



PHYS 1235: General Physics II (With Lab)

2021 Winter Session	
Total Class Sessions: 25 Class Sessions Per Week: 6 Total Weeks: 4 Class Session Length (Minutes): 145 Credit Hours: 5	Instructor: Staff Classroom: TBA Office Hours: TBA Language: English Total Laboratory Sessions: 10

Course Description:

This course studies the basic theories and principles of physics. Topics covered Electric Charges and Electric Field; Electric Potential; Magnetism; Reflection, Refraction and Diffraction of Lights; Quantum Mechanics; Molecules and Solids; Nuclear Physics; Astrophysics and Cosmology. This course is the continuum of General Physics I. It provides more profound understanding about Physics concepts. It also aims to introduce basic concepts of Physics and use vivid models and teaching measures to develop students' interest on Physics. Includes laboratory.

Learning objectives:

The ultimate goal is for students to be able to carry out open-inquiry investigations to solidify their knowledge of physics. Also, it requires them to plan and implement data collection strategies in relation to particular scientific questions. Meanwhile, it educates student to connect and relate knowledge across various scales, concepts, and representations in and across domains.

Course Materials:

Physics for Scientists and Engineers, 4th ed. by Giancoli.

Course Format and Requirements:

This class is in the format of lectures and lab sessions. Attendance is vital to get a thorough understanding of the material. Students are responsible for lecture notes, any course material handed out, and attendance in class, while attendance will not to be formally recorded.

Labs:

The goal of the labs is to provide a hands-on experience with General Physics material and to enhance abilities in scientific methodology, critical thinking, and communicating about General Physics. Attendance is mandatory. No make-up labs will be provided.

Attendance:

Students are expected to attend and participate in class. Strong attendance and participation are good indicators of success. Each student is responsible for all course material, announcements, quizzes and exams made in class, whether or not the student attended that day's class.

**Course Assignments:****Quizzes:**

There will be 7 quizzes administered through the whole semester and the LOWEST two scores will be dropped. Quizzes will always be completed in the first ten minutes of class. The quiz problems will be similar to problem sets and examples on slides. There will be no make-up quizzes.

Exams:**Midterm Exam**

There will be two midterm exam in this course. The midterm exam will be based on concepts covered in class. They will be in-class, close-book and non-cumulative.

Final Exam

The final will be cumulative and close-book. Note that the final will not be taken during the normal class times. Exact time and location for final will be announced later.

Problem Sets:

This will cover the following topics: Electric Charges and Electric Field, Magnetism, Diffraction of Light Waves and Polarization, Quantum Mechanics, Molecules and Solids, and Nuclear Physics and Radioactivity.

Lab Assignments:

The goal of the labs is to provide a hands-on experience with General Physics material and to enhance abilities in scientific methodology, critical thinking, and communicating about General Physics. Attendance is mandatory. No make-up labs will be provided.

Course Assessment:

Quizzes (5 out of 7)	10%
Midterm Exam 1	15%
Midterm Exam 2	15%
Problem Sets	15%
Labs	15%
Final Exam	30%
Total	100%

Grading Scale (percentage):

A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
98-100	93-97	90-92	88-89	83-87	80-82	78-79	73-77	70-72	68-69	63-67	60-62	<60

**Academic Integrity:**

Students are encouraged to study together, and to discuss lecture topics with one another, but all other work should be completed independently.

Students are expected to adhere to the standards of academic honesty and integrity that are described in the Chengdu University of Technology's *Academic Conduct Code*. Any work suspected of violating the standards of the *Academic Conduct Code* will be reported to the Dean's Office. Penalties for violating the *Academic Conduct Code* may include dismissal from the program. All students have an individual responsibility to know and understand the provisions of the *Academic Conduct Code*.

Special Needs or Assistance:

Please contact the Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material. Our goal is to help you learn, not to penalize you for issues which mask your learning.

Course Schedule:

Class	Topics	Assignments
Class 1~5	<ul style="list-style-type: none"> • Course & Syllabus Overview • Review of the Previous Knowledge • Electric Charges and Electric Field <ul style="list-style-type: none"> ➤ Electrification and Electrical Charges ➤ Electric Fields and Electrostatic Induction ➤ Electric Theories, Distribution and Electric Charges ➤ Electrostatic Generators • Gauss's Law • Electric Potential <ul style="list-style-type: none"> ➤ Potential, Capacity, and the Electric Condenser • Capacitance, Dielectrics, Electric Energy Storage • Electric Currents and Resistance • DC Circuits <ul style="list-style-type: none"> ➤ Electrical Currents and Circuits ➤ The Simple Voltaic Cell and its Action ➤ Practical Voltaic Cells 	<ul style="list-style-type: none"> • Quiz 1&2 • Textbook review • Finish the hard copy of problem set about Electric Charges and Electric Field assigned by teacher



<p>Class 6~10</p>	<ul style="list-style-type: none"> • Magnetism <ul style="list-style-type: none"> ➤ The Magnetic Effect of Electric Currents ➤ Electrical Measurements ➤ Ohm's Law and Electrical Circuits ➤ Grouping of Cells and Measuring Resistance • Sources of Magnetic Field • Electromagnetic Induction and Faraday's Law <ul style="list-style-type: none"> ➤ Energy in Magnetic Field • Inductance • Ampere's Law • Magnetic Vector Potential • Magnetic Force on a Moving Charge • Electromagnetic Oscillations and AC Circuits • Maxwell's Equations and Electromagnetic Waves • General Properties and Applications of Maxwell's Equations 	<ul style="list-style-type: none"> • Quiz 3 • Textbook review • Finish the hard copy of problem set about Magnetism assigned by teacher • Midterm 1
<p>Class 11~15</p>	<ul style="list-style-type: none"> • Light: Reflection and Refraction • Lenses and Optical Instruments • The Wave Nature of Light; Interference • Diffraction • Fraunhofer Diffraction • Diffraction of Light Waves <ul style="list-style-type: none"> ➤ Fraunhofer Diffraction by a Single Opening ➤ Fraunhofer Diffraction by a Double Slit ➤ Fraunhofer Diffraction by an Ideal Grating • Fresnel Diffraction <ul style="list-style-type: none"> ➤ Small Circular Opening and Obstacle • Polarization <ul style="list-style-type: none"> ➤ Polarization of Light and State of Polarization ➤ Optical Activity 	<ul style="list-style-type: none"> • Quiz 4&5 • Textbook review • Finish the hard copy of problem set about Diffraction of Light Waves and Polarization assigned by teacher
<p>Class 16~20</p>	<ul style="list-style-type: none"> • The Special Theory of Relativity 	



	<ul style="list-style-type: none"> • Early Quantum Theory and Models of the Atom • Quantum Mechanics <ul style="list-style-type: none"> ➤ Photoelectric and Compton Effects ➤ Wave Nature of Particle ➤ Interpretation of Quantum Mechanics and Schrödinger Equation ➤ Schrödinger’s Picture and Particle in a Potential Box ➤ Time Dependent Schrödinger’s Equation • Quantum mechanics of Atoms 	<ul style="list-style-type: none"> • Quiz 6 • Textbook review • Finish the hard copy of problem set about Quantum Mechanics assigned by teacher • Midterm 2
<p>Class 21~25</p>	<ul style="list-style-type: none"> • Molecules and Solids <ul style="list-style-type: none"> ➤ Free Electron Approximation ➤ Electron Spin Paramagnetism ➤ Block Theorem: Periodic Potential • Nuclear Physics and Radioactivity <ul style="list-style-type: none"> ➤ Semi-classic Models of Nucleus ➤ The Shell Model of the Nucleus ➤ Radioactive Decay of Nucleus ➤ Nuclear Fission ➤ Nuclear Fusion • Nuclear Energy; Effects and Uses of Radiation • Elementary Particles • Astrophysics and Cosmology • Wrap-up 	<ul style="list-style-type: none"> • Quiz 7 • Finish the hard copy of problem set about Molecules and Solids and Nuclear Physics and Radioactivity assigned by teacher • Final exam (cumulative) TBA
<p>Lab Schedule: Lab 1: Electrical Field Mapping Lab 2: Electric Fields and Equivalent potentials Lab 3: Oscilloscope Lab 4: Voltage, Current and Resistance Lab 5: Magnetics field; Lorentz Force <u>Lab Midterm Exam</u> Lab 6: RCL Circuit; Current Balance Lab 7: Measurement of e/m; Lab 8: Induction; Inductance; Motor; Generator</p>		



Lab 9: Geometrical Optics; Snell's Law

Lab 10: Interference; Diffraction

Lab Final Presentation