PHYS 1135: General Physics I (With Lab)

2022 Spring Session	
Total Class Sessions: 25 **Class Sessions Per Week: 5** **Total Weeks: 5** **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 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. 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 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 exams 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.
Lab Assignments: It is expected that all lab reports will be neatly typed (word processed) with college level grammar and spelling. Each report should include the following sections: The purpose of the experiment, the physical phenomenon observed and the concept or numerical constant to be verified; data collected and graphs of results with clearly labeled axes; an explanation and interpretation of the results and how they compare to the stated objective. Questions related to the experiment should be included and answered completely and clearly.

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	• Course & Syllabus Overview • Measurement and Estimating • Describing Motion: Kinematics in One Dimension • Kinematics in Two or Three Dimensions • Vectors ➢ Scalar VS. Vector ➢ Speed & Velocity ➢ Displacement and Distance • Dynamics: Newton's Law of Motion • Newton's First Law ➢ Understand idea of force and motion • Newton's Second Law ➢ Acceleration, velocity and displacement ➢ Centripetal acceleration ➢ Applications of Newton's Second Law: Friction ➢ Static Friction ➢ Sliding Friction ➢ Rolling Friction • Newton's Third Law	• Quiz 1&2 • Textbook review • Finish the hard copy of problem set about Kinematics and Newton's Law of Motion assigned by teacher
Class 6~10	• Circular Motion & Drag Forces ➢ Uniform circular motion • Dynamics of uniform circular motion: Universal Law of Gravitation • Gravitation and Newton's Synthesis • Work and Energy • Idea of negative work • Potential Energy ➢ Elastic Potential Energy ➢ Gravitational Potential Energy	• Quiz 3&4 • Textbook review • Finish the hard copy of problem set about Gravitation and Work and Energy assigned by teacher

	• Conservation of Energy ➢ Equation of Conservation of Energy • Center of mass ➢ How to find the Centroid	
Class 11~15	• Linear Momentum • Conservation of linear momentum • Different types of collisions ➢ Elastic and Inelastic collisions ➢ Apply equations of momentum conservation and energy conservation to model elastic/inelastic collision • Rotational Motion • Angular Momentum and General Rotation ➢ Angular Displacement ➢ Angular Velocity ➢ Angular Acceleration ➢ Rigid body dynamics: angular acceleration, angular velocity and centripetal acceleration • Static Equilibrium and Elasticity and Fracture	• Midterm • Textbook review • Finish the hard copy of problem set about Rotational Motion and Linear Momentum assigned by teacher
Class 16~20	• Fluids • Introduction to fluid dynamics and statics ➢ The hydraulic press ➢ Archimedes' principle ➢ Bernoulli's equation • Oscillations • Wave Motion ➢ The Wave Question ➢ Frequency and Period ➢ Wave energy and power transmitted Doppler effect ➢ Superposition of waves ➢ Interference: the double-slit experiment ➢ Standing waves and musical instruments	• Quiz 5&6 • Textbook review • Finish the hard copy of problem set about Fluids and Wave Motion assigned by teacher
Class 21~25	• Sound	• Quiz 7

	➢ Source ➢ Speed ➢ Media ➢ Intensity and Pitch of Sound ➢ Musical Scales and Resonance • Temperature and Thermal Expansion • The Ideal Gas Law • Modes of Transmitting Heat • Kinetic Theory of Gases • Heat and the First Law of Thermodynamics • Second Law of Thermodynamics • Wrap-up	• Finish the hard copy of problem set about Sound and The Ideal Gas Law assigned by teacher • Final exam (cumulative) TBA

Lab Schedule:
Lab 1: Graph Matching; One-Dimensional Motion
Lab 2: Addition of Vectors; Velocity and Acceleration
Lab 3: Newton's Second Law; Projectile Motion
Lab 4: Centripetal Force; Static and Kinetic Friction
Lab 5: Work and Energy; Conservation of Energy; Buoyant Forces
Lab 6: Collisions and Momentum; Rotational Inertia
Lab 7: Harmonic Motion; Pendulum
Lab 8: Standing Waves; Resonance Tube; Oscillations of a String
Lab 9: Phase Changes; Heat Capacity
Lab 10: Heat of Fusion; Heat of Vaporization

Lab Final Presentation