湖北工業大學
HUBEI UNIVERSITY OF TECHNOLOGY

Course Title	General Physics I
Course Code	PHYS 1011
Semester	Spring 2027
Course Length	4 Weeks, 60 Contact Hours
Credits	4
Instructor	TBA
Office	TBA
Email	TBA
Prerequisite	N/A

Course Description:

This is an introductory undergraduate physics course that requires the use of algebra, trigonometry, and vectors to solve real-world problems. The course will cover the traditional introductory topics, including kinematics, Newton's Laws, momentum, energy, rotational dynamics, gravitation, oscillations, fluids, waves, and thermodynamics.

Course Goals:

Students who successfully complete this course will demonstrate competency in the following general education core goals:

- **Critical thinking skills** – Students will engage in creative and/or innovative thinking, and/or inquiry, analysis, evaluation, synthesis of information, organizing concepts, and constructing solutions.
- **Communication skills** – Students will demonstrate effective written, oral, and visual communication.
- **Teamwork** – Students will demonstrate the ability to work effectively with others to support a shared purpose or goal and consider different points of view.
- **Social responsibility** – Students will demonstrate intercultural competency and civic knowledge by engaging effectively in local, regional, national, and global communities.

Student Learning Outcomes:

Upon completion of this course, students will be able to:

- learn about kinematics and dynamics of particles; force, momentum, work, energy; gravitation; circular, angular and harmonic motion; and waves;
- develop critical thinking and problem-solving skills;

- demonstrate the ability to think critically and to use appropriate vocabulary and concepts to analyze qualitatively problems or situations involving physics;
- use appropriate mathematical techniques and physics concepts and laws to obtain quantitative solutions to problems in physics;
- develop analytical and objective report writing in the laboratory.

Textbooks/Supplies/Materials/Equipment/ Technology or Technical Requirements:

Urone, P. P., & Hinrichs, R. (2022). *College Physics 2e*. OpenStax.

Randall Knight. (2016). *Physics for Scientists and Engineers: A Strategic Approach with Modern Physics*, Fourth Edition. Pearson.

Course Requirements:

Participation and Engagement (5%)
This component rewards students for active engagement in class discussions, tutorials, and lab sessions. Participation includes asking and answering questions during lectures, contributing to group problem-solving, and demonstrating consistent effort in lab sessions.

Problem Sets (20%)
Regular problem sets will be assigned and are designed to reinforce the concepts introduced in lectures. These assignments will focus on analytical problem-solving, application of formulas, vector reasoning, and interpretation of physical phenomena across mechanics, waves, fluids, and thermodynamics. Students are encouraged to attempt all problems independently before discussing them in study groups or tutorials.

Laboratory Component (25%)
Students will participate in a series of lab sessions designed to complement the theoretical material. Emphasis will be placed on data collection, experimental design, uncertainty analysis, and lab report writing. Each lab report will include a detailed discussion, analysis of results, and reflection on the connection between experimental and theoretical findings.

Midterm Exam (20%)
The midterm exam will be administered around the midpoint of the course and will assess students' understanding of topics covered up to that point, primarily focusing on kinematics, dynamics, energy, and momentum. The exam will include conceptual questions, numerical problems, and short-answer explanations.

Final Exam (30%)
The comprehensive final exam will assess all topics covered throughout the course, including rotational motion, oscillations, mechanical waves, fluids, and thermodynamics. It will follow a similar format to the midterm but will require students to integrate knowledge across multiple topics and apply it to complex problem scenarios.

Assessments: Activity	Percent Contribution
Participation and Engagement	5%
Problem Sets	20%
Laboratory Work	25%
Midterm Exam	20%
Final Exam	30%

Grading:

Final grades will be based on the sum of all possible course points as noted above.

Grade	Percentage of available points
A	94-100
A-	90-93
B+	87-89
B	84-86
B-	80-83
C+	77-79
C	74-76
C-	70-73
D	64-69
D-	60-63
F	0-59

Course Schedule:

The schedule of activities is subject to change at the reasonable discretion of the instructor. Minor changes will be announced in class, major ones provided in writing.

PHYS 1011 Schedule

Lecture	Topic	Readings
L1	Introduction, Units, and Measurement Vectors and Coordinate Systems	*Randall* Ch.1, 3
L2	1D Kinematics: Position, Velocity, and Acceleration	*Randall* Ch.2
L3	2D Kinematics and Projectile Motion	*Randall* Ch.4 Lab 1: Projectile Motion
L4	Dynamics: Force and Newton's Laws of Motion	*Urone* Ch.4
L5	Newton's Laws – Applications (Friction, Drag, Elasticity)	*Urone* Ch.5
L6	Uniform Circular Motion & Newton's Law of Gravitation	*Urone* Ch.6 Lab 2: Forces and Newton's Laws
L7	Work and Kinetic Energy	*Urone* Ch.7
L8	Conservative and Non-conservative Forces, Potential Energy	*Urone* Ch.7
L9	Conservation of Energy	*Urone* Ch.7 Lab 3: Conservation of Energy
L10	Linear Momentum and Impulse	*Urone* Ch.8
L11	Collisions: Elastic and Inelastic; Center of Mass and Systems of Particles	*Urone* Ch.8 *Randall* Ch.12
L12	Rotational Kinematics	*Urone* Ch.10

L13	Rotational Dynamics and Torque	*Urone* Ch.10
L14	Conservation of Angular Momentum	*Urone* Ch.10
/	**Midterm Exam**	/
L15	Static Equilibrium and Elasticity	*Randall* Ch.12 Lab 4: Torque and Static Equilibrium
L16	Newton's Theory of Gravity	*Randall* Ch.13
L17	Oscillatory Motion – Simple Harmonic Motion	*Randall* Ch.15
L18	Damped and Driven Oscillations; Resonance	*Randall* Ch.15
L19	Mechanical Waves – Types, Speed, and Energy Transfer	*Randall* Ch.16
L20	Traveling Waves, Sound and Light, Doppler Effect	*Randall* Ch.16 Lab 5: Waves and Sound
L21	Wave Superposition and Standing Waves	*Randall* Ch.17
L22	Introduction to Fluids and Waves: Fluid Statics and Wave Optics Overview	*Randall Ch.33* *Urone* Ch.11
L23	Bernoulli's Equation and Applications	*Urone* Ch.12
L24	Thermodynamics I: Temperature, Heat Transfer, and the First Law	*Randall* Ch.19
L25	Thermodynamics II: The Second Law and Heat Engines	*Randall* Ch.19
/	**Final Exam**	/

Accommodation Statement

Academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. It is imperative that you take the initiative to bring such needs to the instructor's attention. Students who may require assistance in emergency evacuations should contact the instructor as to the most appropriate procedures to follow.

Academic Integrity Statement

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in coursework may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

Other Items:

General Lab Instructions

Laboratory work is a vital part of this course and provides hands-on experience with the physical principles introduced in lectures. The goal is to develop experimental skills, reinforce theoretical concepts, and cultivate scientific reasoning.

- **Lab Attendance and Completion Requirements**
  - ☐ Attendance is mandatory for all scheduled lab sessions.
  - ☐ Pre-lab readings or quizzes may be required before each lab to ensure preparedness.
- **Lab Reports**
  - ☐ A formal lab report is required for each experiment unless otherwise stated. Lab reports must be submitted by the specified deadline, typically within one week of the lab session.
  - ☐ Reports should include: an introduction, objective, methods, data collected, analysis (including error and uncertainty discussion), results, and conclusion.
  - ☐ Late reports may incur a grade penalty unless an extension is granted for documented reasons.
- **Lab Conduct and Academic Integrity**
  - ☐ Follow all safety guidelines provided by your instructor and in the lab manuals.
  - ☐ Handle all lab equipment with care. Do not modify or disassemble instruments unless instructed.
  - ☐ Labs must be completed individually unless otherwise stated. While collaboration during data collection may be permitted, all written work must be your own.
  - ☐ Plagiarism, fabrication of data, or submitting identical reports from group members will be considered academic misconduct and reported according to university policy.

Always prioritize safety and ask your instructor if you have any questions or concerns about the lab procedures or safety measures.

Attendance and Expectations
All students are required to attend every class, except in cases of illness, serious family concerns, or other major problems. We expect that students will arrive on time, be prepared to listen and participate as appropriate, and stay for the duration of a meeting rather than drift in or out casually. In short, we anticipate that students will show professors and fellow students maximum consideration by minimizing the disturbances that cause interruptions in the learning process. This means that punctuality is a must, that cellular phones be turned off, and that courtesy is the guiding principle in all exchanges among students and faculty. You will be responsible for the materials and ideas presented in the lecture.

Assignment Due Dates
All written assignments must be turned in at the time specified. Late assignments will not be accepted unless prior information has been obtained from the instructor. If you believe you have extenuating circumstances, please contact the instructor as soon as possible.

Make-Up Work

The instructor will not provide students with class information or make-up assignments/quizzes/exams missed due to an unexcused absence. Absences will be excused and assignments/quizzes/exams may be made up only with written documentation of an authorized absence. Every effort should be made to avoid scheduling appointments during class. An excused student is responsible for requesting any missed information from the instructor and setting up any necessary appointments outside of class.

Access, Special Needs and Disabilities

Please notify the instructor at the start of the semester if you have any documented disabilities, a medical issue, or any special circumstances that require attention, and the school will be happy to assist.