



Nanchang University PHYS 12: Intermediate Physics

Credit: 4

Contact Hours

This course is composed of 24 lecture sessions, 3 tutorial sessions and 9 office contact hours. Each lecture session takes 2 contact hours in length; each tutorial session takes 3 contact hours in length; There will be a Q-A review session(3 contact hours) and Final Exam (3 contact hours) at the end of this term. This course has 72 contact hours in total.

Course Description

With an emphasis on the topics in modern physics, this course covers the most typical elements of physics, such as the mechanics, thermodynamics, vibrations & waves, electricity & magnetism and light & optics. The course will introduce a sheer simplicity of fundamental physical theories and concepts that can enrich your view of the world around you. By providing a clear strategy for connecting those theories to a consistent problem-solving approach, reinforcing this methodology throughout the whole learning period and connecting it to real-world examples, this course will equip students with systematical learning of classical physics.

Required Textbook

College Physics by Raymond A. Serway, Chris Vuille, Jerry S. Faughn, 8th Edition, Cengage Learning

Grading

- Homework and assignment 10%
- Quizzes 20%
- Labs 20%
- Midterm Exam 20%
- Final Exam 30%

A+ 96-100	A 90-95	A- 85-89
B+ 82-84	B 78-81	B- 75-77
C+ 71-74	C 66-70	C- 62-65
D 60-61	F < 60	



Course Schedule

The course has 24 class sessions in total. All sessions are 2 contact hours in length. At the end of this term, there will be a Q-A review session(3 contact hours) and Final Exam (3 contact hours).

Note: the course outline and required readings are subject to change.

Class 1:

Part I Mechanics

Introduction

Motion in One Dimension

Vectors and Two-Dimensional Motion

Class 2:

The Laws of Motion

Energy

Class 3:

Momentum and Collisions

Class 4:

Rotational Motion and the Law of Gravity

Quiz 1

Class 5:

Rotational Equilibrium and Rotational Dynamics

Class 6:

Solids and Fluids

Class 7:

Part 2 Thermodynamics

Thermal Physics

Quiz 2

Class 8:

Energy in Thermal Processes

Class 9:

The Laws of Thermodynamics

Class 10:

Part 3 Vibrations and Waves

Vibrations and Waves



Class 11:

Sound

Quiz 3

Class 12:

Midterm

Class 13:

Part 4 Electricity and Magnetism

Electric Forces and Electric Fields

Class 14:

Electrical Energy and Capacitance

Class 15:

Current and Resistance

Direct-Current Circuits

Quiz 4

Class 16:

Magnetism

Induced Voltages and Inductance

Class 17:

Alternating-Current Circuits and Electromagnetic Waves

Class 18:

Part 5 Light and Optics

Reflection and Refraction of Light

Mirrors and Lenses

Class 19:

Wave Optics

Optical Instruments

Quiz 5

Class 20:

Part 6 Modern Physics

Relativity

Quantum Physics

Class 21:

Atomic Physics



Class 22:
Nuclear Physics

Class 23:
Nuclear Energy and Elementary Particles

Class 24:
Brief interpretation of Appendixes
Overall Review

Laboratory Schedule

Room: To be announced

The lab reports have three parts, the pre-lab (to be completed on-line before the lab commences), the data and calculations and the post-lab. The pre-Lab Assignment due when you enter the lab. You and your partner will work collaboratively on the data and post-lab sections and hand in one report for the two of you.

In order to do a good job in the experiments, it is essential that you come well prepared. Reading the experiment for the first time in lab will put you and your partner at a disadvantage and make it very difficult to complete the experiment on time.

If you have any technical questions on the pre-lab, data section or post-lab assignments, you are encouraged to ask the professor. Each lab will be 3-hour long, and totally 10 labs will be scheduled. Here are the tentative list of labs an instructor may choose from (an instructor can offer new labs based on actual teaching setting):

- Lab 1: Coulomb's Law
- Lab 2: Instrumentation
- Lab 3: Electric Fields and Potentials
- Lab 4: Capacitors
- Lab 5: Simple Resistor Circuit
- Lab 6: Complex Circuits
- Lab 7: RC Circuits
- Lab 8: Magnetic Force and Fields
- Lab 9: Biot-Savart Law with Helmholtz Coil
- Lab 10: Mass to Charge Ratio
- Lab 11: Faraday's Law
- Lab 12: AC Circuits
- Lab 13: Optical Diffraction
- Lab 14: AC Circuits
- Lab 15: Nuclear Spectroscopy
- Lab 16: Optical Spectroscopy
- Lab 17: Electron Spin Resonance



Attending Policy

Regular and prompt attendance is required. Under ordinary circumstances, you may miss two times without penalty. Each absence over this number will lower your course grade by a third of a letter and missing more than five classes may lead to a failing grade in the course. Arriving late and/or leaving before the end of the class period are equivalent to absences.

Policy on "Late Withdrawals"

In accordance with university policy, appeals for late withdrawal will be approved **ONLY** in case of medical emergency and similar crises.

Academic Honesty

Nanchang University expects all students to do their own work. Instructors will fail assignments that show evidence of plagiarism or other forms of cheating, and will also report the student's name to the University administration. A student reported to the University for cheating is placed on disciplinary probation; a student reported twice is suspended or expelled.

General Expectations:

Students are expected to:

- Attend all classes and be responsible for all materials covered in class and otherwise assigned;
- Complete the day's required reading and assignments before class;
- Review the previous day's notes before class and make notes about questions you have about the previous class or the day's reading;
- Participate in class discussions and complete required written work on time;
- Refrain from texting, phoning or engaging in computer activities unrelated to class during the class period;
- While class participation is welcome, even required, you are expected to refrain from private conversations during the class period.

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.