DEPARTMENT OF INDUSTRIAL AND SYSTEMS ENGINEERING

ISEN 314: STATISTICAL CONTROL OF QUALITY

REQUIRED or ELECTIVE: Required Course

CATALOG DESCRIPTION (2-3) Credit 3

Quality control with statistical principles applied to problems in various production systems, including probability concepts, density and distribution functions, control chart concepts and sampling inspection plans; laboratory exercises for exposure to basic metrology and applied statistics for quality control applications in discrete-item manufacturing systems.

PREREQUISITES

STAT 212

PROFESSIONAL COMPONENT

This course provides fundamental concepts, theory, and procedures for the study of statistical quality control (QC) of production processes and product realization. Analytical procedures are developed to enhance the decision-making process in the design, improvement, and evaluation of QC techniques. The knowledge learned in this course will be practiced through ten lab lessons targeting quality control applications in discrete-item manufacturing systems. This course is the first QC related course that demonstrates how modern statistical technology will be applied to production and quality control. Together with ISEN 414, the QC curriculum covers two pillar technologies in every Six Sigma training problem – ISEN 314 for Statistical Process Control and ISEN 414 for Response Surface Methodology.

COURSE LEARNING OUTCOMES

At the end of the course, students should

- learn formulations, models, and analytical procedures for the study of quality control;
- learn fundamental principles of statistical quality control techniques;
- be able to implement the quality engineering tools in industrial applications; and
- improve team working skills and data-collecting capability.

TEXTBOOK

Introduction to Statistical Quality Control, 6^{th} Edition, Douglas C. Montgomery, Prentice-Hall, Inc., 2005.

TOPICS COVERED

1. Concept of quality and quality control
2. Probability distribution and histogram
3. Inference about process quality
4. Type-I error (α-error) and type II error (β-error)
5. Design of control chart

6. Average run length for chart performance
7. Control charts for variables
8. Control charts for attributes
9. Control charts with memory

CLASS AND LAB SCHEDULE

One hundred minutes of lectures per week at two days a week for 50 minutes per day. Laboratory meetings are 150 minutes per week.

CONTRIBUTION TO MEETING REQUIREMENTS OF CRITERION 5:

Subject	Semester hrs	Subject	Semester hrs	Subject	Semester hrs
Mathematics		Engineering Science	2	General	
Basic Science		Engineering Design	1		

RELATIONSHIP OF COURSE TO PROGRAM OUTCOMES:

A. An ability to apply knowledge of mathematics, science, and engineering.
B. An ability to design and conduct experiments as well as to analyze and interpret data.
C. Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
D. An ability to function on multi-disciplinary teams.
E. An ability to identify, formulate, and solve engineering problems.
K. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

PREPARED BY: Yu Ding **Date** March 4, 2010