

Fairmont State University

PHYS 1115

Principles of Physics 1

Instructor:

Dr. Ganga Sharma
gsharma@fairmontstate.edu
Office: HHH 318
304-367-4582

Office Hours: TBA

Also by appointment

Meeting Times and Location:

Lecture (HHH 308) – MW 9-10:50 am

Lab (HHH 107) –Th 9:30-12:20

Exams (ET 305) – Thursday 6:30-8:30 pm (not every week)

Course Description and Objectives

An introduction to elementary principles of mechanics. The course is 4 credit hours. A three-hour laboratory period each week supplements the three 1-hour weekly lecture-recitation periods. **Prerequisites: MATH 2501 or TECH 2290**

Learning Objectives

By the end of the semester, students will be able to do the following:

- Employ differential and integral calculus to describe the physical systems and solve qualitative problems in mechanics. determining velocity, acceleration, and displacement from given functions of time.

- Describe the motion of objects moving with constant acceleration in one and two dimensions using graphical representations and kinematic equations
- Apply Newton's first, second, and third laws to describe the dynamics of physical systems in one and two dimensions
- Understand important physics conservation rules (mechanical energy, momentum) and apply them to the appropriate physical scenarios
- Describe the motion of rotating objects using centripetal force, torque, angular kinematics, rotational kinetic energy, and angular momentum
- Understand the required conditions and resulting behavior of an object oscillating under simple harmonic motion

Lab Outcomes

- Students will demonstrate proficiency with data collection and observations using appropriate equipment and record-keeping during laboratory activities.
- Students will demonstrate proficiency with the use of data analysis to develop and test hypotheses that address real world problems.
- Students will use scientific content and data analysis to discuss the limitations of the scientific process.

Textbook and Course Materials

We will use Blackboard for course management. *Be sure to check Blackboard regularly for course information, announcements, and assignments.*

Online Textbook:

<https://openstax.org/details/books/university-physics-volume-1>

This textbook is free to access. The link is also posted on Blackboard. There are other resources available which you may find useful under the "Student Resources" tab.

Homework System:

Physics LE: www.PhysicsLE.com

To access the homework system, you must create an account and purchase an access code for \$26.95. You may purchase access directly on their website or through the bookstore.

To find this course, search for "Fairmont State University, Fairmont WV, Physics, Dr. Ganga Sharma".

Other materials:

Scientific or graphing calculator (note that no phone calculators will be allowed on exams and quizzes)

Notebook paper and/or graph paper

Assignments and Assessments

Pre-lecture Assignments

You must complete a short pre-lecture assignment before the beginning of each class. This will ensure that you are familiar with the material and ready to participate and dive in deeper during class time. The assignment will usually involve reading the textbook, but may also include videos, slides, or other references. You will be required to answer several questions on the material to show that you completed the assignment. The pre-lecture assignments will be posted to Blackboard and due at the beginning of each lecture. You must complete the pre-lecture *even if you do not attend class that day*.

Participation and In-class Work

Attendance, participation, and group collaboration are critical for mastering the material and developing the skills this class is designed to teach. Class time will primarily be spent reinforcing concepts through group problem solving. In order to ensure everyone participates, groups will sometimes be required to turn in written work at the end of the class period. The work will be graded on completion, and the instructor will give feedback to support student's learning of the material. If a student does not actively participate in the discussions and problem solving, they will not receive credit for class that day even if they are "present" in the room. If a student misses class *for an excused reason*, an alternate opportunity for credit will be provided by the instructor.

Homework

Homework will be assigned and completed through the online PhysicsLE homework system. The purpose of the homework is to help you master the problem-solving methods and content of the course. It is important that you consistently practice the material in order to master it. There will be one homework assignment every week, due on Wednesdays at 11:59 pm unless otherwise announced by the instructor.

You will be allowed to attempt the homework problems an unlimited number of times up until the due date. The grade of your best attempt will be recorded in the gradebook. Because the homework is online, a late submission will generally not be accepted unless special arrangements have been made *in advance* with the instructor.

Lab

This class includes a three-hour lab section. Students must complete a short pre-lab assignment on Blackboard before each lab. Experiments will be done in groups, and a lab report will be required after almost every lab. Lab reports will often be written as a group, but sometimes you will be required to write individual reports. If lab reports are not completed within class time, they will be due one week later at the next lab meeting. During some lab sessions, your group will work on solving challenge problems that will require you to apply your physics knowledge to real-world scenarios. The lab grade will be a weighted average of the pre-lab, lab report, and group problem-solving. The

student will be informed of the specific weighting for each week. Labs can only be made up if an absence is excused.

Exams

There will be four exams throughout the semester, including the final exam. Exams will test your ability to apply what has been learned in class and homework to solve new problems. The three midterm exams will take place Thursday evening 6:30-8:30 in ET 305. (This is the “test lab” section you have registered for.) The tentative dates for these exams are **September 19, October 10, and November 7**. If these dates are changed, you will be notified in advance. The final exam will take place during final exam week. All four exams, including the final, will be equally weighted. In general tests cannot be made up unless special arrangements have been made with the instructor *in advance*.

Course Evaluation and Policies

All grades will be posted on Blackboard. You are strongly encouraged to check your scores in Blackboard regularly. A final grade will be assigned based on the following percentages:

Participation and In-class Work – 15%
Homework – 15%
Lab – 15%
Exams – 55%

A letter grade will be assigned based on the standard Fairmont State grading scale:
A = 90-100; B = 80-89; C = 70-79; D = 60-69; F = Below 60

Attendance and Late Policy

Attendance is a mandatory component of this course and will only be excused for medical reasons or school-sponsored activities. In order to receive an excused absence, documentation verifying the illness or activity must be *provided in advance if possible*, and no later than the first day you are back in class. Labs and in-class assignments can only be made up if the absence is excused. Missed pre-labs and homework will not be excused and can only be turned in late if special arrangements are made with the instructor. Exams must be taken on the scheduled days unless special arrangements are made *in advance* with the instructor. Late work may be penalized per instructor discretion, even if the absence is excused.

Communication with Instructor

The best way to contact the instructors is by email. The instructors will also check Blackboard messages periodically, but there may be a longer delay in response time.

It is critical that you check Blackboard frequently for announcements and assignments. I also expect that you check your school email frequently. If I need to contact you individually, I will reach out via Blackboard messages and via email.

Course Outline

This outline is tentative and subject to change. Any changes will be announced in advance by the instructor.

Week	Topic	Textbook Chapters
Week 1	Units, Trigonometry, and Vectors	Chapter 1
Weeks 2-3	Kinematics in 1D	Chapter 2
Exam 1 – Sept 19		
Week 4	Kinematics in 2D	Chapter 3
Weeks 5-6	Forces and Newton's Laws	Chapter 4 – 5
Exam 2 – Oct 10		
Weeks 7-8	Uniform Circular Motion and Gravity	Chapter 6
Weeks 9-10	Work and Energy	Chapter 7
Exam 3 – Nov 7		
Week 11	Linear Momentum and Collisions	Chapter 8
Week 12	Simple Harmonic Motion	Chapter 16
Week 13	Statics and Torque	Chapter 9
Week 14	Rotational Motion and Angular Momentum	Chapter 10
Final Exam Week		

This syllabus is subject to modification at the instructor's discretion. Students will be notified promptly of any changes.

Academic Support and Resources

Standard Syllabus Statements

<https://www.fairmontstate.edu/academicaffairs/syllabus-statements>

Accessibility Services

<https://www.fairmontstate.edu/student-services/accessibility-services>

Health Services

<https://www.fairmontstate.edu/falconcenter/health-services>

Counseling Services

<https://www.fairmontstate.edu/student-services/counseling-service>

Learning Enrichment and Academic Development Center

<https://www.fairmontstate.edu/academics/lead-center>