

Physics 1B: Electricity & Magnetism Fall Quarter 2010

Course Syllabus & Logistical Information

Lectures: Tu & Th, 9:30–10:50 a.m., York Hall 2722

Instructor: Dr. Alex Markowitz
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Office: 412 SERF (Science & Engineering Research Bldg.)
4-8016
Office Hours: Monday 11:30–12:30 & Thursday 11:30–12:30

T.A.: Grigor Aslanyan
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Office: 4514 MHA (Mayer Hall Addition)
4-4071
Office Hours: Monday 2–3 & Thursday 2–3

Physics 1B Lab: Concurrent enrollment in the laboratory course, Physics 1BL, is required, but it is a separate course (separate grading, different instructor) – you must register separately!

Prerequisites: Physics 1A & 1AL. Prior or concurrent enrollment in Math 10C, 10D, or 20C. In this course there will be some algebra, exponentials, & vectors, plus some light calculus and a little basic trigonometry. (The Physics 1ABC series is a lecture and laboratory course geared towards life-science majors. This sequence is not suitable for students majoring in Physics, MAE, ECE or CSE.)

Textbook: Serway & Jewett, Physics I: Volume II – Principles of Physics. This is a version printed especially for UCSD.

Course web page:

<http://physics.ucsd.edu/students/courses/fall2010/physics1b/>
Check it frequently for updates & announcements!

Problem Session / Discussion Section: Every Monday evening, 6:00–7:50 p.m., in 2622 York Hall. These sessions will be led by Grigor, who will review lecture material and selected assigned homework problems in preparation for quizzes.

Quizzes: There will be four quizzes:

Tues Oct. 5 (lect. 4)

Tues Oct. 19 (lect. 8)

Tues Nov. 2 (lect. 12)

Thurs Nov. 18 (lect. 16)

Each quiz will start promptly at 9:30 a.m.!

Each quiz will be approximately 45 minutes long, after which we'll continue with the lectures. **THERE WILL BE NO MAKE UP QUIZZES.**

Final Examination: The date and time of the final exam are already set in stone: Thursday, December 9th, 8:00–11:00 a.m., room location TBA. *Please check your final exam schedules and notify the instructor immediately if there are any conflicts! THERE WILL BE NO MAKE UP FINAL.*

Grading Policy: Your final grade will be calculated as follows:

63% Quizzes (Lowest quiz grade counts only for 9%; the top three quiz grades are 18% each)
37% Final Exam

Extra Credit: No.

You must purchase your own scantron for the quizzes and the final exam. Use scantron version no. X-101864-PAR only! They're available at the bookstore and the general store co-op. You will need to bring a no. 2 pencil for the scantrons.

You will be allowed to use a simple scientific calculator for all quizzes and the final. (but no iPhones, or any device which can communicate with any other device). For the quizzes, you may bring one 3'×5' index card for notes (you may write on both sides), but no laptops, cell phones, or other notes. For the final, you may bring three index cards of notes.

Bring your current UCSD photo I.D. to every quiz and to the final!

Exam Code numbers: Exam scores can be posted online only if names or university ID numbers are omitted, so every student will be assigned a three-digit exam code number. At the first quiz on Tues., Oct. 5, you'll receive a "Code Number Assignment" form, containing your code number. You must write this number on every scantron for every quiz! Filling in the number incorrectly may inadvertently lead to complications in getting your grade registered!

Homework: Homework problems will be assigned (see last page), but will not be collected or graded. The quizzes/final will feature problems very similar to those covered by the assigned homework problems and will cover the same material, so doing the homework problems are the best way to practice for the quizzes/final.

Physics Tutorial Center: 2702 Mayer Hall Addition. Hours of operation: 3–8 p.m., Sunday through Thursday. Tutors will be available to assist you with reviewing and applying concepts covered in lectures, as well as discussing approaches to problem solving (thought they cannot, for instance, give specific answers to all of a given course's assigned homework problems). Personalized tutoring as well as individual/group assistance will be available. Visit <http://tutorialcenter.ucsd.edu> for more info.

Add/Drop: Use WebReg to add/drop the course or drop from waitlists. See the Physics Department's Student Affairs Office in 2521 Mayer Hall Addition for more details or for more advice.

Deadlines:

Last day to add a class: Friday, Oct. 8

Last day to drop a class without a W or to change grade option: Friday, Oct. 22

Last day to drop a class WITH a W but without an F: Monday, Nov. 29

<http://blink.ucsd.edu/instructors/courses/enrollment/calendars/2010.html>

Academic Dishonesty: All students are responsible for reading, understanding, and adhering to the U.C. Policy on Integrity of Scholarship, available in the UCSD General Catalog, and discussed on the web at <http://senate.ucsd.edu/manual/Appendices/app2.htm> and <http://www.ucsd.edu/catalog/front/AcadRegu.html>. Any form of cheating, including knowingly allowing a peer to copy your quizzes or tests, will result in an F in this course and referral to the Dean for disciplinary action.

Approximate Lecture Schedule

Date	Chapter	Topic
9/23 Th	19	Course overview; Charges; Insulators & Conductors
9/28 Tu	19	Electrostatic Forces; Electric Fields & Field Lines
9/30 Th	19	Electric Flux; Gauss' Law ; Conductors in Equilibrium
10/5 Tu	20	Electric Potential Difference; Electric Potential Energy
10/7 Th	20	Electric Potential due to charge distributions, conductors
10/12 Tu	20	Capacitors & Capacitance
10/14 Th	20	Energy storage in capacitors; Capacitors with Dielectrics
10/10 Tu	21	Electric Current; Resistance; Ohm's Law; Superconductors
10/21 Th	21	Electrical Energy & Power; DC circuits & EMF; Combining Resistors
10/26 Tu	21	Kirchhoff's Junction & Loop Rules; RC Circuits
10/28 Th	22	Magnetic Fields; Motion of charged particles in magnetic fields
11/2 Tu	22	Magnetic forces on current-carrying wires
11/4 Th	22	Ampère's Law
11/9 Tu	22	Solenoids; Magnetism in Matter / Ferromagnetism
11/11 Th		<i>Veteran's Day Holiday: no classes</i>
11/16 Tu	23	Faraday's & Lenz's Laws
11/18 Th	23	Motional EMF; AC Generators
11/23 Tu	23	Inductors; RL Circuits
11/25 Th		<i>Thanksgiving Holiday: no classes</i>
11/30 Tu	24	Displacement Current; Maxwell's Equations
12/2 Th	24	Properties of Electromagnetic Waves
12/9 Th		Final Exam, 08:00-11:00 a.m., location TBA

Homework Problems

19.1–19.3 / Electric Charges; Insulators & Conductors, Electrostatic Forces, Coulomb’s Law	2 5 7 54
19.5–19.7 / Electric Fields, Field Lines, Motion of particles in E-fields	10 12 15 23 24 26 28
19.8–19.10 / Electric Flux, Gauss’ Law	30 31 33 34 36 38 41 63
19.11 / Conductors in Equilibrium	44 46 48
20.1–20.5 / Elec. Potential & Elec. Potential Energy	1 2 3 4 7 10 13 17 22 62
20.6 / Elec. Potential in Conductors	28 29
20.7 / Capacitance & Capacitors	31 35 36
20.8 / Combinations of Capacitors	39 41 43 46
20.9 / Energy Storage in Capacitors	48 50
20.10 / Dielectrics	53 57
21.1 / Electrical Current	1 5
21.2–21.4 / Resistance, Resistivity, Ohm’s Law	6 7 8 9 10 12
21.5 / Electrical Energy & Power	14 17 18 19 21 23 49 53 55
21.6–21.7 / DC Circuits, EMF, Combining Resistors	26 27 30
21.8 / Kirchhoff’s Junction & Loop Rules	34
21.9 / RC Circuits	41 42 43 46
21.10 / The Atmosphere as a Conductor	47
22.1–22.2 / Magnetic Fields & Field Lines	1 2 4 5 62
22.3–22.4 Charged Particles moving in a B-field	9 11 60 61
22.5–22.6 / Magn. Forces on current-carrying conductors	15 16 18 19 21 22
22.7 / Biot-Savart Law	23 24 26 27
22.8 / Magnetic Force between two parallel conductors	34 35
22.9 / Ampère’s Law	41 43
22.10 / Solenoids	44 45
22.11 / Magnetism in Matter	48
23.1 / Faraday’s Law	1 3 6 7 10 50 55 58
23.2–23.4 / Motional EMF; Lenz’s Law; Induced EMF	12 19 20 23 25
23.5–23.6 / Self-Inductance, Inductors, RL Circuits	27 28 29 32 33 36 38
23.7 / Energy stored in a Magnetic Field	43 45 64
24.1 / Displacement Current	1
24.2–24.3 / Maxwell’s Equations, Electromagnetic Waves	4 5 6 7 12 14 15
24.4 / Hertz’s Discoveries; Resonance in RLC Circuits	17 18
If time permits:	
(24.5–24.6 / Energy & Momentum in EM Waves)	(21 22 23 27 30)
(24.7 / The Electromagnetic Spectrum)	(31 35 36 38)
(24.8 / Polarization)	(41 42 45)