

PHYS 2320 Introductory Mechanics (CRN 19661) with Open Educational Resources (OER) and other stuff (OS)

This document last updated: August 30th, 2022

Summary of changes

August 30th Added times and locations for TAs: David Lomeli, Philip Oyedele, and Masiel Velarde. Updated office hours of Instructor and added office location for Instructor.

August 29th Added location of MLC. Added new section: "Weekly schedule and assignments." Added an additional quest: "Anachronistic World of Discussion Boards." Added another way to earn gold. Added section on Discussion Boards.

Term: Fall 2022

Lecture: MW 12:00 pm – 1:20 pm UGLC 346

Workshops: Monday 3 pm in Old Main 201 (Oyedele)
Monday 3 pm in Liberal Arts 206 (Lomeli)
Wednesday 3 pm in Quinn Hall 202 (Velarde)
Friday 3 pm in Old Main 201 (Velarde)

Prerequisites: MATH 1411 may be taken concurrently.
I do not use capriciously complicated integrals and derivatives in this course, but calculus is the native language of mechanics. I think it is easier to understand calculus by writing computer code, so I will teach you some coding.

Instructor: Jorge Muñoz

E-mail: jamunoz@utep.edu

Office hours: W 3 pm – 4 pm or by appointment (<https://jamunoz.youcanbook.me>)

Office: PSCI 312C

Note: Make sure to email me at jamunoz@utep.edu (not jamunoz@miners.utep.edu).

TA: Philip Oyedele

E-mail: paoyedele@miners.utep.edu

Coordinates: R 12 pm – 1 pm in PSCI 217A

TA: Masiel Velarde

E-mail: mvelarde4@miners.utep.edu

Coordinates: F 12 pm – 1 pm in PSCI 312A

TA: David Lomeli

E-mail: dlomeli@miners.utep.edu

Coordinates: T 11 am – 12 pm in PSCI 101

Lab C'rdinator: Karla Carmona

E-mail: kcarmona@utep.edu

Office: PSCI 317

MLC location: Library, Room 205

MLC Tutor: Dana Braun Szafer

Email: dbraunszaf@miners.utep.edu

Tutoring hours: TBD

Grading Policy

There are 6 quests, you can use gold to cut yourself some slack.

To get an A you must 'complete' at least 4 quests.

To get a B you must 'complete' at least 3 but less than 4 quests.

To get a C you must 'complete' at least 2 but less than 3 quests.

To get a D you must 'complete' at least 1 but less than 2 quests.

If you do not complete any quests, you will get an F.

QUESTS

1. Scary World of Exams (in-class during lecture time, 3 per semester)
'Complete' standard: At least 70 percent on each one of them.
What you can get with 'gold:': 1 gold piece gets you 10 percent on an exam you do not have to decide how to spend your gold until the end of the semester.
2. Mischievous World of Quizzes (1 per week, 2 problems, 1 retry, based on homework, 14 during the semester)
'Complete' standard: At least 10 quizzes with 2 correct answers during the semester.
What you can get with 'gold:': 1 gold piece can be used to substitute for 1 quiz.
3. Illusory World of Coding Exercises (1 set per week, as a team you will record an explanation during workshop, 14 during the semester)
'Complete' standard: You attend the workshop and contribute to your team's recording at least 10 times.
What you can get with 'gold:': 1 gold piece can be used to substitute for 1 coding exercise.
4. Fun World of Coding Projects (1 every 2 weeks, in pairs)
'Complete' standard: Your code works.
What you can get with 'gold:': 2 gold pieces can be used to substitute for 1 coding project.
5. Dangerous World of Final (cumulative)
'Complete' standard: At least 70 percent on the final.
What you can get with 'gold:': 7 gold pieces can be used to substitute for the final.
6. Anachronistic World of Discussion Boards (15 'complete' contributions)
'Complete' standard: Could be a new threat or reply to an existing threat. It was not generated by a bot (unless you coded up the bot from scratch), it is not malicious and furthers the discussion by developing an idea or seeding a new one. Replying 'lol' is not a contribution.

GOLD

Obtained through participation (2 gold for hosting a study group and 1 gold for attending a study group, 1 gold for every 4 discussion board contributions). There will be other opportunities during the semester including treasure hunts, also open to suggestions.

LEVELING-UP

Homework (10 problems per week, most with solutions available on-line, not graded)

Attending lecture (not graded but will keep you on-track)

Objectives

In accordance with the UTEP Catalog, in this course you will learn dynamics of particles and rigid bodies using vectors and calculus, conservation of energy and momentum, and kinetic theory. These concepts are foundational in the physical sciences and most branches of engineering and if you are taking this class, chances are you will

continue to apply these concepts during the rest of your college career and in your professional career. Putting some effort into this class will pay off.

Textbook

This course uses **Open Educational Resources (OER)**. The required textbook is *Mechanics*, by Ben Crowell, which is distributed under a Creative Commons 3.0 license. This license allows you to download it, copy it, and use in this class free of charge. <http://www.lightandmatter.com/mechanics/>

Lecture Notes

My lecture notes largely follow the structure of *Physics for Scientists & Engineers: A Strategic Approach* 4th Edition by Randall Knight, so this book is optional to acquire. I post my lecture notes to Blackboard, so the content will be available to you even if you don't have the book.

Homework

There will be 14 problem sets during the semester, each consisting of 10 problems. The problems come from Knight, Crowell, and sometimes I invent my own problems. Physics being physics, the concepts are exactly the same in every textbook and at the introductory level, the contents are also largely the same. I encourage to discuss the problems with peers, TAs, professor, tutors, etc. Homework is not graded, but if you don't do homework, it is very unlikely you will get a good grade.

Quizzes

There will be 14 weekly quizzes during the semester, each consisting of 2 problems similar to those in that week's homework, with 1 retry for each problem if you get it wrong the first time. They will be timed on Blackboard.

Your best bet for help with homework problems and to do well in quizzes and exams is to go to the Miner Learning Center and office hours of your TAs and Instructor.

Videos

We have developed our own **Open Educational Resources (OER)**. You will video solutions to most homework problems in my YouTube Channel: <https://www.youtube.com/channel/UCm6Lfxsd0Y1OzCmBJxRZDvw>

Exams

There will be 3 exams scheduled during lecture time: dates TBD but will be on kinematics, dynamics, and conserved quantities. The exams are designed by the students. I provide the structure for the exam (number of problems, difficulty, topics) and you provide the contents (which problems, concepts, etc. to test with the proviso that problems will not be identical to those in the homework). Although the material tested on the exams is not rigorously cumulative, new concepts in physics are built on previous ones.

Workshop

The workshop will be in person and we will use Microsoft Teams to record. You will be randomly assigned to a 3-person group and you will record, as a team, a 5 minute explanation of the coding exercises for that week. Hence, you need to work on your exercises before the workshop in order to contribute in a meaningful way. To avoid freeloaders, you will be able to anonymously report students who do not pull their own weight. If a student is reported 2 times, I will have a conversation with the student.

Final

The final is on Friday December 9th 1:00 pm – 3:45 pm.

Lab

The lab is independent of the class, but there is synergism. Karla Carmona is the Lab Coordinator. Labs start the week after Labor Day.

Participation

It takes time to get good at physics, and time is in short supply for everybody. Before each exam, I will request volunteers to hold student-lead review sessions (2 gold), and if you attend a student-led review session, you get 1 gold. Leads and participants have in the past found this enjoyable and useful. You can also get 1 gold for recordings of problem solving that is made available to the whole class, etc.

Attendance

Attending lecture is encouraged but not required. I value your time and I will try to provide new perspectives and intuition on physics and its role in technology, society, etc. You are paying for this. Attending the workshop has a more direct impact on your grade.

Collaboration

Discussing the problems with peers, tutors, etc. after attempting to solve them on your own is encouraged, but the work you turn in has to be your own.

Winning strategy

The class is structured so that if you put in the effort, you will learn a lot and pass with a good grade. You are free to collaborate on the homework and you should take advantage of the resources available to you (tutoring, office hours, Bb videos, dark web, etc.) Ask questions during the lecture (it makes a difference) and during the workshop. If you take your homework seriously, you will do great on the exams. This is your class and your opinion matters, talk to me. Finally, try to enjoy the class. Understanding and exploitation of physical phenomena has revolutionized our way of life in the past few centuries, but what really attracts me to physics is that it tells us the most about the origin and the fate of the Universe.

Missed exams and other eventualities

Since there are quests and many opportunities to recover, there are no make ups for exams. Nevertheless, if you experience a situation that affects your long-term performance in the class, let me know.

Mentoring

Feel free to approach me for mentoring about your career, research ideas or opportunities, letters of recommendation, etc. I work for you and I like to do a good job, take advantage of that. Also take advantage of your peers. These people go along with you in life.

Blackboard

All the homework problems, slides and lecture notes, and most other materials will be uploaded to Bb. You can also check your grades for the different components of the class.

Students with Disabilities

If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at <https://www.utep.edu/student-affairs/cass/>. Accommodations might include but are not limited to note takers, readers, or extended time on exams and assignments. Please take care of this as soon as possible and before the first exam.

Academic dishonesty

Science is incompatible with cheating, and will not be tolerated. I have sent students to the Office of Student Conduct and Conflict Resolution for the more serious offenses, and I do it to protect our learning environment.

Discussion Boards

Best place to ask for help if you have issues with the technology, concepts from the class, want to share your excitement about the fascinating physics of pinball machines, etc. The PHYS 2320 will check this regularly and answer your questions. If you are too shy to ask questions during class but didn't quite get that concept, this is the place. If you are so shy that you want your contribution to be anonymous, email your question to your instructor. He will post it under his name. You get gold for contributions and enough contributions count as a quest.

Weekly schedule and assignments

| Week | Lecture Dates | Notes | Topics (Approx.) |
|------|-----------------|--|-----------------------------------|
| 1 | Aug. 22, 24 | | Concepts of motion |
| 2 | Aug. 29, 31 | Quiz 1 available/due Aug. 30 | Kinematics in 1-D |
| 3 | Sept. 7 | Quiz 2 available/due Sept. 6 Project 1 due Sept. 9 | Vectors and coordinate systems |
| 4 | Sept. 12, 14 | Quiz 3 available/due Sept. 13 | Kinematics in 2-D |
| 5 | Sept. 19, 21 | Quiz 4 available/due Sept. 22 Exam 1 on Sept. 21 Project 2 due Sept. 23 | Force and motion |
| 6 | Sept. 26, 28 | Quiz 5 available/due Sept. 27 | Dynamics – motion along a line |
| 7 | Oct. 3, 5 | Quiz 6 available/due Oct. 4 Project 3 due Oct. 7 | Newton's third law |
| 8 | Oct. 10, 12 | Quiz 7 available/due Oct. 13 | Dynamics – motion in a plane |
| 9 | Oct. 17, 19 | Quiz 8 available/due Oct. 18 2nd exam Oct. 19 Project 3 due October 21st | Work and kinetic energy |
| 10 | Oct. 24, 26 | Quiz 9 available/due Oct. 25 Withdrawal deadline Oct. 28 | Interactions and potential energy |
| 11 | Oct. 31, Nov. 2 | Quiz 10 available/due Nov. 1 Project 4 due November 4 | Impulse and momentum |
| 12 | Nov. 7, 9 | Quiz 11 available/due Nov. 8 | Oscillations |
| 13 | Nov. 14, 16 | Quiz 12 available/due Nov. 15 Project 5 due November 18 | Rotation of a rigid body |
| 14 | Nov. 21, 23 | Quiz 13 available/due Nov. 22 3rd exam Nov. 23 | Newton's theory of gravity |
| 15 | Nov. 28, 30 | Quiz 14 available/due Nov. 30 Project 6 due December 2nd Final exam on Friday December 9th 1:00 pm – 3:45 pm | Buffer |