OFFICIAL SYLLABUS

STAT 588 – Advanced Quality Control

(Adopted Fall 2010: Committee Rigdon, Neath)

Catalog Description: Concepts of quality, models for production processes, analysis and application of control charts, acceptance sampling. Prerequisite: STAT 480a,b or consent of instructor.

Textbook: *Introduction to Statistical Quality Control*, 6th Ed., by Douglas C. Montgomery, Wiley: New York

Course Outline and Topics:

Chapter 6 Control Charts for Variables

- 6.1 Introduction
- 6.2 Control Charts for $\overline{x}$ and R charts
- 6.3 Control Charts for $\overline{x}$ and S charts
- 6.4 Shewhart Chart for Individual Measurements
- 6.5 Summary
- 6.6 Applications of Variables Control Charts

Chapter 7 Control Charts for Attributes

- 7.1 Introduction
- 7.2 Control Chart for Fraction Nonconforming
- 7.3 Control Chart for Nonconformities (Defects)
- 7.4 Choice Between Attributes and Variables
- 7.5 Guidelines for Implementing Charts

Chapter 8 Process and Measurement System Capability Analysis

- 8.1 Introduction
- 8.2 Process Capability Using a Histogram or Probability Plot
- 8.3 Process Capability Ratios
- 8.4 Process Capability Analysis Using a Control Chart
- 8.5 Process Capability Analysis Using Designed Experiments
- 8.6 Process Capability with Attribute Data
- 8.7 Gauge and Measurement System Capability Studies
- 8.8 Setting Specification Limits on Discrete Components*
- 8.9 Estimating the Natural Tolerance Limits of a Process*

Chapter 9 CUSUM and EWMA Control Charts

- 9.1 The CUSUM Chart
- 9.2 The EWMA Chart
- 9.3 The Moving Average Chart

Chapter 11 Multivariate Process Monitoring and Control

- 11.1 The Multivariate Quality-Control Problem
- 11.2 Description of Multivariate Data
- 11.3 The Hotelling T^2 Chart
- 11.4 The Multivariate EWMA Chart
- 11.5 Regression Adjustment
- 11.6 Control Charts for Monitoring Variability*
- 11.7 Latent Structure Methods (Principal Components and Partial Least Squares)*

Chapter 12 Engineering Process Control and SPC

- 12.1 Process Monitoring and Process Regulation
- 12.2 Process Control Feedback Adjustment*
- 12.3 Combining SPC and EPC*

Chapter 13 Factorial and Fractional Factorial Experiments for Process Design and Improvement

- 13.1 What is Experimental Design
- 13.2 Examples of Designed Experiments in Process and Product Improvement
- 13.3 Guidelines for Designing Experiments
- 13.4 Factorial Experiments*
- 13.5 The 2^k Factorial Designs*
- 13.6 Fractional Factorial Replication of the 2^k Designs*

Chapter 15 Lot-by-Lot Acceptance Sampling for Attributes

- 15.1 The Acceptance Sampling Problem
- 15.2 Single-sampling Plans for Attributes
- 15.3 Double, Multiple, and Sequential Sampling*

Any instructor should cover all of the material specified, except the starred chapters (also in gray font) which are optional.