

<b>Full Title</b>	Six Sigma Green Belt Quality (Apprenticeship)		
<b>Status</b>	Uploaded to Banner	<b>Start Term</b>	2017
<b>NFQ Level</b>	07	<b>ECTS Credits</b>	05
<b>Module Code</b>	MANU07023	<b>Duration</b>	Stage - (26 Weeks)
<b>Grading Mode</b>		<b>Department</b>	Mechanical & Industrial Eng
<b>Module Author</b>	Patrick Delassus		
<b>Co Authors</b>	Carine Gachon, Paul ODowd		

### Module Description

An introduction to Six Sigma Green Belt, which will both explain the concepts and use the techniques of Six Sigma.

### Learning Outcomes

**On completion of this module the learner will/should be able to:**

1. Explain the Define, Measure, Analyse, Improve and Control steps in Six Sigma. Describe lean engineering and the origins of Six sigma.
2. Use 'Define' phase tools to decide on the process improvement of a Six Sigma project
3. Determine the current performance using a variety of 'Measure' tools
4. Use the 'Analyse' tools, including inferential statistics to determine the issues to be addressed.
5. Use the 'Improve' tools, to experiment and assess the process optimisation.
6. 'Control' the process to verify the variances are corrected, select appropriate statistical process control (SPC) techniques.

### Indicative Syllabus

**Overview:** Six Sigma and the Organization, Six sigma and organizational goals, Lean principles in the organization, Design for Six Sigma (DFSS) in the organization, Quality Function Deployment (QFD) and failure mode and effect analysis (FMEA).

**Six Sigma - Define:** Process Management for Projects Project management basics : Business results for projects

**Six Sigma - Measure:** Process analysis and documentation, Collecting and summarising data, Probability and statistics, Six Sigma Measure: Measurement system analysis, Process capability and performance

**Six Sigma - Analyse:** Exploratory data analysis, Hypothesis testing (z, t and p), inferential statistics and Analysis of variances (ANOVA)

**Six Sigma - Improve & Control :** implementing and validate solutions. Selection and application of Statistical process control (SPC)

### Teaching and Learning Strategy

During the GMIT block, the module requires 2 hours theory and 1 hour practical/laboratory work in a computer laboratory. In addition during the Industry block, the student will get support from the lecturer to consolidate his experiential learning and the use of six sigma for the industry project.

The teaching and learning strategy will include: direct-instruction strategy (including lecture, repeating an activity, review and feedback); activity-based strategy (including practice); cooperative strategy (including group work); ICT-based strategy (including the use of a virtual learning environment: Moodle, Minitab, Excel and specific software); independent learning strategy (including homework and independent study); thinking-skills strategy (including problem solving, graphing).

**Assessment Strategy**

Six Sigma Green Belt Quality is a "Type 3" apprenticeship module. It is 25% assessed during the Academic Block. Another 25% of the marks are for work done in the Industry Block. The Industry Block assessment is integrated with the Technical Project (which is about applying the Six Sigma DMAIC Methodology to solving a problem). A further 50% of the marks are for an "exam-format" assessment that takes place towards the end of the Industry Block.

This "exam-format" assessment, includes questions which are based on learning gained in the workplace. For example, questions may refer to learning gained through the Technical Project. Students are asked to refer to examples of theory, tools and techniques used in their own company.

The assessment strategy of this module will be a combination of:

- exam type assessments.
- Industry project

A mind term assessments will represent 30% of the module. They will then have an industry project for 20% to recognise the transfer of acquisition of competences to the workplace. Finally, they will have an exam at the end of the industry module worth 50%. This assessment will be at the end of the industry module (end of stage) to encompass the experiential learning acquired in the workplace.

**Repeat Assessment Strategies**

Students will be given the opportunity to take a repeat examination.

<b>Indicative Coursework and Continuous Assessment:</b>		<b>50 %</b>		
<b>Form</b>	<b>Title</b>	<b>Percent</b>	<b>Week (Indicative)</b>	<b>Learning Outcomes</b>
Assessment	Mid term Assessment	30 %	Week 7	1,4
Project	Industry project	20 %	OnGoing	1,2,3,4,5,6

<b>End of Semester / Year Formal Exam:</b>		<b>50 %</b>		
<b>Form</b>	<b>Title</b>	<b>Percent</b>	<b>Week (Indicative)</b>	<b>Learning Outcomes</b>
Closed Book Exam	Exam	50 %	End of Term	1,2,3,4,5,6

<b>Full Time Delivery Mode Average Weekly Workload:</b>			<b>3.05 Hours</b>		
<b>Type</b>	<b>Description</b>	<b>Location</b>	<b>Hours</b>	<b>Frequency</b>	<b>Weekly Avg</b>
Practical	Laboratory	Computer Laboratory	2	Weekly	2.00
Lecture	Lecture	Not Specified	1	Weekly	1.00
Supervision	Industry project support	Not Specified	0.05	Weekly	0.05

<b>Part Time Delivery Mode Average Weekly Workload:</b>			<b>1.50 Hours</b>		
<b>Type</b>	<b>Description</b>	<b>Location</b>	<b>Hours</b>	<b>Frequency</b>	<b>Weekly Avg</b>
Lecture	Lecture	Not Specified	0.5	Weekly	0.50
Practical	Practical	Computer Laboratory	1	Weekly	1.00

**Recommended Reading Book List**

Kubiak, TM., (2009). *The Certified Six Sigma Black Belt Handbook, Second Edition*. ASQ Quality Press.  
ISBN 0873897323 ISBN-13 9780873897327

Brook, Q., (2006). *Six Sigma and Minitab: A complete toolbox guide for all Six Sigma practitioners (2nd edition)*. QSB Consulting.  
ISBN 0954681320 ISBN-13 9780954681326

Gygi, C., (2005). *Six Sigma For Dummies*. For Dummies.  
ISBN 0764567985 ISBN-13 9780764567988

Brook, Q., (2004). *Six Sigma and MINITAB*. QSB Consulting Ltd.  
ISBN 0954681304 ISBN-13 9780954681302

Bass, I., (2007). *Six Sigma Statistics with EXCEL and MINITAB*. McGraw-Hill Education.

, R., (2008). *The Certified Six Sigma Green Belt Handbook, First Edition*. ASQ Quality Press.  
ISBN 087389698X ISBN-13 9780873896986

#### Online Resources

<http://asq.org/index.aspx>

#### Other Resources

Lecturers Moodle Page

#### Additional Information

None

#### Programme Membership

GA\_EMAJG\_B07 201900 Bachelor of Engineering in Manufacturing Engineering (Apprenticeship)

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