



**University of International Business and Economics
International Summer School**

PHY 220 Introductory Physics II (with lab)

Term: December 19th, 2022 – January 13th, 2023

Instructor: Prof. Shanshan Chen

Home Institution: Renmin University of China

Email: schen@ruc.edu.cn

Class Hours: Monday through Friday, 120 minutes each day (2,400 minutes in total)

Discussion session: 2 hours each week

Office Hours: TBD

Total Contact Hours: 64 contact hours (45 minutes each, 48 hours in total)

Credit: 4 units

Location: WEB

Course Description:

Calculus-based introduction to wave and optics, electricity and magnetism course in Physics. How wave travels, how light propagates through systems consisting of lenses and mirrors. The interference, diffraction of light. Electric and magnetic fields, their origins, and their effects. The origin of electro-magnetic waves, how they relate to light. This is an intensive course, especially given the limited time frame, and students should take this into account.

Course Goals:

The goal is for you to develop a deep conceptual understanding of physics along with problem solving skills that will serve you well in your future studies.

Required Textbook:

"Physics for Scientists and Engineers: A Strategic Approach", 3d Edition, by Randall D. Knight
We will cover chapters 25 to 35, ISBN: 978-0-321-74090-8

Grading Policy:

The grades will be determined as follows:

30% for homework solutions

20% for laboratory

20% for the midterm exam

30% for the final exam

Grading Scale:

Assignments and examinations will be graded according to the following grade scale:

A	90-100	C+	72-74
A-	85-89	C	68-71
B+	82-84	C-	64-67
B	78-81	D	60-63
B-	75-77	F	below 60

Academic Honesty:

Students are expected to maintain high standards of academic honesty. The work you produce in this class should be the product of your own time in reading, thinking, and writing. Any academic misconduct of any type, especially cheating on an exam, will automatically trigger: (1) expulsion from the course; (2) the issuance of a failing grade for the course, (3) the issuance of a formal report about the student's misconduct to the student's home university, and (4) any other disciplinary or administrative action deemed appropriate by Professor Chen and the leaders of UIBE. Students are allowed to co-operate on, but not copy, homework exercises.

Deadline Policy:

Summer school is very intense and to best ensure your success in this class, students must be proactive in their work. This means that you should not only be disciplined about completing assigned reading and assignments in a timely way, but also that you reach out to me when you have questions.

All work in the class will have a reasonable "window" of time within which to complete it, and because of the limit of a 4-week semester, we don't have a lot of room.

Missed Exams:

In the event that you must miss an exam, please let me know as much in advance as possible. In the case of illness or emergency, you may be eligible to make-up one quiz or exam. Please see me upon your return to class and be prepared to provide written documentation. No make-ups will be offered for unexcused absences.

Course Schedule:

Day 1, Mon: Chapters 20 Traveling Waves

Day 2, Tues: Chapters 21 Superposition

Day 3, Wed: Chapters 22 Wave Optics

Day 4, Thurs: Chapters 22 Wave Optics



Day 5, Fri: **Chapters 23** Ray Optics

Day 6, Mon: **Chapter 24** Optical Instruments

Day 7, Tues: **Review**

Day 8, Wed: **Mid-term Exam**

Day 9, Thurs: **Chapter 25** Electric Charges and Forces

Day 10, Fri: **Chapter 26** The Electric Field

Day 11, Mon: **Chapter 27** Gauss's Law

Day 12, Tues: **Chapter 28** The Electric Potential

Day 13, Wed: **Chapter 29** Potential and Field

Day 14, Thurs: **Chapter 30** Current and Resistance

Day 15, Fri: **Chapter 31** Fundamentals of Circuits Potential and Field

Day 16, Mon: **Chapter 32** The Magnetic Field

Day 17, Tues: **Chapter 33** Electromagnetic Induction

Day 18, Wed: **Chapter 34** Electromagnetic Fields and Waves

Day 19, Thurs: **Review session**

Day 20, Fri: **Final Exam**

Laboratory Syllabus

Course Goals:

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

- Demonstrate the ability to work safely and effectively in the laboratory.
- Competently perform a broad variety of analytical and synthetic procedures and critically evaluate the results.
- Perform basic laboratory skills and understand common laboratory practices, procedures, and equipment, including safety issues.
- Explain, analyze and interpret the data obtained from each experiment.

- Demonstrate adequate skills in technical writing.

Tentative Lab Schedule:

Topic
1. Electrostatics 1.1 Producing Static Charge 1.2 Coulomb's Law 1.3 Induced Charge 1.4 Electric Field 1.5 Gauss' Law (Faraday's Cage)
2. Electromotive Force and Current 2.1 Batteries 2.2 Thermoelectricity 2.3 Piezoelectricity
3. Magnetic Materials 3.1 Magnets 3.2 Magnetization 3.3 Para magnetism and Diamagnetism 3.4 Temperature and Magnetism
4. Magnetic Fields and Forces 4.1 Magnetic Fields 4.2 Forces on Magnets 4.3 Force on Current in Wires
5. Electromagnetic Induction 5.1 Induced Currents and Forces 5.2 Eddy Currents 5.3 Motors and Generators
6. Optics 6.1 Straight Line Propagation 6.2 Reflection 6.3 Diffraction 6.4 Interference 6.5 Polarization 6.6 Modern Optics

Each module will contain a Lab Activity document where you will find the instructions and procedures for that module's labs. These activity documents are designed to act as a study guide for the module test.

Each Lab Activity Document has the following:

- Purpose
- Learning Objectives
- Assignment Submission Checklist (Experimental Photographs, Formal Lab Reports, Graphs,



- Lab Assessment, etc.)
- Lab Activity Number
 - ◇ Introduction
 - ◇ Procedure
 - ◇ Analysis and Questions

You will only be submitting what is in the Assignment Submission Checklist Area. You aren't going to submit the handouts or analysis and questions section. Your instructor will have those answers if you are stuck and need clarification.

All reports/handouts will need to be submitted in a word document and uploaded as an attachment. Please make sure you title your file with your last name and the title of the lab. Your name should also be included on the actual document itself.