Do you have lots of unanswered questions about the physical world and its effects on you? Are you interested in how science understands objects with cosmological dimensions as well as the particles that are fundamental to all materials? Do you seek to understand the physics behind technological developments?

You can choose physics subjects that suit your background and your reasons for learning physics. To make your choice you need to consider what you plan to build on your first year physics study (what pathways are you considering?) as well as your previous experience.

Think about what combination of interest and background best describes you.

**Semester 1 subjects**

Each of these Semester 1 subjects focuses on the following areas of study:
- Mechanics (motion in a line, rotational motion);
- Gravitation (orbiting objects such as planets and satellites);
- Special Relativity (for Physics 1 and Physics 1: Advanced only);
- Waves and Sound (musical instruments, hearing and ultrasound);
- Optics (imaging, optical instruments and diffraction effects).

<table>
<thead>
<tr>
<th>Physics 1: Advanced (PHYC 10001)</th>
<th>interest: Are you really interested in physics and want to delve deeply into how physicists gain insight into the physical world? Would you like a more mathematically rigorous introduction to physics than is offered in the standard physics subjects?</th>
<th>background: Strong in both maths and physics—normally an unscaled score ( \geq 35 ) in VCE Unit 3/4 Physics and Specialist Maths. In general students who choose the advanced subject can expect to gain about the same mark for equivalent effort as they would if they had chosen Physics 1.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics 1 (PHYC 10003)</td>
<td>interest: Are you considering taking physics beyond first year, or as a support for your other science or engineering systems studies?</td>
<td>background: Sound in both maths and physics—almost always completion of VCE Unit 3/4 Physics with an unscaled score ( \geq 30 ), together with Unit 3/4 Maths Methods. Approximately two thirds of students have also completed Specialist Maths.</td>
</tr>
<tr>
<td>Physics 1: Fundamentals (PHYC 10005)</td>
<td>interest: Have you always wanted to try some physics but never been able to fit it in? Do you need to fill a physics gap in your background for other studies?</td>
<td>background: Less strong in physics—did not take Physics in Year 12, or obtained a VCE Unit 3/4 unscaled score ( \leq 29 ).</td>
</tr>
</tbody>
</table>

**Semester 2 subjects**

Each of these Semester 2 subjects focuses on the following areas of study:
- Fluids (buoyancy, fluid flow);
- Thermal Physics (energy balance in various environments);
- Electricity and Magnetism (understanding electric and magnetic forces and their applications in circuits, electromagnetic induction etc., electromagnetic waves);
- Quantum and Atomic Physics (quantum physics and atomic structure, interactions of radiation and matter);
- Nuclear Physics and Radiation (nuclear structure, radiation, hazards and applications).

<table>
<thead>
<tr>
<th>Physics 2: Advanced (PHYC 10002)</th>
<th>interest &amp; background: Students who have completed Physics 1: Advanced, or Physics 1 with an excellent result, together with strong Maths, and seek to take the advanced physics approach.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics 2: Physical Science &amp; Technology (PHYC 10004)</td>
<td>interest &amp; background: Students who have completed Physics 1, or Physics 1: Fundamentals, and are interested in a Semester 2 physics subject that places greater emphasis on applications in the physical sciences and technology, including Physics, Chemistry, Earth Sciences and Engineering systems.</td>
</tr>
<tr>
<td>Physics 2: Life &amp; Environmental Sciences (PHYC 10006)</td>
<td>interest &amp; background: Students who are interested in a Semester 2 physics subject that places greater emphasis on applications in the life and environmental sciences. Students normally have completed a Semester 1 Physics subject.</td>
</tr>
<tr>
<td>Physics for Biomedicine (PHYC 10007)</td>
<td>interest &amp; background: Students in the Bachelor of Biomedicine who have not completed VCE Physics. Students in that degree who have completed VCE Physics enrol in P above.</td>
</tr>
</tbody>
</table>

The following flow chart illustrates common pathways through these physics subjects.

All of these pathways can lead to second-year level physics subjects, provided appropriate Maths subjects are also completed.

For further information visit physics.unimelb.edu.au/Current-Students/First-Year-Students 2011
Some Frequently Asked Questions about choosing Physics subjects

What do the first-year physics subjects have in common?
The focus of your learning will range over similar areas of physics in each semester (though the depth and range of applications differs between subjects).
The subjects share the same pattern of teaching:

- three lectures per week, one 1-hour tutorial per week and one 2 to 3-hour laboratory-based workshop class for up to 9 weeks per semester.
The distribution of marks between the different forms of assessment is the same:

  - 60% for one 3-hour written examination at the end of semester;
  - 25% for laboratory work, assessed throughout the semester and
  - 15% for tests and assignment each semester.

Do I have to follow the guidelines for choosing subjects?
In most cases the answer is “Yes”. The guidelines have been designed to help you in making a wise decision, so you should have an excellent reason before considering a different choice.

During the initial course advice period, students have access to their Student Centre student advisors to confirm their decisions. Permission to waive the guidelines should have the approval of the Physics Director of First-Year Studies.

Can I change subjects?
Before the end of the second week of semester, if the change you want to make is consistent with the guidelines, you may change your subject using the procedures of the Student Centre of your course. Otherwise you should first seek permission from the Physics Director of First-Year Studies before making the subject change.

I'm interested in Engineering pathways – which Physics subjects should I choose?
Pathways to Electrical Systems and Mechanical Systems majors in the BSc, and the corresponding streams in the BE and ME, include a pair of first-year level Physics subjects. Physics also can be chosen as the science elective for students planning to complete the Civil Systems major in the BSc and the Civil Engineering stream of the BE.

Students should choose the appropriate Physics 1 subject for their background, and in semester 2 complete Physics 2: Advanced or Physics 2: Physical Science and Technology.

I plan to apply for the Doctor of Veterinary Medicine—does it matter which physics I take?
If you have not completed VCE Unit 3/4 Physics or equivalent, you need to complete at least one 12.5-point Physics subject before entry to the second year prerequisite subjects for the DVM. The “Which Physics for You?” guidelines will assist your choice.

I plan to apply for the Doctor of Optometry—does it matter which physics I take?
You need to complete at least one 12.5-point Physics or Optics subject at first, second or third year level by the end of your degree. The “Which Physics for You?” guidelines will assist your choice.

Can I take Physics as breadth in my course?
The School of Physics is happy to teach students who are doing Physics subjects as breadth. First-Year Physics subjects are available as breadth in the first year of the BA, BCom, BEvns and BMus. They are not available in the breadth component of the BBiomed, BE or BSc as physics subjects contribute to the core of those degrees.

Can I take Physics for Biomedicine (PHYC 10007)?
This subject has been designed specifically for the needs of students enrolled in the Bachelor of Biomedicine course and is not available to students in other courses.

What if I have completed UMEP Physics?
Students who have completed PHYC 10003 and PHYC 10004 via the UMEP programme can take one of two options:

- Consolidate by taking the advanced sequence, PHYC 10001 and PHYC 10002, in their first year. Note that these subjects qualify for an exemption from the laboratory component of the subjects. Please use the standard laboratory exemption application form, available from the Physics First-Year Learning Centre.
- Broaden their first-year studies by taking subjects they would not otherwise have been able to fit into their course.

In general it is not possible to take second-year physics subjects because of their first-year mathematics prerequisite requirements which are in addition to the physics prerequisite. If you believe that you could qualify, please see the Physics Director of First-Year Studies.

Does the School of Physics offer Astronomy subjects?
Yes … but not at first-year level. If you are interested in pursuing Astronomy then study Physics and Maths to prepare for Astronomy subjects at higher year levels. The interdisciplinary subject “Introduction to Life, Earth and Universe” (MULT 1011) includes some components that would interest students with a strong interest in astronomy.

Does the School of Physics offer any other subjects at first year level?
The School of Physics is one of the key departments teaching in the University breadth subject “Introduction to Climate Change” (UNIS 10007) which develops students’ understanding of the scientific basis of climate change and its impacts as well as possible responses.

What is the textbook for First Year Physics subjects?
Physics 1 and Physics 2: Physical Science and Technology, and Physics 1 (Advanced) and 2 (Advanced):

Knight, R
Physics for Scientists and Engineers: A Strategic Approach with Modern Physics
(2nd edition, Addison-Wesley, 2008)

Physics 1: Fundamentals, Physics 2: Life Sciences and Environment, Physics for Biomedicine:

Knight, R, Jones, B, and Field, S
College Physics: A Strategic Approach
(2nd edition, Addison-Wesley, 2010)

When you buy these books from the University of Melbourne Bookshop they will be packaged with access to the relevant Mastering Physics online resources and e-book.

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