湖北工業大學
HUBEI UNIVERSITY OF TECHNOLOGY

Course Title	General Physics II
Course Code	PHYS 1012
Semester	Summer 2026
Course Length	4 Weeks, 60 Contact Hours
Credits	4
Instructor	TBA
Office	TBA
Email	TBA
Prerequisite	PHYS 1011 General Physics I

Course Description:

This course is the second half of a comprehensive introduction to physics, building upon the principles of mechanics established in General Physics I. This course focuses on the study of periodic motion, wave phenomena, and the fundamental laws of electromagnetism. Students will explore the nature of electric charges, circuits, magnetic interactions, and the behavior of light through geometrical and physical optics.

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:

- Model and solve problems involving simple harmonic motion and mechanical wave propagation;

- Apply Coulomb′s Law, Gauss′s Law, and Faraday′s Law to determine forces, fields, and induced currents;
- Design and analyze direct current (DC) circuits using Kirchhoff′s rules and power conservation principles;
- Utilize ray-tracing and wave-interference models to describe the formation of images by mirrors and lenses;
- Conduct laboratory experiments to verify physical constants and document findings through technical report writing.

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:

Problem Sets (20%)
Weekly assignments designed to bridge theoretical lecture concepts with quantitative problem-solving. These tasks emphasize algebraic manipulation and the application of physical laws to various scenarios, ensuring students gain fluency in the mathematical language of physics.

Laboratory Explorations (25%)
Hands-on experimental sessions where students collect data on wave behavior, circuit analysis, and optical properties. Evaluation is based on the accuracy of data collection and the depth of the subsequent analytical lab reports, which must include a formal discussion of uncertainty.

Midterm Examination (20%)
A mid-semester assessment focusing on the first half of the course: oscillations, mechanical waves, and electrostatics. This exam tests both conceptual understanding and the ability to solve multi-step numerical problems within a timed environment.

Cumulative Final Examination (35%)
A comprehensive exam administered at the end of the term covering all course materials, with a significant emphasis on electromagnetism and optics. It serves as the final measure of a student’s ability to integrate diverse physical concepts into a cohesive understanding of the natural world.

Assessments: Activity	**Percent Contribution**
Problem Sets	20%
Laboratory Explorations	25%
Midterm Examination	20%
Cumulative Final Examination	35%

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 1012 Schedule		
Lecture	Topic	Readings
L1	Oscillatory Motion: Simple Harmonic Motion	*Urone*: Ch. 16
L2	Energy in SHM; Pendulums	*Urone*: Ch. 16
L3	Damping and Driven Oscillations	*Urone*: Ch. 16
L4	Mechanical Waves: Transverse and Longitudinal	*Randall*: Ch. 15
L5	Sound Waves, Intensity, and the Doppler Effect	*Urone*: Ch. 17 Lab 1: Oscillations & SHM
L6	Superposition and Standing Waves	*Randall*: Ch. 16
L7	Electric Charge and Coulomb's Law	*Urone*: Ch. 18
L8	Electric Fields and Field Lines	*Urone*: Ch. 18
L9	Electric Potential Energy	*Randall*: Ch. 21
L10	Electric Potential and Equipotential Surfaces	*Urone*: Ch. 19 Lab 2: Standing Waves
L11	Capacitance and Dielectrics	*Urone*: Ch. 19
L12	**Midterm Examination**	Covers L1-L10
L13	Current, Resistance, and Ohm's Law	*Urone*: Ch. 20
L14	DC Circuits: Resistors in Series and Parallel	*Urone*: Ch. 21
L15	Kirchhoff's Rules and Complex DC Circuits	*Urone*: Ch. 21
L16	Magnetism: Magnetic Fields and Forces	*Urone*: Ch. 22 Lab 3: DC Circuits
L17	Magnetic Force on Current-Carrying Conductors	*Urone*: Ch. 22
L18	Sources of Magnetic Fields (Biot-Savart/Ampere)	*Randall*: Ch. 24
L19	Electromagnetic Induction and Faraday's Law	*Urone*: Ch. 23
L20	Lenz's Law and Motional EMF	*Urone*: Ch. 23 Lab 4: Magnetic Induction
L21	Reflection, Refraction, and Snell's Law	*Randall*: Ch. 34
L22	Spherical Mirrors and Image Formation	*Urone*: Ch. 25
L23	Thin Lenses and Ray Tracing	*Urone*: Ch. 25
L24	Physical Optics: Interference and Diffraction	*Urone*: Ch. 27 Lab 5: Lenses & Optics
L25	Course Review and Final Synthesis	Comprehensive
/	**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, as he/she is not legally permitted to inquire. 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.
  - ☐ Students must complete all assigned lab experiments to be eligible to pass the course, regardless of overall grade performance in other components.
  - ☐ 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.
- **Safety Precautions**
  - ☐ Follow all safety guidelines provided by your instructor and in the lab manuals. Always wear appropriate personal protective equipment (PPE) such as safety goggles and closed-toe shoes.

- ☐ Do not eat, drink, or use personal electronic devices (e.g., phones) while handling lab equipment or during experiments.
- ☐ Immediately report any accidents, spills, or broken equipment to the lab instructor or teaching assistant.

- **Lab Conduct and Academic Integrity**
  - ☐ 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.
- **Equipment Care and Clean-Up**
  - ☐ Handle all lab equipment with care. Do not modify or disassemble instruments unless instructed.
  - ☐ Clean your workstation and return all equipment to its proper place before leaving the lab. Failure to do so may result in loss of marks or access restrictions.

By following these instructions and safety guidelines, you will help create a safe and effective learning environment for yourself and your classmates. 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.