

Master Course Syllabus

Department: Engineering Technology **Course Prefix/Number:** MQL 525

Official Course Title: Six Sigma and Design of Experiments

Master Syllabus Approved by Department on: 10/27/2005

I. Catalog Description: Introduction to design and analysis of experiments. Applications in product and process design and development; process correction and quality Improvement. Taguchi's loss-function approach to quality. Strategies for reliable data acquisition and validation will be addressed.

II. Prerequisites: MQL 586, MQL 524.

III. Expanded Course Description:

The objective of this course is to introduce experimental design techniques. Students will be familiar with all of the best design techniques and study the objectives, similarities, differences, advantages, and disadvantages of each. Classical techniques of Fisher, Box, Deming, Shewhart, and Crosby will be blended with more modern techniques of Taguchi, Ishikawa and Shingo. Students will be able to set up designs, conduct simple analysis, setup and analyze robust design, and learn how to recover from experiments that do not confirm.

IV. Knowledge Outcomes:

- The student will define Six Sigma program methods and philosophy
- The student will define the roles of Six Sigma teams (green and black belts)
- Apply principles of Six Sigma: Kano method, QFD, data collection
- Analysis of Six Sigma organizational performance goals and metrics
- Apply Six Sigma principles of measurement: scales, data reliability, repeatability and reproducibility
- Utilize basic Six Sigma methods: problem-solving tools including process mapping, pareto analysis, cause and effect diagrams, flow charts, scatter plots and data analysis
- Demonstrate knowledge through a comprehensive case studies
- Analysis of enumerative statistical methods including expected value, significance, confidence levels, hypothesis testing, errors, process capability, control chart utilization, EWMA charts
- Construct a design of experiments using factorial analysis and intro to ANOVA, reliability analysis methods, risk and quality assessments

V. Unless otherwise stipulated in this master syllabus by the department, the following items are subject to faculty discretion as described in each faculty member's individual course outline/syllabus:

- a) Course Requirements? (grading/evaluation procedures; class attendance policy; term papers, projects, field assignments; examinations; class participation, etc.)

b) Required Text(s)?

b) Bibliography?

Department Head Signature/Date:

Signature

____/____/_____
Date