

Physics B

English Class a

M 13:20 – 14:50

Course No. : 1551

Room : Main Bldg. H117

Instructor : Todd Tilma Email : tilma.t.aa@m.titech.ac.jp Office : Main Bldg. 122A

Office Hours (I welcome your visit!)

Monday - Periods 3 and 4 (Open door policy)

Wednesday - Periods 5 and 6 (Open door policy)

Monday thru Friday - Periods 9 and 10 (By appointment only)

Grading

10pts - Weekly homework (due at the end of each chapter)

15pts - Weekly tests (questions from weekly homework and text book)

25pts - Take home mid-term exam

50pts - Final exam

Total : 100 points

Class Overview

In this class you will learn about electromagnetic fields, including electrostatics and magnetostatics, EM waves, and even a bit of relativity (if we have time). You will also learn some of the mathematical techniques of importance to physics. In short, you are going to be introduced to the way physics is really done by physicists!

Now, as one of my professors used to say, “my duty is to help you learn and your duty is to learn.” So with that in mind, my plan is as follows. I am going to cover the text, following the below schedule (as well as assign homework and exams) to the best of my ability. Your duties include studying the text and handouts, reading other texts as necessary, working with other in the class, doing homework, and taking exams. I assign lots of homework (in relative terms), and you should work together to complete it. However, what you submit must be **in your own words and using your own ideas**. My exams are challenging but doable; if you have done all the homework as well as worked through the problems in the textbook, you should be able to pass. However, you are expected to attend class (and be prepared!) and to participate: One of your main duties is to ask questions. If you do not come and do not participate, you will not be able to succeed. It is your choice.

Basic Schedule

Introduction 6 October

Hand out and go through syllabus

Mechanics Baseline Test

Force Concept Inventory Test

Assign first homework set

Lecture 1 20 October
Pages 1 – 11 (Electric Charge; Coulombs Law; Electric Fields)
Homework test one
Assign second homework set

Lecture 2 27 October
Pages 11 – 25 (Electric Fields from Gauss Law)
Homework test two
Assign third homework set

Lecture 3 6 November
Pages 26 – 38 (Electric Potential)
Homework test three
Assign fourth homework set

Lecture 4 10 November
Pages 39 – 51 (Conductors and Electric Fields; Capacitance)
Homework test four
Assign fifth homework set

Lecture 5 17 November
Pages 52 – 57 (Electric Energy)
Homework test five
Assign sixth homework set

Lecture 6 26 November
Pages 65 – 76 (Current; Force Due to Current; Magnetic Flux Density)
Homework test six
Assign seventh homework set
Homework sets 1 – 6 due

Lecture 7 1 December
Pages 77 – 87 (Magnetic Moment; the Biot-Savart Law)
Homework test seven

Take home mid-term (posted 17:00 December 5, due 08:00 December 8)

Lecture 8 8 December
Pages 87 – 97 (Magnetic Flux Density from Gauss Law; Amperes Law)
Homework test eight
Assign eighth homework set

Lecture 9 15 December
Review of take home mid-term
Homework test nine
Assign ninth homework set

Lecture 10 22 December

Pages 106 – 114 (Electromagnetic Induction; Induced Electric Fields)

Homework test ten

Assign tenth homework set

Homework sets 7 – 9 due

Lecture 11 5 January

Pages 114 – 123 (Self and Mutual Inductance; Magnetic Energy in Coils; Displacement Current)

Homework test eleven

Assign eleventh homework set

Lecture 12 15 January

Pages 124 – 133 (Maxwells Equations; Electromagnetic Waves; Energy in Electromagnetic Waves)

Homework test twelve

Assign twelfth homework set

Lecture 13 19 January

Special Lecture - Relativity and E&M

Homework test thirteen

Assign thirteenth homework set

Lecture 14 26 January

Review for Final Exam

Homework sets 10 – 13 due
