



MSc Lean Sigma Systems - Module Descriptions

AU5041 Lean Thinking & Lean Tools I

This module will explore the principles, tools and techniques of Lean Thinking. Areas covered include:

- The history of Lean Management
- Value Stream Mapping, waste elimination
- Workplace Organisation & Standard Work techniques
- Rapid Improvement Methodologies
- The role of the supply chain in Lean systems

MS5411 Quality Science 1

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

AU5051 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.

AU5011 Strategic Business and Operations Management

- To provide candidates from Manufacturing and Service Sectors (including healthcare) with an overview of the strategy process and of operations management from concept to deployment.
- To introduce candidates to the concepts, theories and techniques of strategic and operations management;
- To provide the skills and approach necessary to design, deploy and maintain effective strategic management and operations systems;
- To enable candidates to realistically evaluate strategic management and operations systems;
- To equip candidates to contribute effectively to the strategy process and operations function from a direct line or staff position.
- Understanding the progression, from identifying the strategic objectives to implementation and deployment.

AU5061 Organisation Behaviour & Development

- To provide candidates with an overview of the changing form, shape, pattern and purpose of contemporary organisational development, focusing on the contribution of best practice, HRM and Japanese management philosophies and the potential links to individual and organisational performance.
- To introduce students to the basic theoretical and empirical contributions of management theory and practice.
- To evaluate the range of internal and external factors shaping group dynamics, management choice and organisational development.
- To understand the human resource contribution to organisational effectiveness and culture management.
- To understand the dimensions of the psychological contract and its implications for organisational effectiveness.

AU5042 Lean Thinking & Lean Tools II

This module will expand the principles, tools and techniques introduced in module AU5041.

Areas covered include:

- Organisation Planning Approaches
- Process techniques to support Lean implementation
- Building quality into the manufacturing process
- Bringing the customer into the Lean organisation
- The extended Lean enterprise

MS5412 Quality Science 2

- 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.

AU5033 Leadership & Change Management

This module will examine the interventions available to organisations in managing change and innovation, and in particular the role of leadership. Areas covered include:

- Change management models and their application
- Organisational diagnosis and change management
- The leaders and their role in the organisation
- Stimulating and encouraging change

AU5031 Information Systems and Software Management

The objective of this module is:

- To consider the role of information technology in organisational development. The material covered here would include simulations, prototyping, product data management systems, workflow systems and case-based reasoning (CBR) at a strategic level.
- To consider how information technology might support the actual management of continuous improvement in a process/service life cycle. The material covered would include knowledge management systems, computer-mediated communication, intranets, groupware, and issues to do with knowledge creation, storage, transfer and reuse. At a strategic level.
- To consider how IT can support the development of the organisation.

Introduction to the information age, information planning, technology planning, networked organisation, information systems development, database systems, database management, managing information systems, and future challenges of information technology.

Organisations undertaking product development in the current climate are faced with a very complex challenge, namely that of trying to balance the reduced time-to-market with the need for increased productivity and improved co-ordination across development teams that will often be geographically distributed. Given the knowledge-intensive nature of product development, information technology can play a significant role in helping to cope with this challenge. The conflict between improvement programmes such as Lean/Six Sigma and IT Systems such as ERP and MRP.

AU5091 Lean Sigma Project Management and Finance

This module will examine the various processes involved in managing lean projects, from their initiation and planning, to implementation and closure. It will focus on the financial elements of managing a lean project. Areas covered include:

- The relationship between project portfolio management and organizational strategy
- Concepts for developing, tracking and controlling the key constraints within which a project operates
- Sources of project finance and the cost of raising finance to support projects
- The application of investment appraisal techniques to a lean project
- The application of performance measurement techniques such as key performance indicators to lean projects
- The monitoring and control of lean projects using earned value management techniques

AU5003/AU5004 In-Company Master Black Belt Thesis

The project is company based and will require the application of the concepts covered in the course. It will involve a written report and oral presentation and must involve Significant benefit to the company which must be verified by the company. The Student, Supervisor and Company will agree the success metric for the project as part of the topic selection process.

Examples of success metrics could include:

- the improvement of a specified performance indicator by an agreed amount.
- the quantifiable addition of value to process or service which was the focus of the project.
- a cost saving of the order of €100,000 which must be verified by the company, or in the case of a Small to Medium Enterprises, (SMEs, <250 employees), project savings must amount to 0.3% of annual turnover.

An example could be a plant relay out that could result in cost savings through inventory reduction to the value of €100,000, or an increase in machine efficiency by 5%, or a reduction process cycle time by 10%.

This project will need to result in a significant benefit to the company and will need to be validated by the financial controller or other appropriate company representative.