



**Faculty of Engineering – Assiut University**  
**Bachelor Degree**

**Mechanical Design and Production Engineering**  
**Program**

Dept. of Mechanical Engineering

**Course specification**

**Quality Control Systems MR 424**

**1. Course Aim**

<b>Main Aim</b>	To teach students the meaning of quality and quality improvement and to provide students with the ability of applying statistical methods for quality control and improvement and dealing with management aspects of quality improvement.
<b>Sub-Aims</b>	The student must has the ability to understand: <ul style="list-style-type: none"><li>• Dimensions of quality</li><li>• Quality engineering terminology</li><li>• Quality philosophy and management strategies</li><li>• The link between quality and productivity</li><li>• Quality costs</li><li>• Legal aspects of quality</li><li>• Implementing quality improvement.</li></ul>

**2. Course Content**

The Meaning of Quality and Quality Improvement - A Brief History of Quality Control and Improvement - Statistical Methods for Quality Control and Improvement - Quality Philosophy and Management Strategies - Describing Variation - Important Discrete Distributions - Important Continuous Distributions - Probability Plots - Some Useful Approximations - Statistics and Sampling Distributions - Point Estimation of Process Parameters - Statistical Inference for a Single Sample - Statistical Inference for Two Samples - What if There are More than Two Populations? - Chance and Assignable Causes of Quality Variation - Statistical Basis of the Control Chart - The Rest of the "Magnificent Seven" - Implementing SPC - An Application of SPC - Manufacturing Applications of Statistical Process Control - Control Charts for  $\bar{x}$  and  $R$  - Control Charts for  $\bar{x}$  and  $s$  - The Shewhart Control Chart for Individual Measurements - Summary of Procedures for  $\bar{x}$ ,  $R$ , and  $s$  Charts - Applications of Variables Control Charts - The Control

Chart for Fraction Nonconforming - Control Charts for Nonconformities (Defects) - Choice Between Attributes and Variables Control Charts - Guidelines for Implementing Control Charts (Reference: Faculty bylaw 2004 – program specification)

<b>3. Course Topics</b>		
<b>Topic No.</b>	<b>Topic Items</b>	<b>No. of weeks</b>
<b>1<sup>st</sup> topic</b>	<b>1. QUALITY IMPROVEMENT IN THE MODERN BUSINESS ENVIRONMENT</b> 1.1 The Meaning of Quality and Quality Improvement 1.2 A Brief History of Quality Control and Improvement 1.3 Statistical Methods for Quality Control and Improvement 1.4 Quality Philosophy and Management Strategies	<b>1</b>
<b>2<sup>nd</sup> topic</b>	<b>2. MODELING PROCESS QUALITY</b> 2.1 Describing Variation 2.2 Important Discrete Distributions 2.3 Important Continuous Distributions 2.4 Probability Plots 2.5 Some Useful Approximations	<b>2</b>
<b>3<sup>rd</sup> topic</b>	<b>3. INFERENCES ABOUT PROCESS QUALITY</b> 3.1 Statistics and Sampling Distributions 3.2 Point Estimation of Process Parameters 3.3 Statistical Inference for a Single Sample 3.4 Statistical Inference for Two Samples 3.5 What if There are More than Two Populations?	<b>3</b>
<b>4<sup>th</sup> topic</b>	<b>4. METHODS AND PHILOSOPHY OF STATISTICAL PROCESS CONTROL</b> 4.1 Introduction 4.2 Chance and Assignable Causes of Quality Variation 4.3 Statistical Basis of the Control Chart 4.4 The Rest of the "Magnificent Seven" 4.5 Implementing SPC 4.6 An Application of SPC 4.7 Manufacturing Applications of Statistical Process Control	<b>3</b>
<b>Topic No.</b>	<b>Topic Items</b>	<b>No. of weeks</b>
<b>5<sup>th</sup> topic</b>	<b>5. CONTROL CHARTS FOR VARIABLES</b> 5.1 Introduction 5.2 Control Charts for $\bar{x}$ and R 5.3 Control Charts for $\bar{x}$ and s	<b>3</b>

	5.4 The Shewhart Control Chart for Individual Measurements 5.5 Summary of Procedures for x, R, and s Charts 5.6 Applications of Variables Control Charts	
<b>6th topic</b>	<b>6. CONTROL CHARTS FOR ATTRIBUTES</b> 6.1 Introduction 6.2 The Control Chart for Fraction Nonconforming 6.3 Control Charts for Nonconformities (Defects) 6.4 Choice Between Attributes and Variables Control Charts 6.5 Guidelines for Implementing Control Charts	2

#### 4. Grades Distribution

Assesment Methods		Percentage	
<b>Final Exam</b>		66.667% من النهائية العظمى (بحسب اللائحة)	
<b>Year work grades</b>	<b>Written Exam</b>	<b>40%</b>	33.333% من النهائية العظمى (بحسب اللائحة)
	<b>Tutorial assessment</b>	<b>10%</b>	
	<b>Report assessment</b>	<b>10%</b>	
	<b>Quiz assessment</b>	<b>10%</b>	
	<b>Presentation assessment</b>	<b>20%</b>	
	<b>Discussion</b>	<b>10%</b>	
<b>Total</b>		<b>100%</b>	

#### 5. List of References

Course notes	
Required books	
Recommended books	Introduction to Statistical Quality Control, Fifth Edition By Douglas C. Montgomery (2005) by John Wiley & Sons Inc.
Periodicals, web sites.. etc.	