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

R389000
Quality Engineering
(品質工程)(英文授課)

Spring 2013

1. **This mission of the College** is to serve business and society in the global economy through developing professionally qualified and socially responsible business leaders as well as through advancing the frontiers of knowledge in business management.

2. **The strategic objective of Department of Industrial and Information Management-Graduate Program / Institute of Information Management** is to **cultivate industrial and information management professionals who possess TIP (Technological knowledge, Innovative foundation, and Perceptive learning).**

**Graduate Program Learning Goals** (goals covered by this course are indicated by checks):

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Instructor: Yu-Ching Chang

Office: IIM 61329  
Tel: 06-2757575#53132  
E-mail: ycchang@mail.ncku.edu.tw

Prerequisites: Statistics I & II

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

Course website: http://myweb.ncku.edu.tw/~ycchang/QE (access limited to NCKU domain)

**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 (2009), 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>Midterm 30%</th>
<th>Final 30%</th>
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**Homework:**
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.
Exams:
The **in-class midterm** is 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 and has to be turned in with answer sheets after the exam. The **take-home final** exam is similar to a homework assignment, but a bit larger. Statistical software is required. You can make use of books or any sources. However, you must complete it independently, meaning that you cannot discuss with your classmates or anybody else other than the instructor.

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 12 minutes and no longer than 15 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: Linear regression  
W5: $2^k$ factorial experiments (Homework 1)  
W6: Two-level factorial designs  
W7: Two-level fractional factorial designs  
W8: Model building for design and improvement  
W9: Taguchi’s methods I (Homework 2)  
W10: Midterm Exam  
W11: Taguchi’s methods II  
W12: Taguchi’s methods III, critique to Taguchi’s methods (Research proposal due)  
W13: Response surface method  
W14: Response surface method and response optimization (Homework 3)  
W15: Advanced experimental designs  
W16: Advanced experimental designs  
W17: Project presentations  
W18: Final Exam