Guide to Tufts Introductory Physics Courses

There are two sequences of introductory physics courses:
  Algebra-based:  Physics 1, 2
  Calculus-based: Physics 11, 12
It can be difficult to understand the similarities and differences and to figure out which course is best for you. This brief guide may help.

Comparison of Physics 1 and 11

<table>
<thead>
<tr>
<th></th>
<th>Physics 1</th>
<th>Physics 11</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content</strong></td>
<td>Mechanics: Kinematics, Newton’s Laws, Energy, Momentum, Rotational Motion, Fluids, Oscillations or Heat &amp; Temperature</td>
<td>Mechanics: Kinematics, Newton’s Laws, Energy, Momentum, Rotational Motion, Fluids, Oscillations or Heat &amp; Temperature</td>
</tr>
<tr>
<td><strong>Who takes it?</strong></td>
<td>Mainly biological science and pre-health students, usually juniors, seniors and post-bacs</td>
<td>Mainly physical science and engineering students, usually first- and second-year</td>
</tr>
<tr>
<td><strong>Math prereq</strong></td>
<td>High-school algebra, trigonometry</td>
<td>Math 11 concurrent</td>
</tr>
<tr>
<td><strong>Calculus</strong></td>
<td>None</td>
<td>Minimal</td>
</tr>
<tr>
<td><strong>Lab</strong></td>
<td>Shared lab sections: 6 labs, with reports</td>
<td></td>
</tr>
<tr>
<td><strong>Offered</strong></td>
<td>Fall semester, Summer sessions I and II</td>
<td>Fall and Spring semesters, Summer session I.</td>
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</table>

Comparison of Physics 2 and 12

<table>
<thead>
<tr>
<th></th>
<th>Physics 2</th>
<th>Physics 12</th>
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</thead>
<tbody>
<tr>
<td><strong>Content</strong></td>
<td>Heat &amp; Temperature or Oscillations, Waves, Sound, Light &amp; Optics, Electricity &amp; Magnetism, Relativity, Quantum Physics, Atomic &amp; Nuclear Physics</td>
<td>Heat &amp; Temperature or Oscillations, Waves, Sound, Light &amp; Optics, Electricity &amp; Magnetism</td>
</tr>
<tr>
<td><strong>Who takes it?</strong></td>
<td>Mainly biological science and pre-health students, usually juniors, seniors and post-bacs</td>
<td>Mainly physical science and engineering students, usually first- and second-year</td>
</tr>
<tr>
<td><strong>Physics prereq</strong></td>
<td>Physics 1 or 11 or equivalent</td>
<td>Physics 1 or 11 or equivalent</td>
</tr>
<tr>
<td><strong>Math prereq</strong></td>
<td>High-school algebra, trigonometry</td>
<td>Math 11 or equivalent, Math 12 concurrent</td>
</tr>
<tr>
<td><strong>Calculus</strong></td>
<td>None</td>
<td>Extensive</td>
</tr>
<tr>
<td><strong>Lab</strong></td>
<td>Shared lab sections: 6 labs, with reports</td>
<td></td>
</tr>
<tr>
<td><strong>Offered</strong></td>
<td>Spring semester, Summer session II</td>
<td>Fall and Spring semesters, Summer session II.</td>
</tr>
</tbody>
</table>
FAQs:

1) Are Physics 1 and 2 easier than Physics 11 and 12?
   Not necessarily. The mathematical level of Physics 11 is slightly higher than that
   of Physics 1, and that of Physics 12 is much higher than that of Physics 2, so the 11/12
   sequence can be challenging for students whose math backgrounds are less strong or in
   the distant past. On the other hand, even well-prepared first- and second-year students
   sometimes struggle in Physics 1 and 2 because they do not yet have the maturity and
   study skills of the more experienced students in those classes.

2) Is the lab required?
   Yes. Prior to the 2010-2011 academic year you could take the classes without lab, but now all students in Physics 1, 11, 2, and 12 must take the lab.

3) I’m not in engineering or the physical sciences but I have a strong math
   background. Should I take Phys 11/12 instead of Physics 1/2?
   It would be fine, but not necessarily better, to take Physics 11 instead of Physics 1.
   But take Physics 2 rather than 12. Physics 12 is a more narrowly focused class intended
   to prepare students for more advanced work in physical sciences and engineering, with
   considerable emphasis on the mathematical and analytical techniques that those more
   advanced courses require. Physics 2 covers a much broader range of topics, with greater
   emphasis on conceptual understanding, and is better suited for a student who will not go
   on to more advanced study in the field.

4) Can I take Physics 2 or 12 without taking 1 or 11 first?
   Physics 1 or 11 is a prerequisite for Physics 2 and 12, for very good reasons. Even
   though the list of topics may seem very different, the material in Physics 2 and 12 draws
   heavily on the ideas and methods developed in Physics 1 and 11. If you have not taken
   one of those courses, or had equivalent preparation, you are likely to have trouble.

5) I took AP Physics in high school. Can I skip these classes?
   Please see the Bulletin for the rules regarding AP credit and consult your
   academic advisor. AP courses vary widely in quality and we have found that simply
   having taken one, even with a high grade, is no assurance that the material has been
   mastered at the necessary level. In general it’s not advisable to skip ahead unless you
   qualify for placement according to the rules in the Bulletin.

6) I’m considering majoring in Physics. Is it OK to wait until the spring
   semester to take Physics 11?
   If you’re considering a physics major it’s best to complete Physics 12 by the end
   of your first year, which means taking Physics 11 in the Fall unless you have advanced
   placement. Physics 13, which is a requirement for the major and a prerequisite for many
   classes, is offered only in the Fall and should be taken after Physics 12. If you wait until
   spring to take Physics 11 it’s still possible to complete the major, but your course choices
   will be more limited.

7) I’m still confused, and so is my advisor. Now what?
   Call the Physics Department office at ext. 73029 and ask to speak with a faculty
   member about your individual situation.