Institute of Information Management/
Department of Industrial and Information Management - Graduate Program

R389000
Quality Engineering
（品質工程）
Spring 2011

The mission of the Department of Industrial and Information Management is to Cultivate quality professionals with enthusiasm and global perspectives.

General Program Learning Goals (goals covered by this course are indicated):

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<tr>
<td>✓</td>
<td>1 Graduates should be able to communicate effectively verbally and in writing.</td>
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<td>2 Graduates should solve strategic problems with a creative and innovative approach.</td>
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<td>3 Graduates should demonstrate leadership skills demanded of a person in authority.</td>
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<td>4 Graduates should possess a global economic and management perspective.</td>
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<td>5 Graduates should possess the necessary skills and values demanded of a true professional.</td>
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Instructor: Yu-Ching Chang, PhD

Office: IIM 61329  
Office hours: Wednesday 12:00-15:00 or by appointment
Tel: 06-2757575#53132  
E-mail: ychang@mail.ncku.edu.tw

Prerequisites: Statistics I & II

Lecture hours: Monday 14:10-15:00, Wednesday 15:10-17:00
Software lab hours: scheduled on Wednesday 16:10-17:00 and announced in advance
Location: 61202

Course website: http://myweb.ncku.edu.tw/~ycchang/QE

Course Description:
Quality engineering studies statistical and quantitative methods to improve quality. This course focuses on Taguchi’s Quality Engineering. We will start with Taguchi’s concepts and then move into the design of experiments (DOE), on which the Taguchi’s methods are built. ANOVA and factorial designs will be covered in the process. Then we will revisit Taguchi’s methods and give a detailed review of Taguchi’s methods and critiques to the methods. Response surface method and its application to process optimization, as well as robust parameter design, will be covered later. If time permits, we will introduce some non-DOE topics, such as control charts or process capability.
Textbook: DeVor, Chang, Sutherland (2007), Statistical Quality Design and Control, 2nd edition, Prentice Hall (華泰代理)

Reference:
- Montgomery (2008), Introduction to Statistical Quality Control, 6th edition, Wiley

Grading Policy:
- Homework assignments: 15%
- Midterm: 30%
- Final exam: 30%
- Group project: 20%
- Class participation: 5%

Grading Policy for AACSB Multiple Assessment:

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<th>HW 15%</th>
<th>Midterm 30%</th>
<th>Final 30%</th>
<th>Project 20%</th>
<th>Participation 5%</th>
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<td>✔ Oral Commu./ Presentation</td>
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<td>✔ Written Communication</td>
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<td>CPSI</td>
<td>✔ Creativity and Innovation</td>
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<td>✔ Problem Solving</td>
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<td>✔ Analytical Skills</td>
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<td>□ Social responsibility</td>
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<td>✔ Values, Skills &amp; Profess.</td>
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<td>✔ Management Skills</td>
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Homeworks:
There will be 3 assignments. You are encouraged to discuss the work with your classmates, but you MUST write up your own submission individually. Late assignments receive a 20% penalty. No late homework will be accepted after 24 hours. Homework solutions will be posted on the course website next day when it is due. You may submit your homework electronically (in Words or PDF format) to instructor’s email box, but you will get less feedback due to the difficulty in making comments.
Exams:
For both midterm and final, exams will be similar to homework assignments, plus some short-answer and multiple-choice questions. The exams are closed book, but you are allowed to prepare an A4 sheet, on which you can write anything you think might be useful. The A4 sheet must be handwritten with your name signed on it. Your A4 sheet has to be stapled to your answer sheets after the exam and to be turned in altogether.

Group project:
We will start group projects after the midterm. Groups are formed by the instructor and each group has about 3 students. The group project is about parameter design and process optimization. You have to choose your research question and set up your parameters. Two weeks after groups are formed, each team must submit a research proposal, on which briefly describe your research question and parameters (no more than 2 pages). Students are required to present their projects during the last week of classes. Presentations should last at least 10 minutes and no longer than 12 minutes. The grade of the group project is based on your presentation (50%) and written report (50%). The maximum page of your report is 20 pages.

Tentative Course Schedule:
W1: Introduction to Quality engineering and Taguchi methods
W2: Statistics review: probability/sampling distributions, hypothesis testing
W3: Simple comparative experiments, analysis of one-factor experiments
W4: 2^k factorial experiments (Homework 1)
W5: Two-level factorial designs
W6: Two-level fractional factorial designs
W7: Model building for design and improvement
W8: Taguchi’s methods I (Homework 2)
W9: Midterm Exam
W10: Taguchi’s methods II
W11: Taguchi’s methods III, critique to Taguchi’s methods (Research proposal due)
W12: Sequential and iterative experiments
W13: Linear regression
W14: Response surface method
W15: Response surface method and response optimization (Homework 3)
W16: Robust parameter design
W17: Project presentations
W18: Final Exam