Physics 121 Syllabus – General Physics I

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Office Hours: 1-2 M & T or by appt.
Class Hours: MWF 9-9:50; T 2-4 (recit), Workman 113

Text: Essential Univ. Physics, vol 1; Wolfson

Pre/co-requisites: Math 131.

Course Designation: This course (or its equivalent) is required for all undergraduate students at NMT.

General Course Content and Goals: This class is designed to teach you two things. First, it will teach you the fundamentals of physics, covering principally simple motion, rotational motion, Newton’s Laws, energy, momentum, wave and fluid motion, gravity and basic thermodynamics. Second, it will teach you how to critically examine a problem and analytically arrive at a solution, all done in the context of these initial physical laws which we will study. We will cover approximately 18 chapters during the semester. Your grade will be comprised of the points you earn on: reading summaries, homework assignments, class participation, three tests during the semester and a cumulative final. Class time will be used mainly for lecture, demonstrations, examples and questions; recitation will be used mainly for working homework problems at the board, asking more detailed questions and taking tests. You are responsible for all the material listed in the reading and homework assignments, whether or not they are covered explicitly in class. A general schedule is attached to this syllabus. Detailed homework assignments, reading assignments, details of using the online HW problems and class announcements will be posted to the website for this course: http://www.physics.nmt.edu/~mce/phys121.html.

Attendance: All students are expected to attend class and recitation sections. Acceptable reasons for missing class include illness, personal or family emergencies, and special research opportunities (i.e. field work, presenting at conferences). It is expected that all students will give appropriate advanced notice for anticipated absences, and will contact the professor as soon as possible for unexpected one. In circumstances of extended absences, a student may be asked to demonstrate corroborating evidence for the absence (e. g. physician’s statement, statement from the Dean). Attendance will be factored into the student’s “Class Participation” portion of the grade.

Points and Grading: You will earn points in the class, upon which your grade will be based, from the following three areas: 1) your performance on tests, reading summaries and homework, 2) your participation in class and recitation, and 3) your participation in limited extra credit opportunities. The total number of points available in the class is 1000, broken down as follows: 1) Sixteen HW sets of approximately 10-15 problems each, where the lower HW set will be counted as extra credit. Each assignment is worth 15 points. = 225 points (22.5%) 2) Fifteen reading summaries of 8 points each. = 120 points (12.0%)
3) Three tests (in recitation) throughout the semester of 120 points each. = 360 points (36%)
4) A class participation component at the instructor's discretion. (This will be evaluated based
   on attendance, class participation during lecture/discussions, recitation participation, general
   enthusiasm and effort in the course.) = 105 points (10.5%)
5) One comprehensive final worth 190 points. = 190 points (19%)

Several extra credit opportunities of varying point values including, but not limited to: extra
credit problems on HW and tests, attendance of special announced lectures accompanied by a
written report, participating in the assessments for the course, and other opportunities as they
arise (about 8%)

Letter grades will be assigned approximately as follows: 92.5% and up: A; 89.5-92.4%: A-;
87.5-89.4%: B+; 82.5-87.4%: B; 79.5-82.4%: B-, etc.

**Assessment:** There will be an assessment tool given in recitation the first and around the 13th
week recitation periods during the semester. The second assessment tool will have attached to it
an extra credit bonus so that I have 2 scores for you during the semester.

**Class Scheduling during the Week:**

**Homework** will be due **Wednesday** on the web (see course webpage for a complete description
of how to use this). (Please contact me as soon as possible if regular internet access is
problematic for you.) **Late homework is pro-rated based on a linear sliding scale – at 48
hours late: -40% credit; more than 48 hours late, no credit.** Reading summaries are due
**Mondays** at the beginning of class; late summaries cannot be accepted except in the case of
approved absences or pre-arrangement with the professor. Recitations, on Tuesdays, are used to
discuss, ask questions, and go through homework at the board that are due that week and any
other problems that might be useful to understanding the material. Also, **all tests are given
during the recitation time period.** It is not advised to schedule another class during that time
period hoping to skip out on recitation. **Tests will NOT be re-offered for make-up except in the
case of approved absences. The final exam is comprehensive and mandatory for all
students.** The date for the final will be announced later in the semester.

**Background for each of the above:**

**Homework:** This will consist of a series of problems assigned and posted on the website above.
We will be using the “Mastering Physics” online homework problems, and the rules for access
and use of this system will be posted at the website above. If you purchased a new text, you
purchased access to this website as part of the course. If you purchased a used textbook, you
will need to buy access to this website for the coursework. Approximately 10-15 problems will
be assigned to work through each week and these should be worked out before recitation and
demonstrated at the board. You are encouraged to work together to solve homework problems
and to seek advice from the instructor or tutors, however each person must turn in his or her own homework set. Mastery of the homework will be demonstrated by performance on the tests.

Reading summaries: These will consist of a hand-written (legibly please) or typed summary of the reading assignment for the week, approximately 1-2 pages. Include a “questions” section at the end of the reading summaries of any outstanding concepts that are still giving you difficulty so that they can be addressed as soon as possible in class. These summaries are intended to help you prepare the material by insuring you have read it BEFORE the class lectures. You should write them with the intention of using them as study guides for the exams.

Tests and the final: These exams will generally consist of four sections: 1) Conceptual questions which don’t require calculations, but do require a short essay (1/2 page) and/or diagrams to answer completely; 2) Short problems – generally very straightforward problems requiring a few steps and a calculator to complete. All your work MUST be shown for these problems to get full credit; 3) Longer problems – generally requiring more steps and more analysis, often with multiple steps. All your work MUST be shown, and often assumptions must be stated, to get full credit for these problems. 4) A few extra credit questions which often will only have been discussed in class or via supplemental material – hint: class attendance will help you here. Sometimes this will include a problem we covered in lecture. You will be allowed to bring a “cheat sheet” and a calculator in for the exams, which will be administered in recitation.

Tips for Success in this Class:

1) Attendance and class demeanor: Obviously, it is highly recommended that you attend all lectures and recitations as you will learn and reinforce what you have read and studied by being present for these discussions and activities. Your class participation grade will in-part be determined by your attendance and by your activity in class discussions and recitation work done at the board. Additionally, being on-time for class shows respect for me and your classmates and helps us make the best use of the time that is available – please endeavor to always be on time. If you cannot be, please endeavor to cause as little disruption to the class as possible while finding your seat. Finally, please shut off cell-phones ringers and laptops while in class (unless you use the laptops to take notes). If you have to leave class early, please let me know before lecture begins.

2) Homework and Reading Assignments: All assigned homework should be attempted before you come to Tuesday recitations, as you will be responsible for presenting it at the board in recitation and for turning in the HW on the web. The problems on the exams will be very similar to those you will do in the HW, and the more practice you get doing physics, the better you will become at it. It is my opinion that most people learn through practice and repetition, and therefore reading the assignments ahead of class lecture will also better prepare you to understand and absorb the material that is lectured upon. This will also help you remain more engaged in class discussions and ask intelligent/insightful questions.

3) Responsibility/Pace of Course: Ultimately it is you who are responsible for learning the material presented in this course. If you are having trouble with the material, or falling behind in the homework, please make use of my office hours or contact me to make an appointment as
soon as possible so that we may determine the best course of action to keep you (or get you back) on track and keep you successful within the course. You will earn your grade in this class based on the work you ultimately put into it. The pace of this course has been designed by a team of professors in the department of Physics to: 1) cover most of the text in one semester, and 2) be synchronized across all the different sections and with the labs. This has been done to maximize your opportunities for success. In my experience, almost no one who puts in his/her time on the coursework for this class fails it; however many do not get the grade s/he would like, mainly through lack of consistent effort.

4) General Success Tips/Getting Help: I expect you will spend on average 2-3 hours a week per hour in class to complete the reading and homework assignments for this class. If you are not doing well with the material, and are spending substantially less time than this on your coursework, then you should first try to find a way to spend more time on the assignments. If you are spending this amount of time on the assignments and still having trouble, please come see me to discuss the problem as soon as possible. I am available during office hours, or by appointment, to help you. Tutors are also available through the University (Sunday evenings in particular) and in the Physics department free of charge, and you should avail yourself of the tutors’ time whenever you are having trouble with the material. Finally, finding study partners to work with will always help you concentrate on and absorb the material. We have attempted to “sync” all sections of Physics 121 at NMT so that you may get study partners from any section to work with on the material.

General reading assignments/tests for the semester (see website for detailed info):

<table>
<thead>
<tr>
<th>Week</th>
<th>Starting Date</th>
<th>Chapter</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan 15</td>
<td>1 – Units, vectors – Doing Physics</td>
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<td></td>
<td></td>
<td>Assessment pre-test.</td>
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<td>2</td>
<td>Jan 22</td>
<td>2-3 -- Simple motion</td>
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<td>3</td>
<td>Jan 29</td>
<td>4 – Force and Motion</td>
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<td>4</td>
<td>Feb 5</td>
<td>4-5 -- Newton’s Laws</td>
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<td>5</td>
<td>Feb 12</td>
<td>5 – Using Newton’s Laws</td>
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<td>6</td>
<td>Feb 19</td>
<td>6 – Work, energy and power – *Test #1: Ch 1-5</td>
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<td>7</td>
<td>Feb 26</td>
<td>7 – Energy conservation</td>
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<td>8</td>
<td>March 5</td>
<td>9 – Systems of particles</td>
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<td>9</td>
<td>March 12</td>
<td>SPRING BREAK</td>
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<td>10</td>
<td>March 19</td>
<td>10 – Rotational dynamics</td>
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<td>11</td>
<td>March 26</td>
<td>11 – Rotation and angular momentum</td>
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<td>12</td>
<td>April 2</td>
<td>8 – Gravity – *Test #2: Ch 6-7, 9-11</td>
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<td>13</td>
<td>April 9</td>
<td>13-14 – Oscillatory and Wave Motion</td>
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<td>Assessment post test.</td>
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<td>14</td>
<td>April 16</td>
<td>14-15 – Wave and Fluid Motion</td>
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<td>15</td>
<td>April 23</td>
<td>16-17 – Temp., Heat and Thermal Prop. of Matter</td>
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<td>*Test #3: Ch 8, 13-15</td>
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<td>16</td>
<td>April 30</td>
<td>18-19 – Heat and Thermodynamics</td>
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<td>17</td>
<td>May 7</td>
<td>FINALS WEEK (Comprehensive final includes Ch 16-19)</td>
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