PHYS 0175: Physics for Science and Engineering 2

Modifications to this syllabus may be required during the semester.
Any changes to the syllabus will be announced in class.

Instructor:

Fang Lin, Ph.D.

Center for Theoretical Physics, Sichuan University.

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Office Hours:

Fridays 13:30 to 16:30, room 216, zone 4 in SCUPi (Jiangan Campus).

Always available in Wechat.

Lecture Time:

Class	First	Second
IE	Monday 08:15 - 09:55	Tuesday 10:15 - 11:55
MSE	Tuesday 15:50 - 17:30	Wednesday 13:50 - 15:30
ME	Wednesday 10:15 - 11:55	Friday 10:15 - 11:55

Teaching Assistants:

Jinyu Zhao, a senior student in Physics College, SCU.

Cell: 15756217545

Catalog Description:

4 Credits. As the second part of a two-semester introduction to general physics, this course introduces students to the basic principles of electromagnetic field, the wave theory of light and quantum theory. Topics include static electric field, capacitance, current and resistance, circuit,

magnetic field, induction and inductance, Maxwell's equations, oscillation and wave, interference and diffraction of light, quantum theory.

Required Text:

Principles of Physics (10^{th} Edition), Halliday, Resnick, Walker. International Student Version.

Course Objective:

Students should be able to

- Calculate the electric field intensity and potential of a given charge distribution;
- Comprehend the Gauss' Law and its applications;
- Comprehend the nature of electrostatic field;
- Calculate the electric field inside a conductor or dielectric;
- Calculate the equivalent capacitance of a combination of several capacitors;
- Comprehend the Ohm's law and Kirchhoff's law, and solve problems about circuits;
- Comprehend Biot-Savart law and calculate the magnetic field generated by a current;
- Comprehend Ampere's law and calculate the torque of a magnetic moment in a magnetic field;
- Comprehend the Ampere circuital theorem and its applications;
- Comprehend the nature of magnetic field, and compare it with electrostatic field;
- Comprehend induction and inductance, and calculate the induction electromotive force;
- Comprehend Maxwell's equations and their applications;
- Comprehend simple harmonic oscillation and calculate its properties;
- Comprehend the combinations of simple harmonic motions;
- Comprehend mechanical wave and calculate its properties;
- Comprehend the interference and diffraction of mechanical waves;
- Comprehend the interference and diffraction of light, as well as their applications;
- Comprehend matter wave and wave-particle dualism;
- Comprehend basic quantum theory, and its applications and achievements.

Course Outline:

Part 1: Electromagnetic Field

Electric field: Chapter 21 – 25
Current and Circuit: Chapter 26 – 27
Magnetic field: Chapter 28 – 29
Induction and inductance: Chapter 30 – 31
Maxwell's equations: Chapter 32 – 33

Part 2: Oscillation and Wave

Oscillations: Chapter 15

Wave: Chapter 16 – 17

Part 3: Wave Theory of Light

Interference: Chapter 35
Diffraction: Chapter 36

Part 4: Quantum Theory

Matter wave: Chapter 38 – 39
Basic theory of quantum mechanics: Part of chapter 40 - 43

Examination Schedule:

Midterm Exam on Friday, November 09, 2018.

Final Exam on Monday, January 07, 2019.

Both the Midterm Exam and the Final Exam will take 60 mins.

Course Grading:

Homework: 20%

Homework is to be submitted in class at the end of lecture on the assigned due date.

Discussions and questions in class: 10%

Midterm Exam: 30%

Final Exam: 40%

Grading Scale:

A 100-point scale will be used as a baseline for final grades (A, A- > 90, 89 > B+, B, B- >80, etc.). An additional curve may be applied, as determined by the overall final grade distribution of the class. Grades of A-, B+, B-, etc. will be determined at the instructor's discretion.

Class Policies:

Regular class attendance is expected and encouraged. Each student is responsible for all of the material presented in class and in the reading assignments. Exams will emphasize treatment of material covered in lectures.

In general, no late assignments will be accepted or makeup exams given. Exceptions will be made for a valid excuse consistent with University Policy. If you cannot attend an exam or meet a due date, you must contact the instructor prior to the exam or due date. Arrangements will be made for students on a case by case basis. (Failure to contact the instructor prior to the exam or assignment due date will result in a zero on that exam/assignment.)

Academic Integrity Policy:

"Violations of academic integrity include, but are not limited to, *cheating, plagiarism, or misrepresentation in oral or written form*. Such violations will be dealt with severely, in accordance with University policy. Plagiarism means representing someone else's idea or writing as if it were your own. If you use someone else's ideas or writing, be sure the source is clearly designated." It is expected that students adhere to the academic integrity policy that is presented in the Student's Honor Code of Conduct / Student Handbook.

Disability Services:

Any personal learning accommodation that may be needed by the student to be successful in this course must be told to the instructor immediately in order to assure compliance and accommodation. Audio or video recording (or any other form of recording) of classes is not permitted unless expressly allowed by the instructor as a special accommodation for students who are currently registered with the Disability Resource Services Program and are approved for this accommodation. Recordings allowed as special accommodations are for the personal use of the DRS-approved student, and may only be distributed to other persons who have been approved by the DRS program. The instructor may require the student to sign an Audio/Video Recording Agreement, which they may keep for their records.