Syllabus, Winter Quarter, 2015

Physics 200B—Theory of Electromagnetism

CRN 86720, 4 units
Lecture Time: Mon., Wed. 10:30 – 11:50 a.m.
First Class: Jan. 5, 2015, Place: 185 Physics

Instructor: Shirley Chiang, 235 Physics, tel. 530-402-7113, FAX 530-752-4717
E-mail: chiang@physics.ucdavis.edu
Office hours: To be arranged. Also by appointment

TA: Bret Stenger
E-mail: bhstenger@ucdavis.edu
Office hour: To be arranged. Also by appointment.

Course web page: http://www.physics.ucdavis.edu/classes/Physics200B/Physics200B.html
with this syllabus and other supplementary materials. Course web page is accessible from the
Physics Department’s web page: http://www.physics.ucdavis.edu, click on “course websites”
on the left, then click on Physics 200B under Winter 2015.
Problem Set Solutions will be posted on https://smartsite.ucdavis.edu

Prerequisites: Physics 200A, and Physics 204B concurrently.
Required Textbook: John David Jackson, Classical Electrodynamics, 3rd edition, John Wiley &
Sons, 1999.

Grading:
Homework 25%
Midterm 25%
Final Exam 50%

Course requirements and policies:
1. **Required Homework.** Homework is normally due on Friday 5 p.m. to Mr. Stenger’s
mailbox. The calendar shows all problem assignments and their due dates. You learn how to
solve physics problems by working as many as you can by yourself. While you may work
with your colleagues on the problems, you should write up your solutions independently.
Copying the work of someone else (published or not) is forbidden. Consulting
solutions on the internet is also forbidden. Consulting solutions from
any other year (any instructor) is also forbidden. Be sure to show all steps in your solution
so that partial credit can be given to you. Correct answers with no detailed work shown will
receive no credit. The homework answers will be handed out after the time when the
homework is due.

2. **Homework grading:** Problems will normally be worth 10 points each. Exceptions are noted
on the syllabus.

3. **Policy on late homework:** You are each permitted to turn in up to 4 late homework
assignments during the quarter, with the understanding that you do not look at the posted
answers (honor system); the late assignments will receive full credit if they are handed in
by Monday 6 p.m. (or Tues. 5 p.m. if Monday is a holiday) of the week following the due
**date to Mr. Stenger’s mailbox, and will not be accepted thereafter.** Please write at the top of late homework “Late Homework 1” or “Late Homework 2”, etc.

4. **Rules for Midterm Exam, Final Exam:** All are closed book and closed notes. You will be permitted to use one or two formula sheets provided by the instructor prior to the exam. Bring a pencil, eraser, and calculator. Plain white paper will be provided. If you prefer lined paper, please bring your own.


6. The **Final Exam** for the course will be given during exam period at the time specified in the Class Schedule – Tues. Mar. 17, 2015, 1:00 – 3:00 p.m., in 185 Physics The exam will be cumulative and will cover all material covered in the course, Jackson Chapters I, 1-5, Problem Sets 1-9.

**Calendar: Subject to Change**

Jackson Section Numbers to be covered in lecture are shown (subject to change). Schedule shows dates when homework problem sets (PS#) are due. Problem Numbers from Jackson are given. **Note Homework assignments after PS3 are subject to change.**

<table>
<thead>
<tr>
<th>Week</th>
<th>Day</th>
<th>Date</th>
<th>Jackson Section Numbers</th>
<th>Homework due 5.p.m. Fridays of week indicated Jackson Problem Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mon.</td>
<td>Jan. 5</td>
<td>I.1, 1.1, 1.2, 1.4, 1.5, 1.3, 1.4, 1.5, 1.6 (surface charge), 1.7</td>
<td>First lecture</td>
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<tr>
<td></td>
<td>Wed.</td>
<td>Jan. 7</td>
<td>1.11, 1.6 (dipole layer), 1.8, 1.9, 1.10</td>
<td>Problem Set 1(PS1) : All are 10 pts except for 1.3 (5 pts), 1.4, 1.6, 1.8,</td>
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<tr>
<td>2</td>
<td>Mon.</td>
<td>Jan. 12</td>
<td>Variational Methods, 2.1, 2.2</td>
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<tr>
<td></td>
<td>Wed.</td>
<td>Jan. 14</td>
<td>2.3, 2.4, 2.5, 2.6</td>
<td>PS2: 1.13 (use result of prob. 1.12), 1.17 (5 pts), 1.20, 1.19 [5 pts, do this problem for spherical capacitor of Prob. 1.6], $\psi(r) = (b - r)/(b - a)$, 2.1</td>
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<tr>
<td>3</td>
<td>Mon.</td>
<td>Jan. 19</td>
<td>Martin Luther King, Jr. Day</td>
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<td></td>
<td>Wed.</td>
<td>Jan. 21</td>
<td>2.7, 2.8, 2.9</td>
<td>PS3: 2.2, 2.7, 2.10, one problem on class website</td>
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<tr>
<td>4</td>
<td>Mon.</td>
<td>Jan. 26</td>
<td>2.10, 2.11, 3.1</td>
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<td></td>
<td>Wed.</td>
<td>Jan. 28</td>
<td>3.2, 3.3, 3.5</td>
<td>PS4: 2.14, 2.23, 3.3, 3.7</td>
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<tr>
<td>5</td>
<td>Mon.</td>
<td>Feb. 2</td>
<td>3.6, 3.7, 3.8</td>
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<td></td>
<td>Wed.</td>
<td>Feb. 4</td>
<td>3.9, 3.10</td>
<td>PS5: 3.5, 3.10, 3.13 (class website has solution to 3.1)</td>
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<tr>
<td>6</td>
<td>Mon.</td>
<td>Feb. 9</td>
<td>3.11, 3.12</td>
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<tr>
<td></td>
<td>Wed.</td>
<td>Feb. 11</td>
<td>4.1, 4.2, 4.3</td>
<td>PS6: 3.14 (15 pts), 3.23 (25 pts)</td>
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<tr>
<td>7</td>
<td>Mon.</td>
<td>Feb. 16</td>
<td>Presidents’ Day</td>
<td>No Lecture</td>
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<td></td>
<td>Wed.</td>
<td>Feb. 18</td>
<td>Midterm: Jackson Chapters I, 1-3 and PS 1-6</td>
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<tr>
<td>Week</td>
<td>Mon.</td>
<td>Feb. 23</td>
<td>4.4, 4.7</td>
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<td>8</td>
<td>Wed.</td>
<td>Feb. 25</td>
<td>5.1, 5.2, 5.3, 5.4</td>
<td>PS7: 4.1a, 4.6ac, 4.7, 4.9</td>
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<td>9</td>
<td>Mon.</td>
<td>Mar. 2</td>
<td>5.5, 5.6</td>
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<tr>
<td>10</td>
<td>Wed.</td>
<td>Mar. 4</td>
<td>5.7, 5.8, 5.9</td>
<td>PS8: 4.8 [in b, do plot for $\varepsilon/\varepsilon_0 = 3$], 5.3, 5.6, 5.13</td>
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<tr>
<td>11</td>
<td>Mon.</td>
<td>Mar. 9</td>
<td>5.10, 5.11, 5.12</td>
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<tr>
<td>11</td>
<td>Wed.</td>
<td>Mar. 11</td>
<td>5.15, 5.16, 5.17</td>
<td>PS9: 5.17, 5.19a, 5.27</td>
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<tr>
<td>11</td>
<td>Mon.</td>
<td>Mar. 16</td>
<td>6.1, 6.2; Last lecture</td>
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<td>11</td>
<td>Tues.</td>
<td>Mar. 17, 1:00 – 3:00 p.m.</td>
<td>Final Examination: Jackson Chapters I, 1-5; PS 1-9</td>
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**Sections in Jackson Chapters I, 1-5, to be skipped:**

1.2, 1.3, 1.6
1.12, 1.13
2.12
3.4, 3.13
4.5, 4.6
5.13, 5.14, 5.18