General Physics II: Overview

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Fall 2023

The Series

- General Physics I
  - Newtonian mechanics
    [I. Newton (1642 - 1726)]
  - Theory of relativity
    [A. Einstein (1879 - 1955)]
  - Thermal physics
    [L. Boltzmann (1844 - 1906)]
- General Physics II
  - Electricity
  - Magnetism
  - Optics
    [C. de Coulomb (1736 - 1806) . . .
    J. C. Maxwell (1831 - 1879)]
  - Quantum physics

$$\mathbf{F} = q\mathbf{E} + q\mathbf{v} \times \mathbf{B}$$

$$\nabla \cdot \mathbf{E} = \frac{\rho}{\epsilon_0}$$

$$\nabla \cdot \mathbf{B} = 0$$

$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t}$$

$$\nabla \times \mathbf{B} = \mu_0 \mathbf{J} + \mu_0 \epsilon_0 \frac{\partial \mathbf{E}}{\partial t}$$

$$i\hbar \frac{\partial \psi}{\partial t} = -\frac{\hbar^2}{2m} \nabla^2 \psi + U\psi$$

References

- Halliday, D., Resnick, R., and Walker, J., *Fundamentals of Physics*, 10th ed., Wiley, 2014
  - In fact, any edition is okay. It has long been a popular college textbook and covers the basics we will discuss. But for the honors course, we often go beyond it.
- Feynman, R. P., *The Feynman Lectures on Physics*, 2nd ed., Addison-Wesley, 2005 (https://www.feynmanlectures.caltech.edu)
  - A set of lectures from the legendary physicist Richard Feynman. "Tough, but nourishing and full of flavor."

Additional References

- Berkeley Physics Course
  - Purcell, E. M., *Vol. II: Electricity and Magnetism*, McGraw-Hill, 2014
  - Crawford, F. S., Jr., *Vol. III: Waves*, McGraw-Hill, 2014
  - Wichmann, E. H., *Vol. IV: Quantum Physics*, McGraw-Hill, 2014

"The intention of the writers has been to present elementary physics as far as possible in the way in which it is used by physicists working on the forefront of their field. We have sought to make a course that would vigorously emphasize the foundations of physics."

Grading

- Homework: (to be graded by TAs, tentatively 30%)
  - Total 8 problem sets.
  - To be published on Wednesday and due normally two weeks later.
  - MUST BE HANDED IN PAPER MATERIALS. NO ELECTRONIC SUBMISSION PERMITTED!
- Quizzes and Midterm Exam: (tentatively 30%)
  - Midterm: November 15 (tentative)
  - Quizzes are given unannounced (in-class)
- Final Exam: (tentatively 40%)

HW Rules

- Due **EXACTLY** at the end of your first class (during break) on Wednesday.
- **NO ELECTRONIC SUBMISSION!!!**
- Full score for in-time submission; *PENALTY* for late-submission **WITHIN ONE WEEK**; no score otherwise
- In the following special cases, contact professor **BEFORE** submission time:
  - forgot to bring (No more than 3 times)
  - broke my arm/physically cannot finish (certain proof)
  - etc

Special Cases for this year

For the volunteers in Asian Games:

- Contact me **IN EMAIL** *with proof*

Tronclass

- Sign in the Learning in ZJU system.
- Join the current course, if you are already enrolled.
- Under Introduction, finish the Questionnaire on General Physics.

- Discussion: We have different tools for communication (Email, DingTalk, TronClass, ...). Which one shall I choose when I have a question?

TronClass vs DingTalk vs Email

- TronClass: Good for digital resources, in-class activities, and extended discussions.
  - Course materials: lecture notes, homework problems, solutions, additional materials
  - Interaction: homework submissions, rollcalls, in-class quizzes, questionnaires
  - Forum: Start or join a thread for serious and thought-provoking discussion

- DingTalk: Good for **real-time off-class activities**.
  - Announcements or polls for the organization of off-class activities
  - Online office hours
  - Online TA sessions (discussing homework solutions)
  - Casual discussions: Use private chats or arrange separate Ding groups (Be kind not to disturb others)

- Email: Good for **private but professional correspondences**, especially for things you want to keep a record.
  - Asking for leave
  - Asking for help on a specific problem
  - Discussing difficulties in learning
  - Late homework submission (in particular, when you just miss the deadline)

Email Rules

- Use your official Zhejiang University email account if possible.
- In the subject line, include "[PHYSICS]" and a title of your message. For example: "[PHYSICS] On Coulomb's Law".
- Include your real name and class index (A or B) in your email message.
- Check Learning at ZJU web pages first to see when assignments are due and whether solutions are available.
- Send questions related to problem sets to TAs for prompt replies.

How to Email Contact a Professor

- Before you write an email in English, you may want to check out
  - https://www.wikihow.com/Email-a-Professor
  - https://sparkmailapp.com/how-to-email-professor-template, or
  - https://propellercollective.org/blog/on-campus/how-to-email-your-professor
- The same rules apply to emails in Chinese as well.

Sample email for not attending class

Dear Professor Lu/Watanabe,

This is Sam Wang from General Physics II, Class A. I am writing to inform you that I will not be able to attend your class on Thursday, as I have a doctor appointment at 10 AM. Thank you.

Sincerely,

Sam Wang
General Physics II
Class A

To Be Covered in This Semester

- Weeks 1-4: Electricity (Xin Lu)
  - Electrostatics
  - DC circuits
- Weeks 5-8: Magnetism (Xin Lu)
  - Magnetism
  - AC circuits
  - Electromagnetic waves
- Weeks 9-12: Optics (Gentaro Watanabe)
  - Geometrical optics
  - Wave optics
- Weeks 13-16: Quantum Physics (Gentaro Watanabe)