

## Subject Description Form

<b>Subject Code</b>	AP20013
<b>Subject Title</b>	Product Quality Control
<b>Credit Value</b>	3
<b>Level</b>	2
<b>Pre-requisite/ Co-requisite/ Exclusion</b>	Nil
<b>Objectives</b>	<p>(1) Provide students with an appreciation of quality assurance, quality control and reliability, and an understanding of some fundamental statistics techniques of assurance science.</p> <p>(2) Provides the fundamentals of materials science and engineering, in particular those related to product testing.</p> <p>(3) Provide knowledge on applications and selection of materials.</p>
<b>Intended Learning Outcomes</b>	<p>Upon completion of the subject, students will be able to:</p> <p>(a) differentiate between quality assurance, quality control and reliability;</p> <p>(b) use some of the established techniques in quality control in practical situations;</p> <p>(c) explain the importance of specifications and standards, interrelationship between quality and manufacturing and applications in materials science and instrumentation;</p> <p>(d) apply acceptance sampling by attributes, operating characteristics curves and ISO standard set attributes in sampling plans;</p> <p>(e) understand the basic concepts in materials science as well as material processing and their relations with material properties;</p> <p>(f) classify material types, have knowledge of their properties, and utilize them in product testing, with consideration of environmental issues; and</p> <p>(g) understand the failure of materials.</p>
<b>Subject Synopsis/ Indicative Syllabus</b>	<p><b>Overview of QC Applications in the Field of Applied Physics, Materials Science and Instrumentation:</b> Definition of quality related terms. Different interpretations of the term quality. Importance of specifications and standards such as ISO9000. Inter-relationship between quality, design, manufacturing, inspection, sales and field performance.</p> <p><b>Reliability:</b> Three stages of equipment life. Reliability of series and parallel systems. Life tests. General discussion on methods available for reliability improvement.</p> <p><b>Basic Mechanics and Mechanical Properties of Materials:</b> Basic mechanical concepts. Stress and Strain. Measurements of fracture, ductility, tensile and shear strength, yield strength.</p> <p><b>Availability, Application and Selection of Engineering Materials:</b> Evolution of engineering materials. Ferrous and non-ferrous alloys. Engineering plastics. Ceramics and composites. Properties of engineering materials and their applications. Materials selection criteria. Sources of material property data. Performance indices, materials selection charts, performance maximizing criteria.</p>

<b>Teaching/Learning Methodology</b>	<p><b>Lecture:</b> Background knowledge behind all experiments will be systematically introduced in lectures. Class work and assignments related to the content of lectures will be used to enhance students learning.</p> <p><b>Laboratory session:</b> Experiments are essential for students to relate the concepts to practical applications and they are exposed to hand-on experience and proper use of equipment and also analytical skills on interpreting experimental results.</p>																																																			
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	<table border="1" data-bbox="421 499 1469 808"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="7">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> <th>f</th> <th>g</th> </tr> </thead> <tbody> <tr> <td>(1) Continuous Assessment</td> <td>40</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>(2) Examination</td> <td>60</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>Total</td> <td>100</td> <td colspan="7"></td> </tr> </tbody> </table> <p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>Assignments will strengthen the students' basic knowledge and the analytical skills to solve the problems related to this subject. Practical Tests is useful to assess students' experimental skills and knowledge learned from the lectures and lab works. Examination will review their understanding of the course assess their ability to solve problems. Hence, the proposed assessment methods are necessary to assess the intended learning outcomes.</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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<b>Reading List and References</b>	<p>(1) M. F. Ashby, Materials Selection in Mechanical Design, (Pergamon Press, 1992).</p> <p>(2) J. Banks, Principles of Quality Control (John Wileys and Son, 1989).</p>																																																			