

## PHYS 2320 Introductory Mechanics (CRN 26080) with Open Educational Resources (OER) and other stuff (OS)

**This document last updated: January 17th, 2023**

Term: Spring 2023  
Lecture: MW 3:00 pm – 4:20 pm LART 106

Workshops: M 9:30 am in Quinn Hall 202 (Lhaki)  
T 3:30 pm in Education 318 (Salas)

Prerequisites: MATH 1411 may be taken concurrently.  
I will try to give you some intuition about calculus using some computer code

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Coordinates: M 1:30 pm – 2:30 pm PSCI 312

Lab Coordinator: Karla Carmona  
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### Grading Policy

This class is gamified, your final grade will be assigned according to how many ‘quests’ you complete. There are 5 quests and a ‘complete’ standard for each quest. Gold can be mined by participating in activities and used to help you complete quests. More details are below.

Completing 4 or 5 quests will get you an A.  
Completing 3 quests will get you a B.  
Completing 2 quests will get you a C.  
Completing 1 quest will get you a D.  
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, 15 points each)  
'Complete' standard: 30 points (out of 45 possible)  
What you can get with 'gold:' 1 gold gets you 2 exam points
2. Mischievous World of Quizzes (1 per week on Wednesdays during lecture, on Blackboard, based on homework problem sets, 2 multiple choice problems per quiz, 1 point per problem, 15 quizzes total)  
'Complete' standard: 20 points (out of 30 possible)  
What you can get with 'gold:' 1 gold gets you 1 quiz point
3. Illusory World of Coding Exercises (1 set per week on Google Collab, student assigned to random team during workshop, 2 points per workshop/exercise, due at the end of the day, 15 during the semester)  
'Complete' standard: 24 points (out of 30 possible)  
What you can get with 'gold:' 1 gold gets you 2 exercise points  
Github: [https://github.com/jamunozlab/introductory\\_mechanics\\_spring\\_2023/tree/main/exercises](https://github.com/jamunozlab/introductory_mechanics_spring_2023/tree/main/exercises)  
Google Form: <https://forms.gle/kJk3hwi4wTPWy8427>
4. Fun World of Coding Projects (1 project every 2 weeks on Google Collab, optionally in pairs, 4 points per project, due on Fridays end the day, 7 during the semester)  
'Complete' standard: 22 points (out of 28 possible)  
What you can get with 'gold:' 1 gold gets you 2 project points
5. Dangerous World of Final (1 at the end of the semester, cumulative, 24 points)  
'Complete' standard: 16 points (out of 24 possible)  
What you can get with 'gold:' 1 gold gets you 2 final exam points

## GOLD

Google Form: <https://forms.gle/6rsgN8vgbT6pxihCA>

Host a study group (for problem set, exam, project, etc.) – 2 points

Attend a study group – 1 point

Attend Miner Learning Center (MLC) one-on-one – 2 points

Attend Miner Learning Center (MLC) group activity – 1 point

Report a problem (errors on quizzes or problems, bugs on code, etc.) – 1 point

Other opportunities might occur ad hoc

## LEVELING-UP

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

Attending lecture (not graded but will keep you on-track, code to access quizzes will be given during lecture)

## 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 quizzes are based on them.

### **Quizzes**

There will be 14 weekly quizzes during the semester, each consisting of 2 problems similar to those in the homework for that week's homework. The quizzes will be timed on Blackboard. Access code will be provided during lecture.

### **Videos**

We have developed our own **Open Educational Resources (OER)**. Video solutions for most homework problems are available on my YouTube Channel: <https://www.youtube.com/@JorgeMunozJr>

### **Exams**

There will be 3 exams scheduled during lecture time: February 20th (kinematics), April 3rd (forces), May 1st (conservation of energy and momentum). I make the exams based on feedback from the students. Although the material tested on the exams is not rigorously cumulative, new concepts in physics are built on previous ones.

### **Workshop**

You will be randomly assigned to a 3-person group and you will submit, as a team, answers to questions in the coding exercises for that week. To avoid freeloaders, you can 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 Monday May 8th 1:00 pm – 3:45 pm.

### **Lab**

The lab is independent of the class, but there is synergism. Karla Carmona is the Lab Coordinator.

### **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 gold for hosting sessions for projects or homework, attending the Miner Learning Center, 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.

## Collaboration

Discussing the problems with peers, tutors, etc. after attempting to solve them on your own is encouraged.

## 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.

## 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 and friends: they 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](mailto: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.

## Weekly schedule and assignments

The emojis below tell you what is going on each week

Legend:  = Quiz     = Workshop     = Project     = Exam     = Final     = Spring Break

Week	Lecture Dates	To do:	Topics (Approx.)
1  	Jan. 18	Quiz 0 Jan. 18	Intro to class mechanics
2  	Jan. 23, 25	Quiz 1 Jan. 25	Concepts of motion
3   	Jan. 30, Feb. 1	Quiz 2 Feb. 1 Project 1 due Feb. 3	Kinematics in 1-D
4  	Feb. 6, 8	Quiz 3 Feb. 8	Vectors and coordinate systems
5   	Feb. 13, 15	Quiz 4 Feb. 15 Project 2 due Feb. 17	Kinematics in 2-D
6   	Feb. 20, 22	Quiz 5 Feb. 22	Force and motion

7	  	Feb. 27, March 1	Exam 1 on February 20 Quiz 6 March 1 Project 3 due March 3	Dynamics – motion along a line
8	 	March 6, 8	Quiz 7 March 8	Newton's third law
			Spring Break March 13th – 17th	
9	  	March 20, 22	Quiz 8 March 22 Project 4 March 24	Dynamics – motion in a plane
10	 	March 27, 29	Quiz 9 March 29	Work and kinetic energy
11	   	April 3, 5	Quiz 10 April 5 Exam 2 on April 3 Project 5 due April 7	Interactions and potential energy
12	 	April 10, 12	Quiz 11 April 12	Impulse and momentum
13	  	April 17, 19	Quiz 12 April 19 Project 6 due April 21	Oscillations
14	 	April 24, 26	Quiz 13 April 26	Rotation of a rigid body
15	   	May 1, 3	Quiz 14 May 3 Exam 3 on May 1 Project 7 due May 5	Newton's theory of gravity
16		Final exam on Monday May 8th 1:00 pm – 3:45 pm		