COURSE INFORMATION

PHYSICS 4002, Electricity and Magnetism, 3 credits
Lectures: Mon, Wed, Fri, 10:10 - 11:00, Anderson 230
Course Prerequisites: Phys1301, Phys1302, Phys4001, The entire calculus series including and especially vector calculus (=calc4).

Instructor: Shaul Hanany
Office: Rm. 316 PAN
Office hours: Friday, 1:00 - 2:00 pm in PAN 316

TAs:
Sam Ducatman: ducatman@physics.umn.edu; Office Hour: Tuesday 2:30 - 3:30, PAN 334
Marcos Garcia Garcia: garciagarcia@physics.umn.edu; Office hour: Thursday 10:10 - 11:00, PAN 434
Yahor Savich: savich@physics.umn.edu; Office Hour: Friday 5:40 - 6:30, PAN217

REQUIRED MATERIALS


COURSE GOALS

Introduce Electrostatics, Magnetism and Electrodynamics at an advanced undergraduate level.

GRADING and GRADUATING

Homework (lowest two HW grades dropped): 32.5%; 2 best Quizzes: 32.5%; Final Exam: 35%

Many of you must receive at least a C- to receive credit for this class, and some of you are scheduled to graduate at the end of this semester. Are you one of them? If so, please make extra effort to avoid an unresolvable crisis at the end of the semester in which you have earned a grade of less than C- and now you can’t graduate. Submit all homework. Attend all lectures and discussions. Spend more time preparing for quizzes. Attend office hours. Ask questions. Please remember: we can’t and won’t grade graduating students differently than other students.

Are grades curved? Most probably not, but we don’t know until the very end of the semester, after the final exam. Historical grade distribution from past years will be shown in class. If this is a standard class - and there is every reason to believe it is - you should expect a similar grade distribution. In past years there was no need to do any curving.
### TENTATIVE CLASS SCHEDULE, QUIZZES AND FINAL

<table>
<thead>
<tr>
<th>Week</th>
<th>Start Date</th>
<th>Subject</th>
<th>Chapter</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan. 19</td>
<td>Electrostatics</td>
<td>2</td>
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<td>2</td>
<td>Jan. 25</td>
<td>Electrostatics</td>
<td>2</td>
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<tr>
<td>3</td>
<td>Feb. 1</td>
<td>Potentials</td>
<td>3</td>
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<td>4</td>
<td>Feb. 8</td>
<td>Potentials</td>
<td>3</td>
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<td></td>
<td>Friday, Feb. 12</td>
<td>Quiz 1</td>
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<td>5</td>
<td>Feb. 15</td>
<td>Electric Fields in Matter</td>
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<tr>
<td>6</td>
<td>Feb. 22</td>
<td>Electric Fields in Matter</td>
<td>4</td>
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<tr>
<td>7</td>
<td>Feb. 29</td>
<td>Magnetostatics</td>
<td>5</td>
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<td>8</td>
<td>Mar. 7</td>
<td>Magnetostatics</td>
<td>5</td>
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<td></td>
<td>Wednesday, Mar. 9</td>
<td>Quiz 2</td>
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<td>9</td>
<td>Mar. 14</td>
<td>Spring Break</td>
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<td>10</td>
<td>Mar. 21</td>
<td>Magnetostatics / Magnetic Fields in Matter</td>
<td>5,6</td>
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<td>11</td>
<td>Mar. 28</td>
<td>Magnetic Fields in Matter</td>
<td>6</td>
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<tr>
<td>12</td>
<td>Apr. 4</td>
<td>Magnetic fields in matter / Electrodynamics</td>
<td>6,7</td>
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<td></td>
<td>Monday, Apr. 11</td>
<td>Quiz 3</td>
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<td>13</td>
<td>Apr. 11</td>
<td>Electrodynamics</td>
<td>7</td>
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<td>14</td>
<td>Apr. 18</td>
<td>Electrodynamics</td>
<td>7</td>
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<td>15</td>
<td>Apr. 25</td>
<td>Conservation Laws</td>
<td>8</td>
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<tr>
<td>16</td>
<td>May 2</td>
<td>Conservation Laws</td>
<td>8</td>
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<td></td>
<td>May 14</td>
<td>Final Exam (8:30-11:30)</td>
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HOMEWORK

Each week’s homework assignment will consist of two types of problems, ‘weekly’ and ‘rolling’. The weekly HW will be assigned on Monday and will be due the following Monday. The rolling HW will be assigned by the evening of a given lecture day, and will be due in class by the next lecture. The total HW load is the same as if the HW was all weekly.

Struggling with new concepts and having difficulty with how to apply them, e.g. while solving HW problems, is expected, completely natural, and an important part of the learning process. Something is wrong with this class if you are not struggling and not making mistakes. This part of your learning is lost if you don’t struggle with the concepts and calculations on your own. You are welcome to do your homework with friends, but each student must hand in his/her own work. The best way to work with friends is for you to first solve the problems on your own, or make as much progress as you can separately, and only then compare your work to others.

Please note that late homework will not be accepted. All HW must be submitted at or before the deadline. If you have a University sanctioned reason for missing a homework deadline (documented illness, or University sanctioned activity) you will not be penalized but if you want to receive credit you must submit before the deadline.

Electronic submissions prior to the deadline are allowed - technical details will be relayed in class - but it is your responsibility to ensure sufficient resolution and readability. Non-readable submissions will not be graded.

QUIZZES + FINAL EXAM

Quiz dates are given in the syllabus. Please note that there are no make-up quizzes.

If you have a University sanctioned reason for missing a quiz we can make some accommodations. For example, if you are going on an athletic activity, please consult with the instructor.

CLASS ROOM BEHAVIOR

If you attend class, you have come to learn. Please: no smartphones, no ipads, and no laptops (not even for taking notes). No open newspapers, no food, no texting.

Lectures end when the discussion of a particular topic comes to an end. Please collect your books when the instructor indicates that the lecture has ended. Doing otherwise disrupts the class.

COMMUNICATIONS, WEBSITE

The primary means for information transfer is the class meeting. Although the class has a web-site: http://www.physics.umn.edu/classes/phys/2015/spring/Phys%204002.001/index.html you are responsible for any information relayed in class, but not posted on the web.

You are more than welcome to provide feedback and voice your concerns. The class website has features that enable you to provide anonymous feedback, or post a question. There is also a wiki area in which you can exchange notes with your peers and TAs.
You are welcome to send the instructor e-mail, it will likely be read, but please do not expect an answer. This class is too large to enable e-mail communications. The best way to interact with the professor is face-to-face right before or after class, or during the weekly office hour.

**IS THERE KEY TO SUCCESS?**

Define success. Is it passing (= getting C- or above)? Getting at least B? Getting A?

Regardless of your specific definition, the single most important element for any of the definitions is doing your homework in as conscientious and complete way as you can. Completing all HW with reasonable grades won’t guarantee an A, but it would guarantee that you pass and it is a critical element if your success criterion aims higher.

**DEPARTMENTAL POLICIES**

**ATHLETES** must provide their official University of Minnesota athletic letter containing the approved competition schedule to their instructor and the staff in office 148. Away exams will be arranged with the athletic adviser traveling with the team. Accommodations will be made for official university sports only (i.e. no accommodations will be made for intramurals, club sports, etc.)

**DISABILITY SERVICES:** If you have accommodations for this course, please provide the staff in office 148 with a copy of your accommodation letter for the current semester. Exams will be arranged according to accommodations and sent to the testing center for administration.

**MANDATORY POLICY INFORMATION [REFERENCES/LINKS VERSION FOLLOWS]**

- Student conduct code

- Scholastic Dishonesty
  *See student conduct code*

- Disability Accommodations
  [http://ds.umn.edu/student-services.html](http://ds.umn.edu/student-services.html)

- Use of Personal Electronic Devices in the Classroom
  [http://www.policy.umn.edu/Policies/Education/Education/STUDENTRESP.html](http://www.policy.umn.edu/Policies/Education/Education/STUDENTRESP.html)

- Appropriate Student Use of Class Notes and Course Materials
  [http://www.policy.umn.edu/Policies/Education/Education/STUDENTRESP.html](http://www.policy.umn.edu/Policies/Education/Education/STUDENTRESP.html)

- Makeup Work for Legitimate Absences
  [http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html](http://policy.umn.edu/Policies/Education/Education/MAKEUPWORK.html)
Grading and Transcripts
http://policy.umn.edu/Policies/Education/Education/GRADINGTRANSCRIPTS.html

Sexual Harassment
http://regents.umn.edu/sites/default/files/policies/SexHarassment.pdf

Equity, Diversity, Equal Opportunity, and Affirmative Action
http://regents.umn.edu/sites/default/files/policies/Equity_Diversity EO_AA.pdf

Mental Health and Stress Management
http://www.mentalhealth.umn.edu

MANDATORY POLICY INFORMATION [FULL TEXT VERSION Follows]

Student Conduct Code

The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical or mental health or safety of members of the University community.

As a student at the University you are expected adhere to Board of Regents Policy: Student Conduct Code. To review the Student Conduct Code, please see: http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf.

Note that the conduct code specifically addresses disruptive classroom conduct, which means "engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach or student learning. The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities."

Scholastic Dishonesty

You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University
academic record; or fabricating or falsifying data, research procedures, or data analysis. (Student Conduct Code: http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf) If it is determined that a student has cheated, he or she may be given an "F" or an "N" for the course, and may face additional sanctions from the University. For additional information, please see: http://policy.umn.edu/Policies/Education/Education/INSTRUCTORRESP.html.

The Office for Student Conduct and Academic Integrity has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty: http://www1.umn.edu/oscai/integrity/student/index.html. If you have additional questions, please clarify with your instructor for the course. Your instructor can respond to your specific questions regarding what would constitute scholastic dishonesty in the context of a particular class-e.g., whether collaboration on assignments is permitted, requirements and methods for citing sources, if electronic aids are permitted or prohibited during an exam.

Disability Accommodations

The University of Minnesota is committed to providing equitable access to learning opportunities for all students. Disability Services (DS) is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations.

If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact DS at 612-626-1333 to arrange a confidential discussion regarding equitable access and reasonable accommodations.

If you are registered with DS and have a current letter requesting reasonable accommodations, please contact your instructor as early in the semester as possible to discuss how the accommodations will be applied in the course.

For more information, please see the DS website, https://diversity.umn.edu/disability/.

Use of Personal Electronic Devices in the Classroom

Using personal electronic devices in the classroom setting can hinder instruction and learning, not only for the student using the device but also for other students in the class. To this end, the University establishes the right of each faculty member to determine if and how personal electronic devices are allowed to be used in the classroom. For complete information, please reference: http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html.

Makeup Work for Legitimate Absences
Students will not be penalized for absence during the semester due to unavoidable or legitimate circumstances. Such circumstances include verified illness, participation in intercollegiate athletic events, subpoenas, jury duty, military service, bereavement, and religious observances. Such circumstances do not include voting in local, state, or national elections. For complete information, please see: http://policy.umn.edu/Policies/Education/MAKEUPWORK.html.

Appropriate Student Use of Class Notes and Course Materials

Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of the academic community. For additional information, please see: http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html.

Grading and Transcripts

The University utilizes plus and minus grading on a 4.000 cumulative grade point scale in accordance with the following:

A
4.000 - Represents achievement that is outstanding relative to the level necessary to meet course requirements
A-
3.667
B+
3.333
B
3.000 - Represents achievement that is significantly above the level necessary to meet course requirements
B-
2.667
C+
2.333
C
2.000 - Represents achievement that meets the course requirements in every respect
C-
1.667
D+
1.333
D
1.000 - Represents achievement that is worthy of credit even though it fails to meet fully the course requirements
S
Represents achievement that is satisfactory, which is equivalent to a C- or better.
For additional information, please refer to: http://policy.umn.edu/Policies/Education/GRADINGTRANSCRIPTS.html.

Sexual Harassment
"Sexual harassment" means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature. Such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. Such behavior is not acceptable in the University setting. For additional information, please consult Board of Regents Policy: [http://regents.umn.edu/sites/default/files/policies/SexHarassment.pdf](http://regents.umn.edu/sites/default/files/policies/SexHarassment.pdf)

**Equity, Diversity, Equal Opportunity, and Affirmative Action**

The University provides equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy: [http://regents.umn.edu/sites/default/files/policies/Equity_Diversity_EO_AA.pdf](http://regents.umn.edu/sites/default/files/policies/Equity_Diversity_EO_AA.pdf).

**Mental Health and Stress Management**

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. University of Minnesota services are available to assist you. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website: [http://www.mentalhealth.umn.edu](http://www.mentalhealth.umn.edu)