

Full Title	Statistics and Experimental Design		
Status	Uploaded to Banner	Start Term	2017
NFQ Level	08	ECTS Credits	10
Module Code	STAT08011	Duration	Stage - (26 Weeks)
Grading Mode		Department	Physical & Life Sciences
Module Author	Seamus Lennon		
Co Authors	Rachel McCarthy		

Module Description

This module will provide the student with the statistical tools necessary to analyse industry related data problems and plan, conduct and analyse data and experiments. The application of these tools will allow the student to perform Problem Solving activities and optimise products and processes using Six Sigma and other continuous improvement strategies.

Learning Outcomes

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

1. Identify and conduct the relevant statistical tests and analyses relevant to industry.
2. Select and apply the appropriate statistical methods and Six Sigma techniques to problem solving and process improvement quality improvement efforts.
3. Design and manage the execution of experiments to gather data.
4. Evaluate and interpret experimental data (with the use of a statistical package).
5. Explain how to set up and interpret a Design of Experiment (DOE)

Indicative Syllabus

Problem Solving and Process Improvement using DMAIC, Lean Manufacturing and other Continuous Improvement Techniques.
 Normality Testing.
 Data Analysis for industry with the use of the statistical software package, Minitab.
 Correlation, correlation coefficient (r).
 Linear Regression.
 Confidence Intervals, Tolerance Intervals - the application of Statistics in decision making, under uncertainty.
 Hypothesis testing.
 Sample size requirements.
 Steps in planning and conducting an experiment.
 Design of Experiments (DOE); factorial designs, blocking, replication.

Teaching and Learning Strategy

Teaching will be a blend of classroom based lectures, computer labs, case study examples from industry and peer assisted learning.

Assessment Strategy

A mixture of Continuous Assessment (CA) and Final Exam

Repeat Assessment Strategies

Repeat examination available.

Indicative Coursework and Continuous Assessment:		30 %		
Form	Title	Percent	Week (Indicative)	Learning Outcomes
Assignment	Computer based Assessment	15 %	Week 10	1,2
Assessment	Multiple Choice Assessment	15 %	Week 16	1,2,3

End of Semester / Year Formal Exam:		70 %		
Form	Title	Percent	Week (Indicative)	Learning Outcomes
Assessment	Final Exam	70 %	End of Term	1,2,3,4,5

Part Time Delivery Mode Average Weekly Workload:			2.00 Hours		
Type	Description	Location	Hours	Frequency	Weekly Avg
Lecture	Lecture	Not Specified	2	Weekly	2.00

Recommended Reading Book List

Brook, Q., (2014). *Lean Six Sigma and Minitab (4th Edition): The Complete Toolbox Guide for Business Improvement* OPEX Resources Ltd. ISBN 095468138X ISBN-13 9780954681388

Brewer, F., *Design of Experiments for Process Improvement and Quality Assurance (Engineers in Business Series)*. Inst of Industrial Engineers. ISBN 0898061652 ISBN-13 9780898061659

Reilly, J., (2006). *Using Statistics*. Gill & Macmillan Ltd. ISBN 0717140229 ISBN-13 9780717140220

Montgomery, C., (2012). *Design and Analysis of Experiments, 8th Edition*. Wiley.

, ., (2015). *The Certified Six Sigma Green Belt Handb.* ISBN 9332559392 ISBN-13 9789332559394

Dean, A., (2017). *Design and Analysis of Experiments (Springer Texts in Statistics)*. Springer. ISBN 3319522485 ISBN-13 9783319522487

Mitra, A., (2016). *Fundamentals of Quality Control and Improvement*. Wiley. ISBN 1118705149 ISBN-13 9781118705148

Barker, B., (2016). *Quality by Experimental Design, Fourth Edition*. Chapman and Hall/CRC.

Hooper, W., (2017). *Continuous Improvement, Probability, and Statistics: Using Creative Hands-On Techniques (Continuous Improvement Series)*. CRC Press.

Online Resources

ASQ.org
Minitab.com

Programme Membership

GA_SQUAG_H08 201700 Bachelor of Science (Honours) in Quality For Industry
GA_SQMDG_N08 201700 Certificate in Quality for the Medical Device Industry