

# Industrial and Entrepreneurial Engineering and Engineering Management

## EM 5080 Advanced Quality Management

### Prerequisite course

IEE 2620 or EDMM 3280 or IEE 5010 or equivalent

### Course Description

Overview of topics relating to managing quality across an organization. Topics to be covered include: history of quality, quality philosophies, quality implementation strategies, and quality cost modeling. This course will also focus heavily on the use of statistics and analytics in decision making for quality. These topics will cover acceptance sampling, control charting, capability studies, design, and reliability.

### Textbook

Evans, J. and Lindsay, W., *Managing for Quality and Performance Excellence..*

### Course Learning Objectives

- Understand the importance of quality; from the process, system, and enterprise levels
- Identify opportunities for quality improvement and implement strategic planning
- Implement a myriad of quality tools
- Analyze the performance of quality tools with respect to quality system design

### Course Grading

*Participation (20%):* The success of this course will rely heavily upon student involvements in discussions. Each week there will be several discussion topics covered. It is expected that all students participate in these discussions. In addition, each discussion topic will be led by a student(s). This involves but is not limited to: presenting an overview of the material, posing questions to the class regarding the topic, bringing outside material for furthering the discussion, etc.

*Homeworks (30%):* Each homework problem will be graded on a five-point scale, where one point is reserved for Neatness, Legibility, and Professionalism. Homeworks will be due one week from assigned date. Please see Course Policies for additional information.

*Exams (50%):* One mid-term and one final take home exam will be given during the semester. Each student's highest scoring exam will be worth 30% of their final grade, while their lowest scoring exam will be worth 20% of their final grade.

### Grading Scale

<b>A</b>	<b>90 - 100</b>	<b>C</b>	<b>70 - 74.9</b>
<b>BA</b>	<b>85 - 89.9</b>	<b>DC</b>	<b>65 - 69.9</b>
<b>B</b>	<b>80 - 84.9</b>	<b>D</b>	<b>60 - 64.9</b>
<b>CB</b>	<b>75 - 79.9</b>	<b>E</b>	<b>&lt; 60</b>

The final grade for each student may be determined based upon both the student's score and its relationship to the class distribution.

### Course Policies

*Homework* is assigned as individual work. Students are allowed to discuss homework with their classmates; however, each student must submit his/her own work. You can talk about the assignment but you cannot share the solution or results. Homework assignments must be submitted in class, at the start of class, and in hardcopy form, unless prior arrangements have been made with course instructor.

*Neatness, Legibility, and Professionalism in Submitted Work:* The ability to express ideas in a well-ordered, clear, and concise manner, and to present material in a highly-legible format, is of paramount importance in the engineering profession. Marks will be deducted if professionalism is lacking, e.g., homework is not identified, questions are answered out-of-order, papers are not stapled (single staple, upper left-hand corner) or stapled out-of-order, units are not specified, etc.

*Academic Honesty:* You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate and Graduate Catalog that pertain to Academic Integrity or on the web at <http://www.wmich.edu/conduct/academichonesty>. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Conduct. You will be given the opportunity to review the charge(s). If you believe you are not responsible, you will have the opportunity for a hearing. You should consult with me if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test. Penalty for academic dishonesty will range from a reduction in grade up to failure in the course.

*Re-Grades:* Requests for re-grades of tests and homework assignments must be submitted to the course instructor, in writing, within one week of the date the work was returned to the student. The instructor reserves the right to re-grade any other section of the work as deemed appropriate. Adjusted scores following shall be considered final.

*Phones and Laptops* – Cell phones must not be used during the class; otherwise, you will be asked to leave the classroom. Laptops must be turned off unless used to take notes.

### Tentative Course Schedule

Week	Principles of Quality Topic	Quality Tools and Techniques Topic
1	Introduction, Quality Defined, & History of Quality	Acceptance Sampling (Lot-by-Lot)
2	Deming, Crosby, and Juran	Acceptance Sampling (Continuous & Variables)
3	Total Quality Management and Total Quality	Gage Capability

4	Quality Cost Models	Control Charts (Discrete & Shewhart)
5	Quality Function Deployment	Control Charts (CUSUM & EWMA)
6	Continuous Improvement Strategies	Control Charts (Multivariate)
<b>Take Home Exam</b>		
7	Baldrige Framework	Control Charts (Profile)
8	Six Sigma	Control Charts (Advanced Topics)
9	ISO 9000	Process Capability
10	Lean Manufacturing	Taguchi Experiments
11	Strategic Planning	Axiomatic Design
12	Performance Measurement	Reliability
<b>Take Home Exam</b>		

### Student Led Discussion Topics

#### Week 2

1. Process Focus (pgs. 205 - 207); Quality Profiles: Honeywell Federal Manufacturing & Technologies and Boeing Aerospace Support (pg. 207); and Process Management (pgs. 208 - 209)
2. Identifying Processes and Requirements (pgs. 209 - 213)

#### Week 3

1. Process Design (pgs. 213 - 221)
2. Process Control (pgs. 221 - 226)

#### Week 4

1. Process Improvement (pgs. 226 - 234)
2. Managing Supply Chain Processes (pgs. 234 - 236); Quality in Practice: K&N Management, Inc. (pgs. 236 - 238); and Quality in Practice: Building Japanese Quality in North America (pgs. 239 - 240)

### Week 5

1. Customer Focus (pgs. 95 - 96); Quality Profiles: Park Place Lexus and K&N Management (pg. 97); and Customer Satisfaction and Engagement (pgs. 98 - 100)
2. Identifying Customers (pgs. 100 - 102); Understanding Customer Needs (pgs. 102 - 110); and Linking Customer Needs to Design, Production, and Service Delivery (pgs. 111 - 113)

### Week 6

1. Building a Customer-Focused Organization (pgs. 113 - 118) and Managing Customer Relationships (pgs. 119 - 120)
2. Measuring Customer Satisfaction and Engagement (pgs. 120 - 131)

### Week 7

1. Quality in Practice: Harley-Davidson (pgs. 131 - 133) and Quality in Practice: Unique Online Furniture, Inc. (pgs. 133 - 136)
2. Workforce Focus (pgs. 151 - 152) and Quality Profiles: Veterans Affairs Cooperative Studies Program Clinical Research Pharmacy Coordinating Center and PRO-TEC Coating Company (pgs. 153 - 154)

### Week 8

1. The Evolution of Workforce Management (pgs. 154 - 155) and High Performance Work Culture (pgs. 155 - 158)
2. Principles of Workforce Engagement and Motivation (pgs. 158 - 164)

### Week 9

1. Designing High-Performance Work Systems (pgs. 164 - 184)

### Week 10

1. Assessing Workforce Effectiveness, Satisfaction, and Engagement (pgs. 184 - 186) and Sustaining High-Performance Work Systems (pgs. 187 - 189)
2. Quality in Practice: Training for Improving Service Quality at Honda (pgs. 189 - 192) and Quality in Practice: Improving Employee Retention Through Six Sigma (pgs. 192 - 194)

### Week 11

1. Leadership for Performance Excellence (pgs. 635 - 636); Quality Profiles: The Studer Group and Saint Luke's Hospital of Kansas City (pgs. 636 - 637); and Leadership Competencies and Practices (pgs. 637 - 642)
2. Leadership Theory and Practice (pgs. 643 - 648) and Leadership, Governance, and Societal Responsibilities (pgs. 649 - 653)

### Week 12

1. Quality in Practice: Leadership at Advocate Good Samaritan Hospital (pgs. 653 - 655) and Quality in Practice: Leadership Changes at Alcoa (pgs. 656 - 658)