

## Subject Description Form

<b>Subject Code</b>	AP10001
<b>Subject Title</b>	<b>Introduction to Physics</b>
<b>Credit Value</b>	3
<b>Level</b>	1
<b>Pre-requisite/ Co-requisite/ Exclusion</b>	Nil
<b>Objectives</b>	This is a subject designed for students with no background in physics studies. Fundamental concepts in major topics of physics (mechanics, heat, wave and electromagnetism) will be discussed. The aim of this subject is to equip students with some basic physics knowledge, and to appreciate its applications in various branches of science and technology.
<b>Intended Learning Outcomes</b>	Upon completion of the subject, students will be able to: <ul style="list-style-type: none"> <li>a. Solve simple problems in kinematics Newton's law and Energy;</li> <li>b. Solve problems in heat capacity and latent heat;</li> <li>c. Explain phenomena related to the wave character of light;</li> <li>d. Apply the superposition of waves;</li> <li>e. Understand electrostatic field and potential;</li> <li>f. Solve problems on interaction between current and magnetic field; and</li> <li>g. Describe and demonstrate the phenomenon of electromagnetism.</li> </ul>
<b>Contribution to Programme Outcomes (Refer to Part I Section 10)</b>	<ul style="list-style-type: none"> <li>▪ Programme Outcome 1: Demonstrate an ability to apply knowledge of mathematics, science, and engineering appropriate to the Biomedical Engineering (BME) discipline. (Teach)</li> </ul>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p><b>Mechanics:</b> scalars and vectors; kinematics and dynamics; Newton's laws; momentum, impulse, work and energy; conservation of momentum and conservation of energy.</p> <p><b>Thermal physics:</b> heat and internal energy; heat capacity; conduction, convection and radiation; latent heat.</p> <p><b>Waves:</b> nature of waves; wave motion; reflection and refraction; image formation by mirrors and lenses; superposition of waves; standing waves; diffraction and interference; electromagnetic spectrum; sound waves.</p>

	<p><b>Electromagnetism:</b> charges; Coulomb’s law; electric field and potential; current and resistance; Ohm’s law; magnetic field; magnetic force on moving charges and current-carrying conductors; Faraday’s law and Lenz’s law.</p>																																																			
<p><b>Teaching/Learning Methodology</b></p>	<p><b>Lecture:</b> Fundamentals in mechanics, waves and electromagnetism will be explained. Examples will be used to illustrate the concepts and ideas in the lecture. Students are free to request help. Homework problem sets will be given.</p> <p><b>Student-centered Tutorial:</b> Students will work on a set of problems in tutorials. Students are encouraged to solve problems and to use their own knowledge to verify their solutions before seeking assistance. These problem sets provide them opportunities to apply their knowledge gained from the lecture. They also help the students to consolidate what they have learned. Furthermore, students can develop a deeper understanding of the subject in relation to daily life phenomena or experience.</p> <p><b>e-learning:</b> In order to enhance the effectiveness of teaching and learning processes, electronic means and multimedia technologies would be adopted for presentations of lectures; communication between students and lecturer; delivery of handouts, homework and notices etc.</p>																																																			
<p><b>Assessment Methods in Alignment with Intended Learning Outcomes</b></p>	<table border="1" data-bbox="451 1035 1458 1381"> <thead> <tr> <th data-bbox="451 1035 829 1234" rowspan="2">Specific assessment methods/tasks</th> <th data-bbox="829 1035 995 1234" rowspan="2">% weighting</th> <th colspan="7" data-bbox="995 1035 1458 1182">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th data-bbox="995 1182 1060 1234">a</th> <th data-bbox="1060 1182 1125 1234">b</th> <th data-bbox="1125 1182 1190 1234">c</th> <th data-bbox="1190 1182 1255 1234">d</th> <th data-bbox="1255 1182 1320 1234">e</th> <th data-bbox="1320 1182 1385 1234">f</th> <th data-bbox="1385 1182 1458 1234">g</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 1234 829 1283">(1) Continuous assessment</td> <td data-bbox="829 1234 995 1283">40</td> <td data-bbox="995 1234 1060 1283">✓</td> <td data-bbox="1060 1234 1125 1283">✓</td> <td data-bbox="1125 1234 1190 1283">✓</td> <td data-bbox="1190 1234 1255 1283">✓</td> <td data-bbox="1255 1234 1320 1283">✓</td> <td data-bbox="1320 1234 1385 1283">✓</td> <td data-bbox="1385 1234 1458 1283">✓</td> </tr> <tr> <td data-bbox="451 1283 829 1331">(2) Examination</td> <td data-bbox="829 1283 995 1331">60</td> <td data-bbox="995 1283 1060 1331">✓</td> <td data-bbox="1060 1283 1125 1331">✓</td> <td data-bbox="1125 1283 1190 1331">✓</td> <td data-bbox="1190 1283 1255 1331">✓</td> <td data-bbox="1255 1283 1320 1331">✓</td> <td data-bbox="1320 1283 1385 1331">✓</td> <td data-bbox="1385 1283 1458 1331">✓</td> </tr> <tr> <td data-bbox="451 1331 829 1381">Total</td> <td data-bbox="829 1331 995 1381">100</td> <td colspan="7" data-bbox="995 1331 1458 1381"></td> </tr> </tbody> </table> <p><b>Continuous assessment:</b> The continuous assessment includes assignments, quizzes and test(s) which aim at checking the progress of students study throughout the course, assisting them in fulfilling the learning outcomes. Assignments in general include end-of-chapter problems, which are used to reinforce and assess the concepts and skills acquired by the students; and to let them know the level of understanding that they are expected to reach. At least one test would be administered during the course of the subject as a means of timely checking of learning progress by referring to the intended outcomes, and as means of checking how effective the students digest and consolidate the materials taught in the class.</p> <p><b>Examination:</b> This is a major assessment component of the subject. It would</p>									Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)							a	b	c	d	e	f	g	(1) Continuous assessment	40	✓	✓	✓	✓	✓	✓	✓	(2) Examination	60	✓	✓	✓	✓	✓	✓	✓	Total	100							
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	be a closed-book examination. Complicated formulas would be given to avoid rote memory, such that the emphasis of assessment would be put on testing the understanding, analysis and problem solving ability of the students.	
<b>Student Study Effort Expected</b>	Class contact:	
	▪ Lecture	33 Hrs.
	▪ Tutorial	6 Hrs.
	Other student study effort:	
	▪ Self-study	81 Hrs.
	Total student study effort	120 Hrs.
<b>Reading List and References</b>	<ul style="list-style-type: none"> <li>▪ John D. Cutnell &amp; Kenneth W. Johnson, <b>Introduction to Physics</b>, 9th edition, 2013, John Wiley &amp; Sons.</li> <li>▪ Hewitt, <b>Conceptual Physics</b>, 11th edition, 2010, Benjamin Cummings.</li> </ul>	