

McMaster University  
**Commerce 4QG3 and MBA P714**  
**Total Quality Management Course Outline**

August 2001

This is a preliminary course outline and the items described here are subject to change. The final course outline will be presented in the first class.

Course Description:

The many factors that effect the quality of products and services comprise the broad subject called *total quality management* or *TQM*. The goal of this course is to familiarize students with all aspects of TQM and to provide them with the knowledge they need to become designers of, and participants in, TQM programs.

The topics covered in this course include: strategic quality planning, organization structure for quality, quality in design and processes, statistical tools for quality assurance and process management, and programs and standards such as Six-Sigma, ISO 9000, QS 9000, and the Baldrige, European, and Canadian Quality Awards.

The course consists of lectures, videos, in-class exercises, a process-management project, a company-literature review project, readings, test, and a final exam.

Instructor:

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Books:

Evans, J.R., and W. M. Lindsay, *The Management and Control of Quality*, Fourth edition, West Publishing, New York, 1999.

Miltenburg, J., *Lecture Notes for Commerce 4QG3 and MBA P714: Total Quality Management*, 2001.

Evaluation:

	<i>Commerce 4QG3</i>	<i>MBA P714</i>
Project 1.		
Company-literature review project: report (20)	20	20
Project 2.—P714-project 2a; 4QG3-project 2a or 2b but not both.		
2a. Workplace TQM project: report (20), presentation (5)	0 or 25	25
2b. Personal quality project: report	10 or 0	0
Six in-class tests	30	30
Final exam	40 or 25	25
	100	100

Key for calculating final grades:

Mark:	0–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85–89	90–100
Final grade:	F	C-	C	C+	B-	B	B+	A-	A	A+

1. Company literature review project: Work in teams of 2 or 3 students. Start in the week of Oct. 1. Each team must write a ten-page report on the quality management system at a company that has won the Baldrige award or the European quality award. Winners of the Canadian quality award may be studied if special permission is obtained from the instructor. Baldrige award winners and European quality award winners are listed on pages 34a and b in the *Lecture Notes*. Information on these companies is available in the textbook, at the company's web-site and elsewhere on the Internet, and in the business press. We will run an in-class lottery to assign companies to teams. The report must be on 8½ x 11, with font size no less than 11, line spacing no less than 1½, and 1 inch margins. The report is due at our last class (Nov. 29 or 30).

2a. Workplace TQM project: Work in teams of 2 or 3 students. Start on Oct. 11 or 12. Details are on page 136 of *Lecture Notes*. The report and presentation are due in the week of November 19.

2b. Personal quality project: Work individually. Start on Oct. 11 or 12. Details are on page 137 of *Lecture Notes*. The report is due in the week of November 19.

Sample projects are on reserve in the Innis Reading Room. *Workplace TQM projects, personal quality projects, and company literature review projects* WILL NOT BE RETURNED after they are graded.

*In-class tests:* Six 10- to 15-minute in-class tests will be written at the beginning of the classes shown on the schedule. Tests will consist of true/false questions, multiple choice questions, short problems, etc., and will cover material from assigned cases, chapters and problems in the textbook, lecture notes, etc. No make-up tests will be given. If a student misses a test for a legitimate, documented reason, then the marks for the test will be added to the final exam. Solutions to in-class tests will be taken up during class. Question pages WILL NOT BE RETURNED.

*Final exam:* . A 2½-hour, open-book, final exam will be written on Sunday, December 2 from 7-9:30 pm. A sample final exam is on reserve.

Academic Dishonesty:

Your attention is directed to the *Senate Resolutions on Academic Dishonesty* and the *Statement on Academic Ethics* as found in the *Senate Policy Statements* distributed at registration and available in the Senate Office. Any violations will be dealt with according to this policy. No excuses (including ignorance of the policy) are accepted; and leniency should not be expected. Note that those who supply information or assistance are just as guilty as those who receive it.

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Materials on Reserve

1. Supplementary Materials

Continuous Process Improvement Guidebook: TD Bank	section 1
Continuous Quality Improvement Workbook: Hamilton Regional Cancer Center	section 2
Quality Management Analyst Software (1998)	section 3
Malcolm Baldrige National Quality Award: 1998 Business Criteria	section 4
1998 Health Care Criteria	section 5
1998 Scorebook	section 6

2. ISO 9000 Quality Standard (includes auditor assessment manual)

3. Sample Solutions

Sample reports for Workplace TQM project	section 1
Sample reports for Personal quality project	section 2
1998 final exam and solution	section 3

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## Workplace TQM Project

Teams of 2 or 3 students should begin this project *next week*. A report and presentation are due in the week of November 19.

The *report* should have a title page, no more than five pages of material, and an appendix of tables and graphs of five or fewer pages. Paper must be 8½ x 11, font size no less than 11, line spacing no less than 1½, and 1 inch margins. Marks will be deducted if the report does not follow this format. Sample reports are on reserve.

The *presentation* must not exceed 15 minutes and must use standard overhead transparencies. It will be followed by a question period of up to 5 minutes.

The report and presentation must be organized as described below, which is Evan's 6-step quality improvement process (ch. 9).

1. Introduction: Briefly describe the purpose of your project and the organization of your report.
2. Evan's step 1—Understanding the mess: Describe the "process" in which you are personally involved. Of course, this includes the suppliers, owners, and customers in the process. If there are groups of customers, assign an importance weighting to each group.
3. Evan's step 2—Finding facts:
  - a) Consider the many quality variables that are important to each customer in the process. If appropriate consider quality variables in the process that are interlinked to the customer quality variables.  
e.g. customer quality variable = good surface finish  
    ...interlinked process quality variables = age of cutting tool, material supplier  
Select the important quality variables that you will measure (i.e. the ones that have the largest affect on customer satisfaction, not the ones that are easiest to measure). Define each variable precisely, gives units, etc.  
Perhaps define an aggregate quality variable for the process that can be calculated daily. Think of this as a quality scorecard.
  - b) Measure each variable each shift, daily, etc. as appropriate. Record values on a carefully-organized table (called a check sheet).
4. Evan's step 3—Identifying problems: After you have about 3 weeks of data, analyze the data by plotting some variables on run charts (if you like, put  $\pm 3$  standard deviation control limits on the run charts to make sure the process is in control), using histograms and Pareto charts, etc. to identify problems. Select the most important problem(s).
5. Evan's step 4—Generating ideas: For each important problem from step 3, develop a cause-and-effect diagram to determine the root causes of the problem.
6. Evan's step 5—Developing solutions: If possible use the data from step 2 to create a scatter plot between the important problem from step 3 and the root cause from step 4. The graph should show a strong correlation between the important problem and the root cause.
7. Evan's step 6—Implementation: Make improvements to eliminate the root cause(s) from steps 4 and 5. Continue measuring each quality variable (step 2) and see how much quality improves. **THIS STEP IS OPTIONAL FOR THIS PROJECT.**
8. Discussion: Discuss what happened in your project, what you learned, etc..

## Personal quality project

Personal quality is an essential ingredient of quality in the workplace. It also unlocks the door to a deeper understanding of what TQM is all about. *Each* student should begin the “personal TQM project” described here and on pp. 23-27 of the textbook in the week of Oct. 1. A report is due in class in the week of November 19. It should have a title page, no more than five pages of material, and an appendix of tables and graphs of five or fewer pages. Paper must be 8½ x 11, font size no less than 11, line spacing no less than 1½, and 1 inch margins. Marks will be deducted if the report does not follow this format. Sample reports are on reserve.

The report must be organized as described below, which is Evan’s 6-step quality improvement process (ch. 9).

1. Introduction: Briefly describe the purpose of your project and the organization of your report.
2. Evan’s step 1—Understanding the mess: Describe the “processes” in which you are personally involved. Of course, this includes the customers for each process. Perhaps, assign an importance weighting to each process.  
e.g. “education process” ... customers are myself, instructors, class-mates, etc.  
“family process” ... customers are parents, siblings, etc.  
“society process” ... customers are wife/husband, friends, etc.  
“work process” ... customers are boss, co-workers, customers, etc.
3. Evan’s step 2—Finding facts:
  - a) Consider the many quality variables that are important to each customer in each process. If necessary consider quality variables in the process that are interlinked to the customer quality variables.  
e.g. “education process” ... customer=myself ... quality variable=final grade in course ...  
interlinked process variables=complete readings before class, no. classes missed each week, etc.  
Select the important quality variables (i.e. most affects customer satisfaction, not easiest ones to measure) you will measure. Define each variable precisely, gives units, perhaps assign importance weighting, etc.  
e.g. exercise at least 30 minutes a day ... units: 0=yes, 1=no  
Perhaps define an aggregate quality variable for each process that can be calculated daily or weekly.  
Think of this as a quality scorecard.
  - b) Measure each variable daily or weekly as appropriate. Display values on a carefully-organized table (called a check sheet). Plot some variables on run charts. (If you like, put control limits on the run charts to make sure the process is in control. See x,MR chart in ch. 14. We will do this in class in week 12.)
4. Evan’s step 3—Identifying problems: After you have about 5 weeks of data, analyze the data by plotting some variables on run charts (if you like, put  $\pm 3$  standard deviation control limits on the run charts to make sure the process is in control), using histograms and Pareto charts, etc. to identify problems. Select the most important problem(s).
5. Evan’s step 4—Generating ideas: For each important problem from step 3, develop a cause-and-effect diagram to determine the root causes of the problem.
6. Evan’s step 5—Developing solutions: If possible use the data from step 2 to create a scatter plot between the important problem from step 3 and the root cause from step 4.  
e.g. important problem (from step 3) = not completing readings before class  
root cause (from step 4) = watching more than 30 minutes of TV each night  
Go to the data in step 2. For each week  $i=1,2,3,4,5$  count  $x_i$  the number of times readings were not completed before class, and  $y_i$  the number of nights you watched more than 30 minutes of TV. Plot  $x_i, y_i$  on a graph. The graph should show a strong correlation between  $x$  and  $y$ .
7. Evan’s step 6—Implementation: Make improvements to eliminate the root cause(s) from steps 4 and 5. Continue measuring each variable daily/weekly (step 2) and see how much quality improves.
8. Discussion: Discuss what happened in your project, what you learned, etc. For other ideas on what you might discuss see the questions on p. 27 of the textbook.

<u>Week beginning:</u>	<u>Topic</u>	<u>Lecture Notes</u>	<u>Textbook</u>
<u>3-Sept. and 10-Sept.: Introduction, Quality foundations</u>			
	History of quality, definitions of quality.	1-10	Ch 1, 3-24,27-29
	Case: Milliken & Company		Ch 2, 39-56,64-65
	Deming, Juran, and Crosby.	11-28	Ch 3, 71-102
	Video 1a—Deming 1 (8); Video 1b—Deming 2 (12)		
<u>17-Sept.: Quality management systems</u>			
<i>Test 1 (Sept. 20, 21): Ch.1,2,3; Notes 1-24 (including Sundaram-Clayton case)</i>			
	Case: Sundaram-Clayton Company		
	Malcolm Baldrige National Quality Award, European Quality Award, Canadian Quality Award, Deming Prize	29-64	Ch 4, 117-149,159-171
	Video 2a—MBNQA (27); Video 2b—Deming 6 (12)		
<u>24-Sept.: Elements in the quality management system</u>			
<i>Test 2 (Sept. 27, 28): Ch.4, Notes 29-64 (including 3M Dental Products Company case), Deming's 14 points, and MBNQA categories and items</i>			
	Case: 3M Dental Products Co., Gateway Equipment Co.		
	1. Leadership	65-84	Ch 6, 221-226,230-246, 254-259
	2. Strategic planning		
	3. Customer & market focus; Video 3a—Deming 9 (10)		Ch 5, 173-207
<u>1-Oct.: Elements in the quality management system (continued)</u>			
	4. Information and analysis	85-102	Ch 10, 470-476,485-492
	Practice work*: Ch.10, problems 2,4,6,8		
	5. Human resource focus		Ch 7, 275-308
<i>Start Project 1: Company literature review project</i>			
<u>8-Oct.: Elements in the quality management system (continued)</u>			
<i>Test 3 (Oct. 11, 12): Ch.5,6,7,10; Notes 65-102</i>			
	6. Process management	103-114	Ch 8, 339-375
	Tools for process management:		
	- quality function deployment, failure mode and effects analysis	114-135	Ch 9, 396-446
	- Taguchi loss function, quality improvement processes		
	- seven statistical tools, Video 4a—Deming 3 (26)		
	Practice work*: Ch. 9, problems 2,4,8,12		
<i>Start Project 2: a)Workplace TQM project, b)Personal quality project</i>			
	Video 3b—Deming 4 (47)	136-137	
<u>15-Oct. and 22-Oct.: Quality standards and six-sigma</u>			
<i>Test 4 (Oct. 25, 26): Ch.8,9; Notes 103-135</i>			
	ISO 9000: Current standard and new standard for 2003	138-150	Ch 11, 522-548
	QS 9000	151-152	
	Process capability and six-sigma quality improvement program	153-159	Ch 12, 595-609
<u>29-Oct.: Quality assurance</u>			
	Repeatability and reproducibility study	160-163a	Ch 12, 563-568,572-579, 592-594
	Practice work*: Ch. 12, problems 2,12,14,16,18,22		
	Video 3a—Deming 5 (21); Video 3b—Deming 8 (15)		
	Acceptance sampling	163a-163c	
<u>5-Nov., 12-Nov., 19-Nov.: Statistical process control</u>			
<i>Test 5 (Nov. 8, 9): Ch.11,12; Notes 138-163c</i>			
	Hypothesis tests, X-bar and R-charts, X-bar and s-charts, X- and MR-charts, p-chart, c-chart, u-chart	164-189	Ch 13, 648-669,671-693
	Practice work*: Ch. 13, problems 8,12,16,26,34,38,40,42		
	Video 4a—Deming 6 (12)		
<u>19-Nov., 26-Nov.: Project 2a presentations and implementing TQM</u>			
<i>Test 6 (Nov. 22, 23): Ch.13; Notes 164-183</i>			
	Student presentations of workplace TQM projects		
	Building and sustaining total quality organizations	190-193	Ch 14, 722-724
<u>Final exam: Sunday December 2, 7-9:30 pm</u>			

\* Solutions to all practice work problems are given on pages S-1 to S-19 at the end of the textbook.

## Suggestions for Additional Readings

I suggest that the next TQM book you read be one written by a quality guru. Here are my suggestions.

Deming, *Out of the Crisis*, 2000 (about \$23 US) Originally published in 1986, it is the last book written by Deming who died in 1993. Deming reflects on his ideas after a lifetime of experience.

Philip Crosby, *Quality is Still Free: Making Quality Certain in Uncertain Times*, 1995 (about \$25 US)

Philip Crosby, *Quality Without Tears*, 1984.

Joseph Juran, *Juran's Quality Handbook: Fifth Edition*, 1999 (about \$150 US)

Joseph Juran, *Juran on Quality by Design: The New Steps for Planning Quality into Goods and Services*, 1992 (about \$40 US)

Joseph Juran, *Managerial Breakthrough: 30<sup>th</sup> Anniversary Edition*, 1995 (about \$25 US)

Another good book is:

Clemmer, J., *Firing on all cylinders: The service quality system for high-powered corporate performance*, 2<sup>nd</sup> Edition, Macmillan Canada, 1992. reprinted in 1994 (about \$25 US)

All of these books are available at amazon.com. The ones by the guru's are also available through their TQM web sites.

Deming Institute: <http://deming.org>

Juran Institute: [www.juran.com](http://www.juran.com)

Philip Crosby Associates: [www.philipcrosby.com](http://www.philipcrosby.com)