Syllabus

Catalog course description: (3-0) 3 credits. This course is the second course in a two (2) semester calculus-level sequence, covering fundamental concepts of physics. This is the preferred sequence for students majoring in physical science or engineering. Topics include electricity and magnetism, sound, light, and optics. SDSM&T course covers electricity and magnetism only.


Class Time and Location: Monday, Wednesday 11:00 – 11:50 AM, in EEP 252

Course Instructor: Dr. Vladimir Sobolev

Office, office hours: 222 EEP; M, W, 3:00 – 6:00 PM; T, Th 1:00 – 4:00 PM

Phone, E-mail: 394–1225; Vladimir.Sobolev@sdsmt.edu


Prerequisites: PHYS 211.

!! Internet access is required for this course. All homework must be completed and will be graded on-line. Registration on the homework website is required. Go to: http://edugen.wiley.com/edugen/class/cls45914/ and select “Register for this class now”.

NOTE:

Students with special needs or requiring special accommodations should contact the instructor, Dr. V. Sobolev, and/or the campus ADA coordinator, Jollie McCoy, at 394-1924 at the earliest opportunity.

Grade Structure:

<table>
<thead>
<tr>
<th>Points</th>
<th>Grade</th>
<th>%</th>
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<tbody>
<tr>
<td>300</td>
<td>A</td>
<td>85 – 100</td>
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<tr>
<td>100</td>
<td>B</td>
<td>84 – 70</td>
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<td>150</td>
<td>C</td>
<td>69 – 55</td>
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<tr>
<td>550</td>
<td>D</td>
<td>54 – 50</td>
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<td></td>
<td>E</td>
<td>49 – 40</td>
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<td></td>
<td>F</td>
<td>49 – 0</td>
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HOUR EXAM | DATE | TIME | PLACE |
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<tr>
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<tbody>
<tr>
<td>EXAM I</td>
<td>Tuesday, September 25</td>
<td>11:00 a.m.</td>
<td>EEP 252</td>
</tr>
<tr>
<td>EXAM II</td>
<td>Tuesday, October 23</td>
<td>11:00 a.m.</td>
<td>EEP 252</td>
</tr>
<tr>
<td>EXAM III</td>
<td>Tuesday, November 27</td>
<td>11:00 a.m.</td>
<td>EEP 252</td>
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*Quizzes will not be announced beforehand and may be given in both lecture and recitation periods. Students are responsible for taking the exams when scheduled. Anyone missing an exam without prior approval and arrangement with Dr. Sobolev, or certifiable medical reasons, will be assigned a zero grade for the exam in question. Take home tests and quizzes will not be announced beforehand and will be given during the lecture class. Attendance of lectures is compulsory. Nonattendance of lecture classes will lead to significant reduction of the final grade. The final exam will be a comprehensive exam on topics covered in the course. Everyone must take the final exam.

Course Philosophy:

The idea of this course is to offer a logical presentation of the basic concepts and principles of electricity and magnetism, and to strengthen an understanding of concepts and principles through a broad range of applications to the real world. To meet this goal, the emphasis is placed on sound physical arguments, problem solving methodology as
well as numerous examples of use of electricity and magnetism principles in contemporary technology, physical science and other disciplines, including engineering, chemistry, and medicine will be presented.

**Students successfully completed this course will be able to:**

- use SI units for electric and magnetic physical quantities; know non-system units used in electricity and magnetism;
- understand the basic concepts and laws of classical electrostatics and electrodynamics;
- quantitatively describe the forces between point charges; know major application of electrostatics and electrodynamics in modern technology;
- calculate the electric fields and electric potentials due to point charges and simple continuous charge distributions;
- understand the notions of capacitance and resistance, to find equivalent capaci-tances and resistances for capacitors and resistors connected in series and in parallel; know major application of capacitors and resistors in electric circuits;
- to apply the Kirchhoff's laws for calculations of multi-loop circuits;
- understand the phenomena taking place in circuits contain resistor and capacitor and how these phenomena are described by corresponding equations;
- calculate magnetic fields due to electric currents;
- understand the laws of motion of charged particles in uniform electric and magnetic fields or combined electric and magnetic fields and applications of these phenomena in modern science and technology;
- understand the laws of electromagnetic induction and their role in modern technology;
- improve ability to use mathematics and problem solving skills

**Students are expected to spend a minimum of six hours per week studying for every three hours spent in class. Students who spend the minimum time studying usually get the minimum grade.**

**GenEd Goal #6:** *Students will understand the fundamental principles of the natural sciences and apply scientific methods of inquiry to investigate the natural world.*

**Student Learning Outcomes:** As a result of taking courses meeting this goal, students will:

1. Demonstrate the scientific method in a laboratory experience. This outcome will be achieved and assessed in Phys 213L course.
2. Gather and critically evaluate data using scientific method.  
   **Assessment:** Students will be able to critically evaluate data (given or obtained) with proper accuracy using appropriate laws and formulas of classical mechanics for scientifically sound presentation of laboratory reports, homework assignments, and of solutions on quizzes and exams.
3. Identify and explain the basic concepts, terminology and theories of selected natural sciences.  
   **Assessment:** Students will be able to identify and apply basic concepts and appropriate laws of classical mechanics in order to solve assigned problems in homework, quizzes, exams, and in oral presentation.
4. Apply selected natural science concepts and theories to contemporary issues.  
   **Assessment:** Students will be able to explain how physics concepts, laws, and phenomena relate to contemporary engineering and science in classroom discussions and written assignments.

**Freedom in Learning.** Students are responsible for learning the content of any course of study in which they are enrolled. Under Board of Regents and University policy, student academic performance shall be evaluated solely on an academic basis and students should be free to take reasoned exception to the data or views offered in any course of study. Students who believe that an academic evaluation is unrelated to academic standards but is related instead to judgment of their personal opinion or conduct should contact the dean of the college which offers the class to initiate a review of the evaluation.
POLICIES

- The Recitation section is an integral component of the course. Students should attempt to work all assigned problems prior to a recitation so that they may obtain assistance on specific difficulties during the recitation. Attendance at recitation is very important.
- During each recitation, either a quiz will be given or homework will be graded. All homework must be completed and will be graded on-line. The quiz or homework will be graded for your weekly recitation score. No makeup quizzes will be given; no late homework will be accepted.
- Quizzes will be open book, they will not be announced beforehand. Occasionally, the quiz will be selected from the assigned homework problems.
- Normally, all hour exams and quizzes will be returned in your recitation section.
- Hour exams will be a combination of problems and multiple-choice questions. The final exam will be multiple choice only.
- All exams, including the final, are open book. Only the standard course textbook is allowed. Student prepared note cards and sheets are not permitted. Calculators are permitted.
- One-hour exam regular-problem solution should contain:
  - Statement of what is given;
  - Statement of what is to be found;
  - The solution with appropriate equations, pictures and graphs;
  - The necessary steps to show how the problem is solved;
  - If it is a numerical answer, it should be marked with appropriate units, usually to 3 significant numbers.
- There will be considerable grade reduction if any of the above elements are missing in a solution.
- The final exam will be comprehensive with some emphasis on material covered after Exam III.

Appeals for additional credit on exam problems:

Exam grades are determined by assigning credit based on the merit of the solution given. If you feel you should receive more points for a particular solution please use the following procedure.

1. **Do not talk to the TA about it, talk to the instructor and submit.**
   a) Your original test.
   b) A complete and correct solution of the problem in question.
   c) A brief description of why you think you deserve more credit for the solution on your exam.
2. See the professor one or two days after submission for return of your materials.
3. **Appeals must be submitted within 10 working days after the graded exam is returned. There will be no second appeals.**

Academic misconduct:

Any violation of academic integrity policy, such as cheating and plagiarism, will not be tolerated in this course. Penalties may range from a failing grade for the work in question to failure of the course.

TENTATIVE LECTURE TOPIC SCHEDULE

<table>
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<th>WEEK OF</th>
<th>MONDAY</th>
<th>WEDNESDAY</th>
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<tr>
<td>September 3 – 7</td>
<td><strong>Holiday</strong></td>
<td>Introduction, Chapter 21</td>
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<td>September 10 – 14</td>
<td>Chapter 22, 23</td>
<td>Chapter 22, 23</td>
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<td>September 17 – 21</td>
<td>Chapter 24</td>
<td>Chapters 24</td>
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<td>September 24 – 28 (September 25 – Exam I)</td>
<td>Chapter 25</td>
<td>Chapter 25</td>
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<td>October 1 – 5</td>
<td>Chapter 25</td>
<td>Chapter 26</td>
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<tr>
<td>October 8 – 12</td>
<td><strong>Holiday</strong></td>
<td>Chapter 25, 26</td>
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October 15 – 19 | Chapter 26 | Chapter 26
October 22 – 26 (October 23 – Exam II) | Chapters 27 | Chapter 27
October 29 – November 2 | Chapter 27 | Chapter 28
November 5 – 9 | Chapter 28 | Chapter 28
November 12 – 16 | Holiday | Chapter 29
November 19 – 23 | Chapter 29 | Chapter 29
November 26 – 30 (November 27 – Exam III) | Chapter 30 | Chapter 30
December 3 – 7 | Chapter 30 | Chapter 31
December 10 – 14 | Chapter 30 | Chapter 31
December 17 – 21 (Final exams week) | Final exam: December 18, 2:00 – 3:50 p.m in EEP 252

HOMEWORK ASSIGNMENTS

Chapter 21:
Questions: 1, 2, 4, 6, 10
Problems: 4, 7, 11, 13, 15, 17, 21, 25, 27, 31, 32, 37, 42, 43, 54, 55, 59, 62, 66

Chapter 22:
Questions: 1, 2, 4, 5, 7, 9, 11
Problems: 7, 13, 15, 19, 23, 24, 25, 26, 32, 34, 35, 39, 41, 42, 43, 56, 57, 61

Chapter 23:
Questions: 1, 3, 5, 6, 7, 8
Problems: 1, 3, 4, 5, 7, 9, 11, 13, 17, 19, 21, 23, 25, 27, 29, 30, 34, 35, 36, 37, 39, 41, 45, 47

Chapter 24:
Questions: 1, 2, 4, 6, 7
Problems: 6, 7, 11, 15, 17, 19, 21, 22, 23, 25, 29, 31, 35, 36, 39, 41, 44, 45, 53, 62, 63, 64

Chapter 25:
Questions: 1, 2, 6, 7, 10
Problems: 5, 7, 9, 10, 12, 15, 17, 19, 23, 26, 27, 29, 31, 34, 39, 40, 41, 43, 45, 46, 68

Chapter 26:
Questions: 1, 2, 4, 6, 9
Problems: 5, 7, 13, 15, 17, 18, 19, 20, 21, 23, 29, 31, 32, 33, 36, 39, 41, 43, 47, 49, 52, 55

Chapter 27:
Questions: 3, 5, 7, 9, 10
Problems: 6, 12, 13, 19, 25, 27, 29, 31, 35, 37, 45, 41, 49, 51, 53, 57, 59, 62, 63, 69

Chapter 28:
Questions: 2, 3, 7, 9, 11
Problems: 1, 7, 11, 13, 15, 19, 21, 29, 31, 36, 38, 39, 41, 45, 47, 48, 51, 55, 57, 59

Chapter 29:
Questions: 2, 4, 5, 8, 9
Problems: 6, 7, 13, 14, 15, 19, 20, 24, 31, 37, 39, 41, 42, 45, 47, 48, 49, 51, 53, 57, 59

Chapter 30:
Questions: 2, 3, 4, 8, 10
Problems: 2, 9, 10, 13, 15, 17, 22, 23, 29, 31, 35, 37, 39, 40, 45, 46, 51, 52, 55, 58, 61, 63, 67, 69, 71

Chapter 31:
Questions: 1, 3, 5, 7, 11
Problems: 3, 5, 9, 10, 15, 17, 21, 25, 27, 29, 31, 33, 35, 37, 39, 41, 47, 51, 53, 57, 59, 61, 63