UNIVERSITY of LIMERICK
OLLSCOIL LUIMNIGH

Specialist Diploma Six Sigma – Module Descriptions

Quality Science I

To introduce and use the Statistics appropriate for master black belt level Six Sigma. Delivery will include a practical application of software tools to undertake statistical analysis

Areas covered include:

- History and development of traditional quality control techniques; Statistical quality control, inspection and detection methods, Taguchi and the design of metrics
- Fundamental Statistics, Basic distribution theory, Graphs, histograms, location, spread, Box-plots.
- Statistical Process Control, Various types of control charts for both variable and attribute data.
- Basic Six Sigma Statistics, T-tests, Regression, Decision making under uncertainty, hypothesis testing and analysis of variance
- Introduction to Design of Experiments

Problem Solving Tools & Techniques

- Understand the principles of 6 Sigma and how they can be implemented in the manufacturing and service sectors to deliver strategic objectives.
- To develop and apply the tools and techniques of Quality Management and control
- To develop and apply the Taguchi method
- Appreciate how Six Sigma works as a structured long-term business improvement methodology towards relentless reduction in process variation.
- Discuss approaches to quality improvement problem solving and customer impact.
- Introduce some of the key Six Sigma tools used e.g. SPC, FMEA, DOE etc. – specifically in the non-manufacturing sector.
- Review approaches to Problem Identification and Problem Solving
- Introduce some of the other Problem Solving key tools used e.g. 8D, Root Cause Analysis Seven Quality Control Tools I, Seven Management Tools I, Taguchi Methods, QFD, Trizz, FMEA
- Introduce the use of suitable software
- Discuss the roles required for implementation (Executive Leadership, Master Black Belt, Black Belt, Green Belt)
- Implementation of continuous improvement techniques.

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Quality Science II

- To develop the statistical capability of students to master black belt level.
- To outline where in the DMAIC Cycle the tools are used.
- Advanced methods of Statistical Process Control, SPC for short run
- production, Cusum charts, multivari charts, individual/moving range charts.
- Advanced Six Sigma Statistics, Process capability indices - Cp, Cpk etc., R&R studies, machine capability.
- Design of Experiments Fractional and factorial designs, Taguchi methods, EVOP (evolutionary operation) experimentation.
- Multiple Regression, two way analysis of variance.
- Introduction to Reliability Theory.

Quality Science III / Advanced Statistics

- To gain a detailed understanding of the key features of experimental design from theory, through construction, to application.
- Use an appropriate software package (eg. Minitab) to design an experiment, analyse and interpret the resulting data
- Emphasis is on the understanding, interpretation and relevance of statistical analysis rather than on calculations
- Students will have sufficient statistical knowledge for the Six Sigma Master Black Belt level.