

## 640-171 Physics 1: Fundamentals

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| <b>Credit Points:</b>                    | 12.50   |
| <b>Level:</b>                            | 1 (Undergraduate)   |
| <b>Dates &amp; Locations:</b>            | 2009,<br>This subject commences in the following study period/s:<br>Semester 1, - Taught on campus.<br>Lectures, tutorials and practical laboratory classes.  |
| <b>Time Commitment:</b>                  | Contact Hours: 35 lectures (three per week); 11 1-hour tutorials; 27 hours of practical work (pre-laboratory activities plus nine weeks of 2- or 3-hour workshop sessions). Total Time Commitment: 120 hours total time commitment.   |
| <b>Prerequisites:</b>                    | VCE Unit 3/4 Mathematical Methods or equivalent. Some knowledge of physics, to Year 10 level.   |
| <b>Corequisites:</b>                     | None  |
| <b>Recommended Background Knowledge:</b> | None  |
| <b>Non Allowed Subjects:</b>             | Students may only gain credit for one of <i>Physics 1: Advanced</i> , <i>Physics 1</i> , <i>Physics 1: Fundamentals</i> , 640-121 (prior to 2008), 640-141 (prior to 2008), 640-151 (prior to 2008), 640-161 (prior to 2008).   |
| <b>Core Participation Requirements:</b>  | It is University policy to take all reasonable steps to minimise the impact of disability upon academic study and reasonable steps will be made to enhance a student's participation in the University's programs. This subject requires all students to actively and safely participate in laboratory activities. Students who feel their disability may impact upon their participation are encouraged to discuss this with the subject coordinator and the Disability Liaison Unit.  |
| <b>Coordinator:</b>                      | Assoc Prof Michelle Livett  |
| <b>Subject Overview:</b>                 | This subject is designed for students with a minimal background in Physics, and aims to provide a sound introduction to a range of important physics principles and applications. Emphasis is placed on key concepts rather than detailed analysis.<br>Topics include:<br>Mechanics: describing and explaining translational and rotational motion, for example in the contexts of human and animal movement and transport (Newton's laws of motion, both translational and rotational; energy transfer and transformation; momentum and impulse; simple harmonic motion; equilibrium).<br>Waves and sound: water waves; production and detection of sound, eg. musical instruments, hearing; ultrasound (reflection and refraction, superposition, resonance, energy transport, absorption, Doppler effect).<br>Optics: optical imaging; sensors and optical instruments; human vision (dispersion, lenses and mirrors, interference, diffraction, polarisation).<br>Gravitation: universal gravity, weightlessness, planetary and satellite orbits, escape velocity (universal gravity, Kepler's laws).<br>Vector notation, and differential and integral calculus, are used when appropriate. New mathematical concepts that students may not have encountered in previous studies are introduced as required. |
| <b>Objectives:</b>                       | To enable students to understand the importance of physical principles and develop their capacity to: <ul style="list-style-type: none"> <li># understand and explain the physics principles of translational and rotational mechanics, wave and optics;</li> <li># apply these principles using logical reasoning, together with appropriate mathematical reasoning, to a variety of familiar and novel situations and problems; and</li> <li># acquire experimental data using a range of measurement instruments and interpret these data.</li> </ul>  |

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| <b>Assessment:</b>                            | Ongoing assessment of practical work during the semester (25%); two written tests with a total duration of up to 1 hour, held early and mid semester (10%); one written assignment requiring up to 4 hours of work outside class time during the semester (5%); a 3-hour written examination in the examination period (60%). Satisfactory completion of practical work is necessary to pass the subject (i.e. attendance and submission of work for at least 80% of workshop sessions together with a result for assessed work of at least 50%).  |
| <b>Prescribed Texts:</b>                      | R Knight, B Jones and S Field, College Physics: A Strategic Approach, 2nd edition, Addison-Wesley, 2007.   |
| <b>Breadth Options:</b>                       | <p>This subject potentially can be taken as a breadth subject component for the following courses:</p> <ul style="list-style-type: none"> <li># <b>Bachelor of Arts</b> (<a href="https://handbook.unimelb.edu.au/view/2009/D09">https://handbook.unimelb.edu.au/view/2009/D09</a>)</li> <li># <b>Bachelor of Commerce</b> (<a href="https://handbook.unimelb.edu.au/view/2009/F04">https://handbook.unimelb.edu.au/view/2009/F04</a>)</li> <li># <b>Bachelor of Environments</b> (<a href="https://handbook.unimelb.edu.au/view/2009/A04">https://handbook.unimelb.edu.au/view/2009/A04</a>)</li> <li># <b>Bachelor of Music</b> (<a href="https://handbook.unimelb.edu.au/view/2009/M05">https://handbook.unimelb.edu.au/view/2009/M05</a>)</li> </ul> <p>You should visit <b>learn more about breadth subjects</b> (<a href="http://breadth.unimelb.edu.au/breadth/info/index.html">http://breadth.unimelb.edu.au/breadth/info/index.html</a>) and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.</p> |
| <b>Fees Information:</b>                      | Subject EFTSL, Level, Discipline & Census Date, <a href="http://enrolment.unimelb.edu.au/fees">http://enrolment.unimelb.edu.au/fees</a>  |
| <b>Generic Skills:</b>                        | <p>A student who completes this subject should be able to:</p> <ul style="list-style-type: none"> <li># explain their understanding of physics principles and applications lucidly, both in writing and orally;</li> <li># acquire and interpret experimental data and design experimental investigations;</li> <li># participate as an effective member of a group in tutorial discussions, laboratory and study groups;</li> <li># think independently and analytically, and direct his or her own learning; and</li> <li># manage time effectively in order to be prepared for regular practical and tutorial classes, tests and the examination.</li> </ul>  |
| <b>Notes:</b>                                 | <p>This subject is available for science credit to students enrolled in the BSc (both pre-2008 and new degrees), BAsc or a combined BSc course.</p> <p>Students with a score of 30 or more in VCE Unit 3/4 Physics will normally not be permitted to enrol in this subject.</p>  |
| <b>Related Course(s):</b>                     | Bachelor of Optometry<br>Bachelor of Veterinary Science(PV)  |
| <b>Related Majors/Minors/Specialisations:</b> | First year physics   |