Department of Mechanical and Industrial Engineering  
University of Toronto  
MIE 1727F: Statistical Methods in Quality Assurance

Instructor: Prof. V. Makis, MC223, e-mail: makis@mie.utoronto.ca


Course Website: http://portal.utoronto.ca/

Recommended Texts:  

Lectures: Friday, 5:10-8pm

Course Overview: 
Awareness of the importance of quality has increased dramatically. Understanding and improving quality is a key factor leading to company’s success and its enhanced competitive position. The course focuses on the following topics in Quality Assurance: Introduction to quality engineering, TQM, costs of quality, quality and productivity, statistical process control, process capability analysis and supplier-producer relations, quality standards and certification, six sigma philosophy and methodology, quality/process improvement using designed experiments, and an overview of acceptance sampling.

Grading:  
2 Assignments 20% each  
1 Project 20%  
Final exam 40%, closed book.

Two aid sheets of size A4 will be permitted for the final exam written on both sides. Only non-programmable calculators will be permitted for the final exam.

Lecture handouts and tutorials with solutions can be found on the course website.
<table>
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<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Basic concepts in quality engineering. Definitions of quality. Loss functions and Taguchi’s approach to quality improvement. TQM. Costs of quality. Quality and productivity. The three stages in quality assurance.</td>
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<tr>
<td>3-4</td>
<td>Introduction to statistical process control. The seven basic SPC problem-solving tools. Control charts for variables. The $\bar{X}$ chart with known parameters. The OC function. The run length distribution, average run length and the average time to signal. Design of the chart. Analysis of patterns and the zone rules. Controlling manufacturing processes exhibiting trends. Recent research and development in SPC.</td>
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<td>5-6</td>
<td>Control charts for variables-parameters unknown. $\bar{X}$ and R charts. $\bar{X}$ and S charts. Fixed and variable sample size. Control charts for individual measurements - I and MR charts. Three sigma and probability limits.</td>
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<tr>
<td>8-9</td>
<td>EWMA control chart. One and two-sided CUSUM charts based on sequential probability ratio test. Tabular CUSUM and V-mask. FIR CUSUM. Design of the chart.</td>
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Individual Course Project

The Project may be an in-depth analysis of a published case study or a research paper in the quality assurance area, or application of knowledge to a particular problem.

The report will be typed (10-15 pages), and will contain:

a) Introduction
b) Body
c) Conclusion
d) References

The project reports will be collected at the final exam.