暨南大學
JINAN UNIVERSITY

0702P101
Fundamentals of Physics I (With Lab)

Instructor: TBA

E-mail: TBA

Time: December 14, 2026 - January 15, 2027

Office Hours: by appointment

Contact Hours: 60 (50 minutes each)

Credits: 4

Course Description

Fundamentals of Physics I is a general education course designed as an introduction to college physics for students majoring in the biological, environmental, earth, and social sciences, as well as disciplines such as architecture, business, and the humanities. The main emphasis of the course is on the fundamentals of Newtonian mechanics and the physics of fluids. The goals of this course are to provide the student with a clear and logical presentation of the basic concepts and principles of physics, and to strengthen student's understanding of concepts through a range of interesting applications to the real world, including practical examples that demonstrate the role of physics in our universe.

Course Requirements

***College Physics 2e* from OpenStax College**

Textbook. Go to Science - OpenStax or https://openstax.org/subjects/science#Physics and click on green colored College Physics 2e to download the e-book.

A laptop or desktop with camera

Access to a scanner or cell phone with Adobe Scan App for preparing pdf files.

A calculator with square-root, square, sine, cosine and tangent functions.

Access to reliable and high-speed internet connection.

Course Structure

This course covers 5 units on the topics listed below:

Unit 1: Units and significant figures, one and two-dimensional kinematics, position, velocity, and acceleration vs. time graphs, free-fall, projectile motion, vectors, trigonometric analysis of vectors, coordinate systems and vector components

Unit 2: Newton's three laws of motion, identifying forces, Hooke's law, static and kinetic friction, drag, free-body diagrams, equilibrium, statics in two dimensions, motion on inclined planes, dynamics in two dimensions, ropes and pulleys.

Unit 3: Impulse, momentum, the impulse-momentum theorem in one and two dimensions, conservation of momentum, collisions, work, power output, kinetic energy, gravitational potential energy, elastic potential energy, thermal energy, the work-energy theorem, and conservation of energy

Unit 4: Rotational motion, equations of motion for rotational motion, centripetal forces and accelerations, center of mass, torque, gravitational torque and stability, rotational inertia, Newton's second law for rotational motion, angular momentum, conservation of angular momentum, rotational kinetic energy

Unit 5: Fluids, pressure, hydraulic lifts, Buoyancy, fluid dynamics and Bernoulli's principle.

Course Assignments

There will be a total of 680 points which will be converted to a percentage to assign letter grade.

Quizzes - 270 points.

There will be nine module quizzes, each worth 30 points.

Assignments - 90 points.

Nine assignments will be assigned, each worth 10 points. Assignments will be submitted as pdf file for grading.

Lab assignments – 120 points

Three lab assignments will be assigned, 40 points each. Students are required to perform the experiment, record data and analyze data to finish each report. Reports will be submitted as pdf file for grading.

Final Exam – 200 points.

The final is cumulative and required. Final exam will be proctored online and each student will be given 2-hour time to complete final exam. Formula will be given. Calculator is allowed. No cell phone or any AI tool is not allowed. Anyone can have three blank pages for carrying out calculation.

Grading Scale

The instructor will use the grading system as applied by JNU:

Definition	Letter Grade	Score
Excellent	A	90~100
Good	B	80~89
Satisfactory	C	70~79
Poor	D	60~69
Failed	E	Below 60

Course Outline

Please note that the outline is meant to give an overview of the major concepts in this course. Changes may occur as needed to aid in the student`s development.

Module 1: Motion in one dimension

Topics

i. Units and significant figures
ii. Average vs. instantaneous speed
iii. Velocity
iv. Uniform Acceleration
v. Position, velocity, and acceleration vs. time graphs
vi. Free-fall

Assignment 1

Experiment 1

Quiz 1

Module 2: Projectile motion and vectors

Topics

i. Trigonometric representations of vectors
ii. Projectile motion

Assignment 2

Quiz 2

Module 3: Motion and Force

Topics

i. Newton’s first law
ii. Newton’s Second Law
iii. Applying Newton’s Second Law in 1 and 2D
iv. Newton’s Third Law

v. Free-body diagrams

vi. Identifying forces: friction, normal, tension, etc.

Assignment 3

Quiz 3

Module 4: Equilibrium and application of Newton's second law

Topics

i. Static and dynamic equilibrium

ii. Inclined planes

iii. Friction and drag

iv. Centripetal force

Assignment 4

Experiment 2

Quiz 4

Module 5: Momentum and Impulse

Topics

i. Conservation of momentum

ii. Impulse-momentum Theorem

iii. Inelastic collisions vs elastic collisions

Assignment 5

Experiment 3

Quiz 5

Module 6: Work and Energy

Topics

i. Work and power

ii. Kinetic energy

iii. Gravitational potential energy

iv. Conservation of energy

v. Work-energy theorem

Assignment 6

Quiz 6

Module 7: Rotational motion

Topics

i. Uniform circular motion

ii. Angular displacement, velocity, and acceleration

Assignment 7

Quiz 7

Module 8: Torque and rational dynamics

i. Torque and rotational energy

ii. Gravitational

i. Moment of inertia

ii. Angular momentumAngular kinetic energy

Assignment 8

Quiz 8

Module 9: Fluids

Topics

i. Pressure

ii. Buoyancy

iii. Pascal Principle

iv. Archimedes Principle

v. Bernoulli Principle

Assignment 9

Quiz 9

Final Exam

Lab Description

Exp 1: Kinematics. In this experiment, you will study the effect of angle, mass, surface friction and radii on the rolling of a disk down an incline. You will collect the velocity-time data and analyze data to see if the motion has constant acceleration.

Exp 2: Determine coefficient of friction on an inclined plane. In this experiment, you are going to perform the experiment at home and hope you can gain the experience of determining coefficient of friction of any surface. You will increase the angle of slope until a coin starts to slip on the slope. That angle is associated with the coefficient of friction.

Exp 3: Momentum and collision. In this experiment, you will use a simulator to study two different collisions (elastic vs inelastic collision). You are asked to answer a series of questions in differentiating two different collisions using data.

Academic Integrity

As members of the Jinan University academic community, students are expected to be honest in all their academic coursework and activities. Academic dishonesty, includes (but is not limited to) cheating on assignments or examinations; plagiarizing, i.e., misrepresenting as one's own work any work done by another; submitting the same paper, or a substantially similar paper, to meet the requirements of more than one course without the approval and consent of the instructors concerned; or sabotaging other students' work within these general definitions. Instructors, however, determine what constitutes academic misconduct in the courses they teach. Students found guilty of academic misconduct in any portion of the academic work face penalties that range from the lowering of their course grade to receiving a failing grade (E) in the course.