapter 13); Collision theory (Chapter 14); Special relativity (Chapter 15) and Continuum mechanics (Chapter 16).

Prerequisites

Mechanics I (PHY3221) or equivalent. Any required math background will be briefly reviewed in class as needed.

Time and Location

The class will be meeting three times a week, Monday, Wednesday and Friday from 12:50 - 13:40 pm (6th period) in NPB 1002, aka the “small auditorium”, which is located on the first floor of the New Physics Building (NPB).

Office Hours

Office hours will be held on Tuesdays and Thursdays, 12:15 - 13:15 pm.

Required Materials

The main text is John R. Taylor, “Classical Mechanics”. The textbook is necessary — we shall work through most of the end-of-chapter problems in class and on the homework.

PHY 4222 web page

The class webpage is <http://www.phys.ufl.edu/~matchev/phy4222>.

The web page will contain information relevant for the class: there you will find the homework assignments and the class diary. Please check for updates regularly, especially if you miss a lecture. There will also be a webpage on canvas where you will be able to see your grades and see the solutions to the homework and exams.

Assignments

There will be weekly homework. The homework assignments will be posted on the class webpage and on canvas. Homework solutions should be uploaded on canvas by 11:59 pm on the due date. You are also allowed to hand in the homework BEFORE the due date and time. Late homework will not be accepted. Solutions should be complete and legible. The homework constitutes 40% of the grade (see grading policy below).

You are not allowed to consult solutions manuals, the WEB or students from previous years in solving the homework problems. If you do so, it will be considered an act of **Academic Misconduct**. You are allowed to discuss the solutions to problems with both the instructor and your fellow students who are currently enrolled in the class. However, you can not copy directly the solution of another student and you must write up your own solution. If you discuss the problems with other students, you must list them on your homework assignment and acknowledge their help.

Periodic testing: Exams

There will be three in-class (12:50 - 13:40 pm) exams. The dates of the exams are as follows: **February 9 (Friday)**; **March 6 (Wednesday)**; **April 19 (Friday)**. There will be no final cumulative exam. Each exam will cover roughly a third of the material and contribute 20% towards the final grade. All three exams will be "closed book", but a formula sheet will be provided. Calculators, cell-phones and other hi-tech gadgets are not allowed.

Grading policy

The homework will contribute 40% of the grade, and each of the three exams will contribute 20%. The UF grading policies are posted at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

A guaranteed grading scale has been announced:

A: 85%
A⁻: 80%
B⁺: 75%
B: 70%
B⁻: 65%
C⁺: 60%
C: 56%
C⁻: 52%
D⁺: 48%
D: 44%
D⁻: 40%

Some of these thresholds may be lowered, depending upon numerous factors, but will not be raised.

Accommodations for students with disabilities

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://disability.ufl.edu/get-started/>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Academic honesty

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.”

Online evaluations

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

Advising and Counseling

Due to the nature of the environment at the university, it is not uncommon for students to experience stressful situations, and study harder sometimes does not seem to work. If you find yourself in this situation, you are encouraged to seek confidential counseling, see: <http://www.counseling.ufl.edu/cwc/>.

Zoom Code of Conduct

The UF Student Honor Code and Student Conduct Code continue to apply to online behavior. You are expected to be professional and respectful while attending class on Zoom, if we ever need to switch to an online mode of instruction.

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Statement on Inclusion

Physics is practiced and advanced by a scientific community of individuals with diverse backgrounds and identities and is open and welcoming to everyone. The instructional team recognizes the value in diversity, equity and inclusion in all aspects of this course. This includes, but is not limited to differences in race, ethnicity, gender identity, gender expression, sexual orientation, age, socioeconomic status, religion and disability. Students may have opportunities to work together in this course. We expect respectful student collaborations such as attentive listening and responding to the contributions of all teammates.

Physics, like all human endeavors, is something that is learned. Our aim is to foster an atmosphere of learning that is based on inclusion, transparency and respect for all participants. We acknowledge the different needs and perspectives we bring to our common learning space and strive to provide everyone with equal access. All students meeting the course prerequisites belong here and are well positioned for success.

For more info and additional resources, see the Physics IDEA webpage.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A class lecture is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To publish means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Final word of advice

1. **Work hard.** This is not an easy course, to a large extent your success will be correlated with the total number of problems you solve *independently* throughout the semester.
2. **Attend Class.** Remember, the syllabus is defined by what is covered in lectures. You will not be tested on material not covered in class. If you miss class, my advice is to ask a class-mate (or me) for notes. In office hours, I am happy to explain things which you did not understand in class. I am not so happy to explain things that you have not seen because you were not in class and did not get anybody's notes. Also, if you get sick, please stay at home and ask a class-mate (or me) for a copy of the notes later (after you have recovered). Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.
3. **Be on time for class.** Announcements are generally made at the beginning of each lecture, and you are responsible for learning of these whether you attend class or not.
4. **If you are struggling, ask for help.** The best way to get hold of me is right after class, or preferably in our assigned office hours. If you want to discuss physics and cannot make time during my office hours, you can attend the office hours of the TA.
5. **Take notes.** Something that is obvious at the time is quickly forgotten. When it comes to the night before a test, you will appreciate a good set of lecture notes. If it is not in your notes, you'll regret it!
6. **Do your own homework.** I cannot police copying, but you will look foolish if you can do a homework question and then, when the same question comes up on the exam, you have no idea how to approach it.