



## PHYS 1110: General Physics I

2021 Winter Session	
<b>Total Class Sessions: 25</b> <b>Class Sessions Per Week: 6</b> <b>Total Weeks: 4</b> <b>Class Session Length (Minutes): 145</b> <b>Credit Hours: 4</b>	<b>Instructor: Staff</b> <b>Classroom: TBA</b> <b>Office Hours: TBA</b> <b>Language: English</b>

### Course Description:

This course studies the basic theories and principles of physics. Topics covered include Newton's Three Laws; Gravitation; Kinematics; Energy and Work; Linear Momentum; Angular Momentum and General Rotation; Fluid Wave; Motion; The Ideal Gas Law. This course aims to introduce basic concepts of Physics and use vivid models and teaching measures to develop students' interest on Physics.

### 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 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 exams 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 for final will be announced later.

#### **Problem Sets:**



This will cover the following topics: Kinematics, Newton's Law of Motion, Gravitation, Work and Energy, Rotational Motion, Linear Momentum, Fluids, Wave Motion, Sound, and The Ideal Gas Law.

**Attendance:**

More than three unexcused absences will result in an automatic reduction in your participation grade, for instance from A- to B+. Your active participation in the class is expected and constitutes part of your grade.

**Course Assessment:**

Quizzes (5 out of 7)	10%
Midterm Exam 1	20%
Midterm Exam 2	20%
Problem Sets	15%
Attendance	5%
Final Exam	30%
<b>Total</b>	<b>100%</b>

**Grading Scale (percentage):**

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

**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"><li>• Course &amp; Syllabus Overview</li><li>• Measurement and Estimating</li><li>• Describing Motion: Kinematics in One Dimension</li><li>• Kinematics in Two or Three Dimensions</li><li>• Vectors<ul style="list-style-type: none"><li>➤ Scalar VS. Vector</li><li>➤ Speed &amp; Velocity</li><li>➤ Displacement and Distance</li></ul></li><li>• Dynamics: Newton's Law of Motion</li><li>• Newton's First Law<ul style="list-style-type: none"><li>➤ Understand idea of force and motion</li></ul></li><li>• Newton's Second Law<ul style="list-style-type: none"><li>➤ Acceleration, velocity and displacement</li><li>➤ Centripetal acceleration</li><li>➤ Applications of Newton's Second Law: Friction</li><li>➤ Static Friction</li><li>➤ Sliding Friction</li><li>➤ Rolling Friction</li></ul></li><li>• Newton's Third Law</li></ul>	<ul style="list-style-type: none"><li>• Quiz 1&amp;2</li><li>• Textbook review</li><li>• Finish the hard copy of problem set about Kinematics and Newton's Law of Motion assigned by teacher</li></ul>
Class 6~10	<ul style="list-style-type: none"><li>• Circular Motion &amp; Drag Forces<ul style="list-style-type: none"><li>➤ Uniform circular motion</li></ul></li><li>• Dynamics of uniform circular motion: Universal Law of Gravitation</li><li>• Gravitation and Newton's Synthesis</li><li>• Work and Energy</li><li>• Idea of negative work</li><li>• Potential Energy<ul style="list-style-type: none"><li>➤ Elastic Potential Energy</li><li>➤ Gravitational Potential Energy</li></ul></li><li>• Conservation of Energy<ul style="list-style-type: none"><li>➤ Equation of Conservation of Energy</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Quiz 3&amp;4</li><li>• Textbook review</li><li>• Finish the hard copy of problem set about Gravitation and Work and Energy assigned by teacher</li></ul>



	<ul style="list-style-type: none"> <li>• Center of mass             <ul style="list-style-type: none"> <li>➤ How to find the Centroid</li> </ul> </li> </ul>	
Class 11~15	<ul style="list-style-type: none"> <li>• Linear Momentum</li> <li>• Conservation of linear momentum</li> <li>• Different types of collisions             <ul style="list-style-type: none"> <li>➤ Elastic and Inelastic collisions</li> <li>➤ Apply equations of momentum conservation and energy conservation to model elastic/inelastic collision</li> </ul> </li> <li>• Rotational Motion</li> <li>• Angular Momentum and General Rotation             <ul style="list-style-type: none"> <li>➤ Angular Displacement</li> <li>➤ Angular Velocity</li> <li>➤ Angular Acceleration</li> <li>➤ Rigid body dynamics: angular acceleration, angular velocity and centripetal acceleration</li> </ul> </li> <li>• Static Equilibrium and Elasticity and Fracture</li> </ul>	<ul style="list-style-type: none"> <li>• Midterm</li> <li>• Textbook review</li> <li>• Finish the hard copy of problem set about Rotational Motion and Linear Momentum assigned by teacher</li> </ul>
Class 16~20	<ul style="list-style-type: none"> <li>• Fluids</li> <li>• Introduction to fluid dynamics and statics             <ul style="list-style-type: none"> <li>➤ The hydraulic press</li> <li>➤ Archimedes' principle</li> <li>➤ Bernoulli's equation</li> </ul> </li> <li>• Oscillations</li> <li>• Wave Motion             <ul style="list-style-type: none"> <li>➤ The Wave Question</li> <li>➤ Frequency and Period</li> <li>➤ Wave energy and power transmitted</li> <li>➤ Doppler effect</li> <li>➤ Superposition of waves</li> <li>➤ Interference: the double-slit experiment</li> <li>➤ Standing waves and musical instruments</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Quiz 5&amp;6</li> <li>• Textbook review</li> <li>• Finish the hard copy of problem set about Fluids and Wave Motion assigned by teacher</li> </ul>
Class 21~25	<ul style="list-style-type: none"> <li>• Sound             <ul style="list-style-type: none"> <li>➤ Source</li> <li>➤ Speed</li> <li>➤ Media</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Quiz 7</li> <li>• Finish the hard copy of problem set about Sound and The Ideal</li> </ul>



	<ul style="list-style-type: none"><li>➤ Intensity and Pitch of Sound</li><li>➤ Musical Scales and Resonance</li> <li>• Temperature and Thermal Expansion</li><li>• The Ideal Gas Law</li><li>• Modes of Transmitting Heat</li><li>• Kinetic Theory of Gases</li><li>• Heat and the First Law of Thermodynamics</li><li>• Second Law of Thermodynamics</li><li>• Wrap-up</li></ul>	<p>Gas Law assigned by teacher</p> <ul style="list-style-type: none"><li>• Final exam (cumulative) TBA</li></ul>
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