

# The Hong Kong Polytechnic University

## Subject Description Form

<b>Subject Code</b>	LGT5157
<b>Subject Title</b>	Six Sigma and Quality Management Techniques
<b>Credit Value</b>	3
<b>Level</b>	5
<b>Normal Duration</b>	One Semester
<b>Pre-requisite Exclusion</b>	Nil
<b>Role and Purposes</b>	<p>1 To provide students with a focused systematic approach of using Six Sigma and other operational and quality management techniques to meet the aims and objectives of total quality management;</p> <p>2 To develop students with ability in applying the Six Sigma techniques to define and analyse problems in improving quality at the workplace; and</p> <p>3 To develop students with ability to identify opportunities for improvement in the business, service, administrative and manufacturing environments of applying Six Sigma, Kaizen, and other continuous improvement methodologies.</p> <p>This subject contributes to the following Intended Learning Outcomes for the following programme(s):</p> <p>MSc in Management (Operations Management)</p> <p>#2: Develop the specific operations management knowledge</p>
<b>Subject Learning Outcomes</b>	<p>Upon completion of the subject, students will be able to:</p> <p>a. Apply Six Sigma and TQM techniques to tackle and analyse problems in improving quality with particular reference to their own working environment;</p> <p>b. Develop the ability to adopt new techniques and synthesise new knowledge;</p> <p>c. Analyse basic operational and research data using TQM techniques in a systematic way;</p> <p>d. Cooperate efficiently and effectively in a team to apply TQM techniques and tools for accomplishing pre-determined goals; and</p>

	<p>e. Identify opportunities for improvement in the business, service, administrative and manufacturing environments of applying the methodology such as Six Sigma, Kaizen, and other appropriate tools to achieve breakthrough improvements in these processes.</p>																																	
<p><b>Subject Synopsis/ Indicative Syllabus</b></p>	<p><u>Fundamental Concept</u></p> <p>Overview of Six Sigma, Kaizen, Introduction of DMAIC methodology, Voice of Customer, Cost of Quality Concept, Project Identification, Project Charter Writing, Organization of project team.</p> <p><u>Identification of Improvement Area and Baseline Measurement</u></p> <p>SIPOC and Process Mapping, Basic Statistics for Six Sigma, Data collection, Measurement system analysis, Process Capability Calculation, Statistical Process Control, Control Charts, Sigma Level Calculation</p> <p><u>Techniques for Analyzing the Current Situation</u></p> <p>Detailed process mapping, Value-added Analysis, Value Stream Mapping, Root Cause Verification, Muda Concept, Traditional Quality Tools</p> <p><u>Breakthrough Improvement</u></p> <p>Process Documentation, Process Control Plan, Approach to implement Six Sigma in an organization, Selected cases of application and implementation of Kaizen, Six Sigma, in various industries.</p>																																	
<p><b>Teaching/Learning Methodology</b></p>	<p>A systematic approach will be adopted in focusing the use of different quality management techniques, such as six sigma methodology, etc. in meeting the aims and objectives of total quality management, such as will both theoretical and practical aspects and students will be asked to use case studies developed specially for this subject aiming at integrating these two aspects with their own daily responsibilities. Students will be asked to present their evaluation and analysis of case studies and other related project assignments during seminars and presentation sessions.</p>																																	
<p><b>Assessment Methods in Alignment with Intended Learning Outcomes</b></p>	<table border="1"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="5">Intended subject 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> </tr> </thead> <tbody> <tr> <td><b>Continuous Assessment</b></td> <td><b>50%</b></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Group Assignments / Cases</td> <td>25%</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>Individual Assignments / Cases</td> <td>25%</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> </tbody> </table>	Specific assessment methods/tasks	% weighting	Intended subject outcomes to be assessed (Please tick as appropriate)					a	b	c	d	e	<b>Continuous Assessment</b>	<b>50%</b>						Group Assignments / Cases	25%	✓	✓	✓	✓	✓	Individual Assignments / Cases	25%	✓	✓	✓	✓	✓
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	<b>Final Examination</b>	<b>50%</b>	✓	✓	✓	✓	✓
	Total	100 %					
	<p><b>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</b> the various methods are designed to ensure that all students taking this subject will be able to deliver the above mentioned outcomes/ objectives. Specifically,</p> <ul style="list-style-type: none"> <li>• The individual assignments/cases are used to enable students to improve their abilities to achieve outcomes a through e with emphasis on outcomes a through c.</li> <li>• The group assignments/cases are used to enable students to improve their abilities to achieve outcomes a through e with emphasis on outcomes d through e.</li> <li>• Examination is used to test if students master the necessary concepts and methods including roadmaps in carrying out a quality improvement project in a typical business environment.</li> </ul> <p>Feedback is given to students immediately following their case/assignment presentations and all students are invited to join in this discussion.</p> <p><i>To pass this subject, students are required to obtain Grade D or above in BOTH the Continuous Assessment and Exam components.</i></p>						
<b>Student Study Effort Expected</b>	Class contact:						
	Lectures / tutorials	39 Hrs.					
	Other student study effort:						
	Preparing for lectures,	43 Hrs					
	Preparation group assignment / group projects and presentations	44 Hrs.					
	Total student study effort	126 Hrs.					

<p><b>Reading List and References</b></p>	<p>Lean Six Sigma and Minitab, QSB Consulting, (latest edition)</p> <p>Barney, M &amp; McCarty, T. (2003). <i>The new Six Sigma: A leader's guide to achieving rapid business improvement and sustainable results</i>, Upper Saddle River, N.J.: Prentice Hall PTR.</p> <p>Allen, T.T. (2006). <i>Introduction to engineering statistics and Six Sigma: Statistical quality control and design of experiment</i>, London: Springer.</p> <p>Taghizadegan, S. (2006). <i>Essentials of Lean Six Sigma</i>, Amsterdam: Elsevier.</p> <p>Tang, L.C. (2006). <i>Six Sigma: Advanced tools for black belts and master black belts</i>, Chichester, West Sussex, England ; Hoboken, NJ : John Wiley &amp; Sons.</p> <p>Goetsch, D.L. and Davis, S.B. (2006). <i>Introduction to TQM for production, processing and service</i>, 5<sup>th</sup> edition, Prentice-Hall.</p> <p>Ho, S.K.M. (editor) <i>Proceedings of the 14<sup>th</sup> International Conference on ISO9000 &amp; TQM, Taking ISO 9000 to a Higher Level Through Integration, Lean, and Six Sigma</i>, March 6-7 2006, Hong Kong; and previous issues.</p> <p><i>Case Studies of the Implementation of TQM in Textiles &amp; Clothing Industries (1992-1995)</i>, Institute of Textiles &amp; Clothing, The Hong Kong Polytechnic University</p> <p>Cohen, L. (1995). <i>Quality function deployment: How to make QFD work for you</i>, Engineering Process Improvement Series, Addison-Wesley.</p> <p>Kondo, Y. (1989). <i>Human motivation: A key factor for management</i>, 3A Corporation.</p> <p>Hirano, H. (1994). <i>Poka-yoke: Mistake-proofing for zero defects</i>, PHP Institute.</p> <p>Nayatani, Y. (1994). <i>The seven new QC tools: Practical applications for managers</i>, 3A Corporation.</p> <p>Cheng, T.C.E and Willborn, W.W.O. (1994). <i>Global management of quality assurance systems</i>, McGraw-Hill.</p> <p>UNSO, 1993, <i>Handbook of Industrial Statistics</i>, UNIDO.</p> <p>Kume, H. (1985). <i>Statistical methods for quality improvement</i>, AOTS.</p> <p>Mizuno, S. (1988). <i>Company-wide Total Quality Control</i>, Asian Productivity Organization.</p> <p>Ishikawa, K. (1984). <i>Quality control circles at work: Cases from Japan's manufacturing and service sectors</i>, Asian Productivity Organization.</p> <p>Oakland, J.S. (2003). <i>Total quality management</i>, Heinemann, 3<sup>rd</sup> ed.</p>
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