Physics 122-01: General Physics II

Syllabus: 2002 Summer

Instructor: Prof. David Jeffery, Workman Center Rm 313?, Tel: 505-835-5047?, Email: jeffery@kestrel.nmt.edu, Office Hours: MTRF 2:00-4:00 pm (Make an appointment if you need to see the instructor for sure.)

Time and Place: MTWRF 9:00-10:25 am, Workman Center, Rm 113

Course Assistant: Brook Jilek, Email: bjilek@nmt.edu

Course Section Webpage: http://kestrel.nmt.edu/~jeffery/course/c_intro/

Lab Instructor: Billy Oxford, Tel: 5875, Email: woxford@nmt.edu

Labs: 122L-01 TR, 2:00-4:30 pm, Workman Rm 107 (T) and Rm 115 (R)

Lab Webpage: http://www.nmt.edu/~woxford/

Co/Prerequisites: Math 132 (co), Physics 122L (co), Physics 121 (pre)


Catalog Course Description: 4 Credits. Continuation of Physics 121 including electriciy and magnetism, optics, and atomic and nuclear phenomena.

Supplementary Course Description: This is a second semester course in introductory physics. But introductory doesn’t mean easy. Many topics are covered and in some depth. Mathematical tools including calculus are needed. The emphasis is on concepts and calculations, logic, beauty, utility, and the unity of the physics. You may never return to particular topics in later life, but the physics approach should be a lifetime achievement and strength. And we’ll have some fun too.

The course will be run partially in studio style. There will be a daily lecture of about 40 minutes, then group work on daily homework problems, and finally a 10 minute or so problem-working session for the whole class led by a student group. The lectures cannot cover all the topics that must be learned. They will only cover harder developments and example problems. Student readings and problem solving are essential components. The student must do their reading and problems every day to be prepped.

The student groups will have 4 people each usually. We will decide on them on the first day; students will select there own groups: some rearrangement later is possible, of course. The instructor will document the groups. The groups are expected to work together in the group period to solve the daily homework problems and mark last day’s homework. Not all the problems can be done in that time: maybe only one or two. The instructor hopes the groups will work together out of class too. Everyone in the group has to pull their weight. At the end of the period a group chosen in rotation will work one or two homework problems at the board for the class. All group members should participate: this is for glory.

Students will mark their own assignments: solution sheets will be provided. You MUST ask one of your group members to check your marking for fairness. The instructor and course assistant will help out too. Mark every question out of 5 whether full-answer or multiple choice. You should give part marks on the full-answer questions: looking for understanding (or lack of): you shouldn’t take away marks from yourself for mere arithmetic errors unless you’ve been egregious: but certainly if you forget the units for the final answer, you should take away a mark. Multiple-choice questions are only right or wrong, of course. A heavy weighting on multiple choice questions will smooth out the difference between the hard markers from the soft ones. Assignments don’t count for much anyway: the marks are merely to give the necessary frisson.

The rationale for studio style learning in groups is that it has been found to be more effective, more social, more fun than old style lecturing—when well done! Students need to keep on the topic and help
each other—think physics!

Daily Grind: We meet daily 9:00–10:25 am.

1. 9:00–9:40 am lecture
2. 5-minute quiz on daily reading/lecture (instructor marked)
3. 5-minute break
4. ~9:50–10:15: group work on daily homework and marking last day’s homework. Report your mark!
5. ~10:15–10:25: students from a selected group work problems at the board

Evaluation and Grading: The 3 grading categories, their weightings, and their drops are:

<table>
<thead>
<tr>
<th>Category</th>
<th>Weekly %</th>
<th>Weighting</th>
<th>Drops</th>
</tr>
</thead>
<tbody>
<tr>
<td>in-class quizzes</td>
<td>&lt;3 %</td>
<td>3%</td>
<td>3 drops</td>
</tr>
<tr>
<td>daily homeworks</td>
<td>≤9%</td>
<td>9%</td>
<td>3 drops</td>
</tr>
<tr>
<td>4 in-class tests</td>
<td>&gt;88 %</td>
<td>88%</td>
<td>no drop</td>
</tr>
</tbody>
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Preliminary letter grades based cumulative average marks will be assigned according to lower bound scheme:

- A 90 %
- A− 87 %
- B+ 84 %
- B 80 %
- B− 77 %
- C+ 74 %
- C 70 %
- C− 67 %
- D+ 64 %
- D 60 %
- D− 57 %
- F 0 %

The instructor will, however, make a final judgment on letter grades at the end of the course.

Posting of Marks and Grades: Marks and grades will be posted at the course section webpage. Posting will only be for those students who have requested their marks and grades be posted with a signature and have given a confidential alias: no social security number, student number, or recognizable parts of your own name. The alias is for posting only: use your real name on all items (quizzes and exams) that are handed in. The quizzes and exams will be handed back in class.

Quizzes: The quizzes are intended primarily as a mental stimulus for listening to the lectures and doing the daily reading. They will be easy: “don’t panic.”

Homeworks: See above.

In-Class Tests: They will be four in-class tests each taking the whole period. They are each worth 22 % of the total grade. They are already scheduled: see below.

Comprehensive Final: No final.

Make-ups: Make-ups on exams are possible, but the student must have a good reason for needing one and must ask for it promptly.

Disabilities: If you have a disability that requires assistance or accommodation, you should tell the instructor. You can also contact Counseling and Academic Support Services (CASS, Wells Hall, Rm 113,
Tentative Schedule: 2002 Summer

Week of Events in Space-Time

June 10  Chapt. 22, 23, 24: Electrostatics
          Lab 1: Oscilloscope
          Lab 2: Velocity of Electromagnetic Waves
          Classes and Laboratories start June 11

June 17  Chapt. 24, 25: Electrostatics
          Lab 3: Electric Field Mapping
          Lab 4: Capacitors and Induced Charge
          Class Test 1: Jun. 20 Thursday
          <a href="/homework/exam01.pdf">Test 1 Solutions</a>

Jun 24   Chapt. 26, 27: Capacitance and Current
          Lab 5: Electrical Circuits
          Lab 6: Magnetic Forces

July 1  Chapt. 28, 29: Current, Circuits, Magnetic Fields
        Lab 7: Faraday's Law
        Class Test 2: Jul. 3 Wednesday
        <a href="/homework/exam02.pdf">Test 2 Solutions</a>
        July 4 Thursday Academic Holiday

Jul 8    Chapt. 30, 31: Magnetic Field and Induction
        Lab 8: Refraction, Dispersion, Polarization
        Lab 9: Geometrical Optics

July 15  Chapt. 34, 36: Electromagnetic Waves, Light, and Interference
        Lab 10: Interference and Diffraction
        Lab 11: Spectrometer
        Class Test 3: Jul. 18 Thursday
        <a href="/homework/exam03.pdf">Test 3 Solutions</a>
July 22  
Chapt. 37, 39: Diffraction and Photons and Matter Waves  
Lab 12:  X-Ray  
Lab 13:  Spectral Lines

July 29  
Chapt. 40: More About Matter Waves  
Lab 14: Radioactive Decay  
Class Test 4:  Aug. 2 Friday  
<a href="./homewk/exam03.pdf">Test 4 Solutions</a>

August 5  
Grades will be submitted to Registrar ????
Queries to the instructor about grades must be made prior to submission:  the earlier, the better.
With any luck, last exams will be marked and grades will be posted August 3, Saturday, sometime in the afternoon.

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Fun Quiz: Not Marked: Voluntary Except for Name

Name:
Email Address:
Year:
Major, Possible Major, or Engineering Concentration:
Astrological Sign:

1. What is the density of water in grams per cubic centimeter?

2. What is a particle in the context of physics?

3. What is a force in the context of physics?

4. What is energy in one sentence?

5. Do you have personal internet access?

6. If you would like to have your marks and grades posted at the course section webpage, give an unidentifiable confidential alias (no social security numbers, student numbers, or recognizable parts of your own name) and sign to give permission for posting. The alias should be 14 characters or less in length. You may include small and large letters, numbers, spaces, and the special symbols ,-. ’%@. NOTE: The alias is only for posting: hand in items with your real name only. Remember your alias!

Tear this page off and hand it in.