

Course Instructor: Prof. Jelena Maricic (jelena@phys.hawaii.edu, Watanabe-311) Office hours: Mon/Wed: 10-11 am

Textbooks: UNIVERSITY PHYSICS: by H. D. Young and R. A. Freedman, 13th ed. Pearson/Addison Wesley.

Course Website: <https://laulima.hawaii.edu>

Learning Outcomes

On completion successful students will be able to:

- a) Demonstrate mastery of problem solving skills in general
- b) Demonstrate an understanding of the Coulomb's law, Gauss's law, electric field, potential and electric potential
- c) Demonstrate mastery of solving circuits and currents
- d) Demonstrate an understanding of the magnetic field for steady currents and moving charges.
- e) Calculate magnetic properties of simple current distributions using Biot-Savart and Ampère's laws.
- f) Demonstrate an understanding of electromagnetic induction and related concepts, making calculations using Faraday and Lenz's laws.
- g) Demonstrate an appreciation of the physical content of Maxwell's laws in integral form.
- h) Demonstrate an understanding of electromagnetic waves and AC circuits
- j) Demonstrate an understanding of nature of propagation of light and basic laws of geometric optics

NOTES:

1. The course week starts with the Tuesday lecture. (10:30 – 11:45am, Watanabe-112). Lectures will be held every Tuesday and Thursday.

2. **P:** The problems that will be discussed during the lectures.

Homework Assignments. Daily assignment (~ 4 problems) will be assigned from the *Mastering Physics* website (required). Some of the daily homework may involve simple calculations or be of conceptual nature. In addition to the daily homework, a written weekly problem set (consisting of 2 problems) will be due each Tuesday at the start of the class. Please submit solutions that are clear and detailed in addition to being correct. Solutions copied from solution manual will receive 0 credit. Written homework is due on Thursday.

Mastering Physics course code: **MPMARICIC44974**

3. **iClickers** (required): iClickers are available at the UH Bookstore. They will be used for in-class quizzes and 2-minute problems.

Week-1 (01/12/15)

Lectures Chapter 21: secs.1-7

Electric Forces and Electric Fields , Coulomb's Law.

Problems CH-21: 15, 19, 29, 34, 47, 63, (66, 68, 77, 79, 82, 86).

Weekly HW: check the course website

Week-2 (01/19/15)

Lectures Chapter 22: secs. 1-5

Concepts of electric field and flux . Gauss' Law and its applications

Problems CH-22: 14, 16, 21, 23, 39, 43.

Weekly HW: check the course website

Week-3 (01/26/15)

Lectures Chapter 23: secs.1-5

Electric potential and electric potential energy: Discrete and continuous charge distributions.

Problems CH-23: 19, 21, 60, 62, 70.

Weekly HW: check the course website

Week-4 (02/02/15)

Lectures Chapter 24: secs.1-5

Capacitance, series and parallel combinations, energy stored in a capacitor, dielectric-filled capacitors

Problems CH-24: 16, 20, 30, 50, 47, 54, 55.

Weekly HW: check the course website

Week-5 (02/09/15)

Lectures Chapter 25: secs. 1-5 (Quiz#1 and Quiz#2)

Electric current, Ohm's law, electric energy and power.

Problems CH-25: 6, 17, 22, 33, 46, 50, 55, 72.

Weekly HW: check the course website

Week-6 (02/16/15)

Lectures Chapter 26: secs. 1-2

Kirchhoff's rules and dc-circuit analysis.

Problems CH-26: 6, 25, 26, 28, 45, 50,

86.

Weekly HW: check the course website

MIDTERM EXAM #1: 02/19/15, CH21-25

Week-7 (02/23/15)

Lectures Chapter 26: secs. 3-4

Kirchhoff's rules and dc-circuit analysis.

Lectures Chapter 27: secs. 1-4

Magnetic field and its interaction with moving charges and currents.

Problems CH-27: 22, 30, 39, 41, 66, 70, 75.

Weekly HW: check the course website

Week-8 (03/02/15)

Lectures Chapter 27: secs. 5-7 (Quiz#3)

Magnetic field and its interaction with moving charges and currents.

Lectures Chapter 28: secs. 1-4

The Bio-Savart law, interaction between two current carrying wires, the Ampere's law, magnetic field produced by simple current carrying shapes- loops, solenoids and toroids.

Problems CH-28: 14, 36, 22, 27, 68, 70

Weekly HW: check the course website

Week-9 (03/09/15)

Lectures Chapter 28: secs. 5-7

The Bio-Savart law, interaction between two current carrying wires, the Ampere's law, magnetic field produced by simple current carrying shapes- loops, solenoids and toroids.

Lectures Chapter 29: secs. 1-4 (Quiz#4)

Faraday's and Lenz's laws of induction, induced *emf*, self inductance and mutual inductance

Problems CH-29: 24, 28, 27, 23, 36, 57

Weekly HW: check the course website

Week-10 (03/30/15)

Lectures Chapter 29: secs. 5-7

Faraday's and Lenz's laws of induction, induced *emf*, self inductance and mutual inductance

Lectures Chapter 30: secs. 1-3

Inductance

Problems CH- 30: 4, 14, 20, 21, 26, 36, 40, 64

Weekly HW: check the course website

Week -11 (04/06/15)

Lectures Chapter 30: secs. 4-6

Inductance

Lectures Chapter 31: secs. 1-3

Alternating currents

Problems CH-31: 17, 20, 32, 37, 51, 52

Weekly HW: check the course website

MIDTERM EXAM#2: 04/07/15, CH26-30

Week -12 (04/13/15)

Lectures Chapter 31: secs. 4-6 (Quiz#5)

Alternating currents

Weekly HW: check the course website

Week -13 (04/20/15)

Lectures Chapter 32: secs. 1-5

Electromagnetic waves **Problems**

CH-32: 6, 22, 34, 47

Weekly HW: check the course website

Week -14 (04/27/15)

Lectures Chapter 33: secs. 1-7

The Nature and Propagation of Light

Problems CH-33: 8, 11, 22, 25, 31, 48

Weekly HW: check the course website

Week -15 (05/04/15)

Lectures Chapter 34: secs. 1-4 (Quiz#6)

Geometric Optics and Optical Instruments

Problems CH-34: 13, 18, 27, 29

Weekly HW: check the course website

Note: Minor changes may be made to the Syllabus whenever considered appropriate.

QUIZZES: Students use iClickers for the in-class quizzes. These quizzes last approximately 15-20 minutes and consist of 6 multiple choice questions (A...E or A...D for most questions, and True/False for others) that can be answered in 2-3 minutes: either conceptual or simple calculation problems. The students have to work alone, with no talking during the quiz.

In-class 2-minute problems are of a conceptual nature involving application of principles being discussed in each lecture. The questions are multiple choice, very similar to the quizzes. However, in contrast to the quizzes, students are encouraged to discuss the possible answers among themselves before clicking.

The same grading scheme is used for 2-minute problems and for quizzes: 4 points for a correct answer; 1 point for an incorrect answer (a point for participation and effort).

MIDTERMS Two in-class 75-min. midterms will be given during the term. If you miss a midterm and have a documented, valid reason for doing so, please come and discuss it with me as soon as possible. It is not enough just to send an e-mail message about your absence from a midterm. You must state in writing why you missed a midterm (the form to fill out is at the end of the syllabus). A single make-up midterm with material covering chapters 21-30 will be given toward the end of the term. If I get nothing in writing from you, a score of zero will be assigned for the midterm you missed.

MIDTERM SCHEDULE

WEEK	Date/Time	Rooms
6	Thur., 02/19/15	In-class
13	Thur., 04/07/15	In-class

(NOTE: If you are going to be away on a scheduled UH-related activity and miss a midterm, it is your responsibility to discuss it with me at least two weeks before such an expected absence.

FINAL EXAM: The final exam is comprehensive – it will be based on all the subject material covered in the course. However, the material covered during the second half of the term is given more emphasis.

Grading: The final course grade will be based on the following weights.

Quizzes/Midterm 1/Midterm 2	15%/ 15%/ 15%
Daily/Weekly Homework	15%/ 15%
Final Exam	25%
In-class 2-minute problems	5% EXTRA CREDIT

Grade assignment guidelines: A+ 95 > B+ 86-90 C+ 76-80 C- 65-60 F < 50
A 90 B 80-86 C 70-76 D 50-60

PERMISSION TO TAKE THE MAKE-UP MIDTERM

Name _____

(please print)

Student ID: _____

MIDTERM missed: MIDTERM-I MIDTERM-II
(circle one)

Reason for missing the midterm: (please be very brief)

By submitting this form, I understand that if I miss the make-up midterm for any reason whatsoever my grade in the missed midterm will be zero.

Signature: _____