Registrar 2/13

Quality Control and Six Sigma

**Description:** This course covers various statistical and managerial methods for variation modeling and quality improvement. Specifically, it focuses on Six Sigma’s DMAIC methodology, which includes a variety of tools and techniques including statistical process control, measurement system analysis, sampling, design of experiments, hypothesis testing, etc.

**Class Text:** “The Certified Six Sigma Black Belt Handbook,” Second Edition, by T.M. Kubiak and Donald W. Benbow

**Learning Outcomes:**

Students will

* Be able to join Six Sigma teams and work on quality improvement projects using DMAIC methodology;
* Learn managerial as well as analytical aspects of quality improvement methodologies and Six Sigma;
* Understand how, when and in what order to use statistical tools for effective implementation of Six Sigma;
* Understand how to validate and assess the capability of a measurement system;
* Develop skills in process monitoring as well as in design and analyze of factorial experiments.

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| **Topics** | 1. Quality Improvement and Six Sigma  * Quality definition and modeling * Quality improvement approaches * Define, Measure, Analyze, Improve, Control (DMAIC) methodology |
|  | 1. Define  * Voice of customer (VOC) * Project charter * Business case |
|  | 1. Measure  * SIPOC diagram * Type of data and measurement scales * Data collection plan * Measurement system analysis and Gage R&R * Descriptive statistics and probability distributions * Process capability analysis |
|  | 1. Analyze  * Correlation and regression analysis * Point and interval estimation * Hypothesis testing   + Z-test, t-test, goodness of fit tests, nonparametric tests   + Sample size determination * ANOVA and MANOVA * FMEA |
|  | 1. Improve  * Design of experiments   + Factorial design   + Fractional factorial design   + Response surface methodology * Cycle-time reduction and waste elimination * Risk analysis * Implementation |
|  | 1. Control  * Control charts   + Variable control charts: Xbar-R, Xbar-S, X-MR   + Attribute control charts: p, np, c, u   + Advanced control charts: EWMA, CUSUM * Control charts interpretation and trend analysis * Control Plan * Documentation |

**Grading Policy:**

Homework and Mini Project 30%

Exam 1 35%

Exam 2 35%

**Grading scheme:**

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| **Grade** | **Range** |
| A | 90% to 100% |
| B | 80% to 90% |
| C | 70% to 80% |
| D | 60% to 70% |
| F | Below 60% |

**Learning Accommodations:**

If needed, we will make accommodations for students with documented disabilities. These accommodations must be arranged in advance and in accordance with the ADAPTS office (http://www.adapts.gatech.edu).

**Academic Honor Code:**

*All course participants (instructor, teaching assistants, and students) are expected and required to abide by the Georgia Tech Honor Code. Please familiarize yourself with the code, and use it to guide your conduct. Specifically, you must do your own work in all homeworks and exams.*

For any questions involving these or any other Academic Honor Code issues, please visit [www.honor.gatech.edu.](http://www.honor.gatech.edu)