

PHYSICS 310: THEORETICAL MECHANICS I

Fall 2025

Instructor: David Rubin, WAT 228	Time: M W 10:00–11:15
Email: drubin@hawaii.edu	Place: HOLM 243

Please put “PHYS 310” in the subject line!
Please e-mail me again if I don’t get back to you within a few days.

Class Format: We will have class in person, except for two recorded lectures.

Office Hours: After class, M W 11:15–11:45 at least

Course Pages:

- Lamakū

Textbook:

- John Taylor’s *Classical Mechanics*

Learning Outcomes:

- Newtonian Mechanics
 - Newton’s Laws of Motion
 - Point Particles: Friction and Air Resistance
 - Momentum and Angular Momentum
 - Energy
 - Oscillations
 - Calculus of Variations
 - Lagrange’s Equation
 - Two-Body Central-Force Problems
 - Non-Inertial Reference Frames
- A set of mathematical and conceptual tools for solving quantitative problems

Prerequisites: PHYS 170 or 170A; PHYS 272 or 272A; MATH 244 (or concurrent) or MATH 253A (or concurrent). Recommended: MATH 302 (or concurrent)

Grading Policy: Homework (40%), Exam 1 (30%), Exam 2 (30%). On some occasions, I may decide that an answer goes above and beyond the question and assign extra credit for it.

Important Dates:

Exam 1 Wednesday, 29-Oct
Exam 2 Finals week, TBD

Course Policies:

- Homeworks are due Wednesday at 11:55 pm (on weeks where we have homework due). You can upload your work electronically on Lamakū. If you do not have a phone or scanner, please bring your homework to class or office hours and I can upload it for you.
- It is okay to use computerized tools such as Mathematica or Large Language Models (like ChatGPT) for the homeworks, but please show your work step-by-step and you are responsible for understanding what the computer is doing. Please don't come to rely on the computer for simple integrals and then run out of time on the exams! It's really better to use these tools to *check* your work than to *do* your work.
- Advice: learn to work together for better understanding (but don't just copy). You never really understand something until you have to explain it to someone else!
- If you are unable to turn in an assignment on time due to illness or extracurricular obligations, let me know ASAP and I'll work around it.
- To help you focus on understanding, rather than memorizing, please bring a page of notes to the exams, but they have to be your own notes.

Approximate Course Outline:

Day	Class #	Date	Chapter (Approximate)	Assignments
Monday	1	25-Aug	Chapter 1	
Wednesday	2	27-Aug	Chapter 1	
Monday		1-Sep		Labor Day
Wednesday	3	3-Sep	Chapter 2	HW 1 Due
Monday	4	8-Sep	Chapter 2	
Wednesday	5	10-Sep	Chapter 2	HW 2 Due
Monday	6	15-Sep	Chapter 2 (Recorded lecture)	
Wednesday	7	17-Sep	Chapter 3 (Recorded lecture)	HW 3 Due
Monday	8	22-Sep	Chapter 3	
Wednesday	9	24-Sep	Chapter 3	HW 4 Due
Monday	10	29-Sep	Chapter 3	
Wednesday	11	1-Oct	Chapter 4	HW 5 Due
Monday	12	6-Oct	Chapter 4	
Wednesday	13	8-Oct	Chapter 4	HW 6 Due
Monday	14	13-Oct	Chapter 4	
Wednesday	15	15-Oct	Chapter 5	HW 7 Due
Monday	16	20-Oct	Chapter 5	
Wednesday	17	22-Oct	Chapter 5	HW 8 Due
Monday	18	27-Oct	Exam Review	
Wednesday	19	29-Oct	Exam 1	Exam 1
Monday	20	3-Nov	Chapter 6	
Wednesday	21	5-Nov	Chapter 6	HW 9 Due
Monday	22	10-Nov	Chapter 6	
Wednesday	23	12-Nov	Chapter 7	HW 10 Due
Monday	24	17-Nov	Chapter 7	
Wednesday	25	19-Nov	Chapter 7	HW 11 Due
Monday	26	24-Nov	Chapter 7	
Wednesday	27	26-Nov	Chapter 8	HW 12 Due
Monday	28	1-Dec	Chapter 8	
Wednesday	29	3-Dec	Chapter 8	HW 13 Due
Monday	30	8-Dec	Chapter 9	
Wednesday	31	10-Dec	Exam Review	HW 14 Due, AI HW Due
Finals Week				Exam 2

Course Policies and Resources

Email

As mentioned above, please include “PHYS 310” in the subject line of your email. I typically receive between 50-100 emails each day, so I’ve set up my email system to divert student emails into a particular folder that I can check daily. This system only works if you include the course number in the subject line (not in the body of the email). I will make every effort to respond to you within two business days but sometimes I get really busy or I don’t see your email. If you do not hear back from me within two business days, please check that you included “PHYS 310” in the subject line and email me again reminding me of our email. I appreciate your help on this!

All important communication between student and professor should be over email so everyone has a record. If we discuss something important in office hours, send me an email following up to document that conversation so we both remember.

University Policies and Procedures

The University of Hawai'i is an equal opportunity/affirmative action institution. It is committed to a policy of nondiscrimination on the basis of race, sex, victims of domestic or sexual violence, gender identity and expression, age, religion, color, national origin, ancestry, citizenship, disability, genetic information, marital status, breastfeeding, income assignment for child support, arrest and court record (except as permissible under State law), sexual orientation, national guard absence, or status as a covered veteran. For additional details, visit the UH Systemwide Policies and Procedures Information System (PPIS) site.

Student Conduct

Review the UH Systemwide Student Conduct Code for more information. Review the Online Netiquette and Privacy Tips to prepare yourself when interacting online.

Academic Honesty

Acts of dishonesty, including but not limited to the following:

- Cheating, plagiarism, or other forms of academic dishonesty.

Cheating is an act of academic dishonesty and includes, but is not limited to:

1. use of any unauthorized assistance in taking quizzes, tests, or examinations;
2. use of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
3. the acquisition, without permission, of tests or other academic material belonging to a member of the UH faculty, staff or student body; and
4. engaging in any behavior specifically prohibited by a faculty member in

the course

syllabus or class discussion.

Plagiarism is also an act of academic dishonesty and includes, but is not limited to:

- the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgement.
- It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.
- Furnishing false information to any UH official, faculty member, or office.
- Forgery, alteration, or misuse of any UH document, record, or form of identification.

Financial Aid Statement

As you enroll in classes, it is very important to remember that colleges are required to take steps necessary to ensure that students are academically engaged in order to justify the disbursement of federal Title IV student aid funds. If students do not begin attendance in an online course, or stop participating in a course, Title IV funds must be returned according to Federal Return of Title IV funds regulations (34 CFR 668.21(a)), which means you may have to return some financial aid that you have received. If at any time your plans change and you no longer plan to participate in the courses in which you enrolled, you must contact the financial aid office to minimize any possible negative financial impact.

For more information on financial assistance for your education, please contact your home campus financial aid office. Financial assistance may include grants, scholarships and other resources to help you pay for the cost of college. A financial aid adviser will be able to help you navigate this process to determine your eligibility for these funds.

UH Title IX

- The University of Hawai'i is committed to providing a learning, working and living environment that promotes personal integrity, civility, and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking (UH Title IX). If you or someone you know is experiencing any of these, the University has staff and resources on your campus to support and assist you.
- If you would like to report incidents of sex discrimination or gender based violence, contact your campus Title IX Coordinator or submit the online reporting form.
- If you wish to remain ANONYMOUS, speak with someone CONFIDENTIALLY, or would like to receive information and support in a CONFIDENTIAL setting, contact your campus' confidential resource.

Accommodation Statement

The University of Hawai'i is committed to a barrier-free campus and provides

accommodations to ensure students with disabilities equal access to education. We agree to make academic adjustments to ensure non-discrimination of students with disabilities. This commitment is in accordance with applicable state and federal laws, including the Americans with Disabilities Act, and Sections 504 and 508 of the Rehabilitation Act.

Under the Americans with Disabilities Act (Title II) and the Rehabilitation act of 1973-section 504 and 508, individuals with disabilities have protections against discrimination and are assured access to programs, services and activities. For more information see “Americans with Disabilities Act” and “Rehabilitation Act of 1973 – Section 504 or Section 508”.

Students must self-identify to the appropriate Disability Services Office and complete the intake process before receiving reasonable accommodations. To ensure the prompt and effective provision of accommodations, students should contact the Disability Services Office as early as possible. Find your disability services office contact for your home campus.

UH Mānoa

Visit the KOKUA website. KOKUA can be reached at (808) 956-7511 or (808) 956-7612,

Additional Accommodations

Note that if you need any other accommodations that are not specified in these policies, please let me know by email. I cannot guarantee that I will be able to accommodate you, but I would at least like the opportunity to try. This is by no means an invitation to ask to do less work simply because you want to do less work, but is intended to recognize that we live in a quickly changing world that the university bureaucracy is not always equipped to handle. I will not offer accommodations that violate university policy, so *any accommodations relating to specific categories already covered by the university should only be guided by the above guidelines and rules. In particular, if you have KOKUA accommodations, you must go through them and cannot ask me for any additional accommodations they did not first approve.*

In any communications to me requesting additional accommodations for issues not covered by the above policies, *please protect your privacy: you do not need to divulge any information you do not wish to divulge.* Particularly during the pandemic, continuing as normal is difficult. If you run into technical challenges, family care issues, ongoing illness, etc., please let me know that you are facing “a challenge” and need to request an alternative assignment. If you would like, I will schedule a Skype or zoom call with you to discuss what sort of alternative assignment might work with your needs and resources and follow up over email documenting whatever assignment we agree on.

email: kokua@hawaii.edu.