LAB COURSE: 253B SPRING 2015

INSTRUCTOR: Yijing Z. Watkins
OFFICE: Physics help desk area on the 2nd floor
E-MAIL: traceyzhang@siu.edu
OFFICE HOURS: Wednesday 4:00 pm – 6:00 pm; or by appointment

2. Scientific calculator

CATALOG DESCRIPTION: One two-hour laboratory per week. Prerequisite: completion of or concurrent enrollment in 203B/205B; if the corresponding lecture course is dropped, the laboratory course must also be dropped.

CREDIT: 1 Hour

COURSE OBJECTIVE: Upon successful completion of this course, the student will be able to:
- Establish a hands-on understanding of electromagnetism
- Understand the wave-like behavior of nature with application to light.
- Solve practical equations in a laboratory setting.

ATTENDANCE: Attendance for this course is mandatory. Since there are no make-up labs, you must attend every lab session. Allowed absences are given for the following documented reasons only: (i) Religious observance; (ii) Military service; (iii) Bereavement (i.e., death in your immediate family); (iv) Official university business (properly documented using appropriate forms from an athletic or academic advisor); and (v) a properly documented medical reason. Note: A slip stating that the student visited the Student Health Center does not fulfill this requirement. Documentation that you were hospitalized or an official doctor’s note is required.

LAB REPORTS: There will be two types of labs: (1) traditional labs (T), in which data is taken by hand and (2) computer labs (C), done using the computer and attached equipment to gather data. Attached to this syllabus is a schedule of the labs. The type of report will depend on which type of lab you are doing.

A. Traditional Lab Reports: Data will be collected manually and shared by all the members of the group. Report format is as follows (follow the format of the sample lab provided in your lab manual on page 5):
- Title of the lab, your name, course number and section number, date.
- Apparatus. What instruments and materials did you use in the lab?
- Introduction/theory. In your own words, briefly, describe the theory behind the experiment.
- Results. This section should include the data collected during the lab, graphs you made from data collected, calculation you had to do.
- Discussion and Conclusions. Brief discussion of what you learned, what could be improved.
- Answers to Questions.
Due date  
Reports are due **3 days after the meeting.** 
- Late reports **will not be accepted.** 
- Reports must be Uploaded onto SIU Online (Desire2Learn), https://online.siu.edu/

B. Computer Lab Reports  
- Choose the electronic workbook that corresponds to the lab scheduled for that specific week. 
- Follow the computer instructions in each section and answer all questions. Remember to include units when reporting results. 
- Reports must be Uploaded onto SIU Online (Desire2Learn)

PRE-LAB:  
The pre-lab is to determine that you have read the lab manual ahead of time and have an idea what is going to be covered in that week’s labs. Lowest grade will be dropped. **No make-up pre-lab will be allowed**

QUIZZES:  
The written quizzes will cover material from the previous three labs. They will be taken before the respective lab and will be between 15-20 minutes in length. The last quiz will be a lab practical. The lowest grade will be dropped. **A make-up quiz will be given for valid absence only**

GRADING:  

<table>
<thead>
<tr>
<th>WEIGHTS:</th>
<th>Lab Report</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Lab</td>
<td>05%</td>
<td></td>
</tr>
<tr>
<td>Quizzes</td>
<td>20%</td>
<td></td>
</tr>
</tbody>
</table>

**SCHEME:**  
90.0 - 100 % = A  
80.0 - 89.9 % = B  
70.0 - 79.9 % = C  
60.0 - 69.9 % = D  
0.0 - 59.9 % = F

**Note:** We will drop the lowest mark from each category of assignments.

ACADEMIC DISHONESTY  
We will follow this code as posted in http://policies.siuc.edu/policies/conduct.html

CELL PHONE USE POLICY  
Cell phone use (of any kind – voice, texting, calculator, photography…) or the use of other personal electronic devices (unless approved by the instructor) is not allowed during the lab. Phones must be rendered *inaudible* (either turn them off completely or at least set them to silent mode) during the lab time. **Note:** During exams and quizzes, any cell phone or computer use will automatically constitute *cheating* (and will be dealt with as such).

EMERGENCY PROCEDURES  
Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. Because some health and safety circumstances are beyond our control, we ask that you become familiar with the SIUC Emergency Response Plan and Building Emergency Response Team (BERT) program. Emergency response information is available on posters in buildings on campus, available on BERT’s website at www.bert.siu.edu, Department of Safety’s website www.dps.siu.edu (disaster drop down) and in Emergency Response Guideline pamphlet. It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency. The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or sheltering within the facility.
# TENTATIVE LAB SCHEDULE

<table>
<thead>
<tr>
<th>Week #</th>
<th>Week of</th>
<th>Activities</th>
<th>Lab Topic</th>
<th>Type*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan 19th</td>
<td></td>
<td>Orientation and Measurements and Uncertainties</td>
<td>T</td>
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<tr>
<td>2</td>
<td>Jan 26th</td>
<td></td>
<td><strong>Basic Electricity and Magnetism</strong>: Explore fundamental electrostatic concepts of like/unlike charge; concepts of magnetism regarding like/unlike poles</td>
<td>T</td>
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<tr>
<td>3</td>
<td>Feb 2nd</td>
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<td><strong>Electric Fields and Equipotential Lines</strong>: Determine the configuration of the electric field between various systems of electrodes by mapping equipotential lines</td>
<td>T</td>
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<tr>
<td>4</td>
<td>Feb 9th</td>
<td></td>
<td><strong>Deflection of Electrons in an Electric Field</strong>: Observe the effect of an electric field on a charged particle</td>
<td>T</td>
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<tr>
<td>5</td>
<td>Feb 16th</td>
<td>Quiz 1</td>
<td><strong>Ohm’s Law</strong>: Study the relationship between voltage, current, and resistance</td>
<td>T</td>
</tr>
<tr>
<td>6</td>
<td>Feb 23rd</td>
<td></td>
<td><strong>Resistors in Series and Parallel</strong>: Measure current and voltage in a series/parallel circuits</td>
<td>T</td>
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<tr>
<td>7</td>
<td>Mar 2nd</td>
<td></td>
<td><strong>The Potentiometer</strong>: Measure an unknown emf</td>
<td>T</td>
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<td><strong>SPRING BREAK</strong></td>
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<tr>
<td>8</td>
<td>Mar 16th</td>
<td>Quiz 2</td>
<td><strong>Determination of an Unknown Resistance using a Wheatstone Bridge</strong>: Measure an unknown resistance</td>
<td>T</td>
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<tr>
<td>9</td>
<td>Mar 23rd</td>
<td></td>
<td><strong>Charging and Discharging of a Capacitor</strong>: Use a voltage sensor to measure the voltage across a capacitor as it charges and discharges in a resistor-capacitor (RC) circuit and use data to calculate capacitance</td>
<td>C</td>
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<tr>
<td>10</td>
<td>Mar 30th</td>
<td></td>
<td><strong>Magnetic Field Around a Wire</strong>: Use a magnetic field sensor and voltage-current sensor to find the magnetic field strength and current in a loop of wire</td>
<td>C</td>
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<tr>
<td>11</td>
<td>Apr 6th</td>
<td>Quiz 3</td>
<td><strong>Magnetic Field of a Solenoid</strong>: Discover what the magnetic field is like inside a coil of wire known as a solenoid and calculate the magnetic field strength</td>
<td>C</td>
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<tr>
<td>12</td>
<td>Apr 13th</td>
<td></td>
<td><strong>Faraday’s Law</strong>: Measure the emf induced in a coil of wire when a magnet is dropped through the center of the coil</td>
<td>C</td>
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<tr>
<td>13</td>
<td>Apr 20th</td>
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<td><strong>Rays, Mirrors, and Thin Lenses</strong>: Study the reflection and refraction of light for mirrors and lenses</td>
<td>T</td>
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<tr>
<td>14</td>
<td>Apr 27th</td>
<td>Quiz 4</td>
<td><strong>Diffraction of Light</strong>: Investigate the wave nature of light by studying single-slit and double-slit diffraction patterns</td>
<td>C</td>
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<td>15</td>
<td>May 4th</td>
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<td>Quiz 5</td>
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*T = Traditional lab  
C = Computer lab