UNSW AUSTRALIA

Course Outline

Semester 1 2016

Never Stand Still | Engineering | Mechanical and Manufacturing Engineering

GSOE9810

PRODUCT AND PROCESS QUALITY IN ENGINEERING

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1. Staff contact details

Contact details and consultation times for course convenor

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Consultation concerning this course is available immediately after the classes. Direct consultation is preferred.

2. Course details

Credit points:

This is a 6 unit-of-credit (UoC) course, and involves three (3) hours per week (h/w) of face-to-face contact.

The UNSW website states “The normal workload expectations of a student are approximately 25 hours per semester for each UoC, including class contact hours, other learning activities, preparation and time spent on all assessable work. Thus, for a full-time enrolled student, the normal workload, averaged across the 16 weeks of teaching, study and examination periods, is about 37.5 hours per week.”

This means that you should aim to spend about 9 h/w on this course. The additional time should be spent in making sure that you understand the lecture material, completing the set assignments, further reading, and revising for any examinations.

Contact hours

	Day	**Time**	**Location**
Lectures	Thursday	18:00 – 21:00	Ainsworth G03

Summary of the Course

This course will introduce you to the cornerstones of creating and sustaining an effective organisation by covering several quality engineering approaches, industrial cases, videos etc. Several topics as well as methods and tools for improved product and process design will be covered which are essential to take organisations into the next generation with significantly improved organisational effectiveness. Managing quality is considered critical in business and organizational governance and this includes all aspects of the engineering discipline, from analysis to design to implementation and improvement. GSOE9810 can therefore be considered an important and logical element of a graduate engineering degree or diploma.

Aims of the Course

This course is designed to cover the core concepts and dynamic approaches in quality engineering field. They do not simply reiterate the textbooks, but build on the lecture topics using examples (many taken from several industries) to show you how successfully and unsuccessfully these approaches are applied in practice.

Tutorials are designed to support your learning process with opportunities for more interaction as well as to enhance individual and team participation through discussion on tutorial problems, questions and cases.

The textbooks, notes, case studies and UNSW Blackboard postings support the lectures and tutorials but they are not intended to be a substitute for attending classes. You are expected to cover all the materials assigned for both lectures and tutorials.

Student learning outcomes

This course is designed to address the below learning outcomes and the corresponding Engineers Australia Stage 1 Competency Standards for Professional Engineers as shown. The full list of Stage 1 Competency Standards may be found in Appendix A.

After successfully completing this course, you should be able to:

Learning outcome		**EA Stage 1 Competencies**
1.	State what an organisation needs to do to remain competitive in today's manufacturing environment.	PE2.1, PE2.2, PE2.4, PE3.4
2.	State how an organisation can improve its processes and integrate its several functions through the best use of quality engineering.	PE1.3, PE1.5
3.	Be able to determine whether a process is capable of producing a product or service to specifications	PE1.2, PE1.3
4.	Be able to integrate very popular topics like total quality management, Six-Sigma, and Benchmarking into organisations.	PE1.6, PE2.2, PE3.4

3. Teaching strategies

Today's organisations are evermore focused on improving supply chain performance. Key to this improvement is quality management. Therefore, quality engineering in product and process design continues to be an evolving, interesting and challenging topic. It has moved from beyond an emphasis on management of quality to a focus on the quality of managing, operating and integrating the design, manufacturing, delivery, marketing, information, customer service and financial areas throughout an organisation's quality value chain including the entire supply chain.

Therefore, a wide variety of concepts and tools of analysis will be covered and you will be interacting with other students in the lectures and tutorials, either online or face-to-face, sometimes in teams or individually. You become more engaged in the learning process if you can see the relevance of your studies to professional, disciplinary and/or personal contexts, and the relevance is shown in the lectures, face-to-face and web-based tutorials by way of examples drawn from different industries.

Several case discussions will take place in lectures and face-to-face tutorials as well as through UNSW Blackboard. These aim to give several opportunities to each of you to interact, exchange ideas, knowledge and experiences with the facilitators and other students through:

- reading from a wide range of cases studies and synthesise a range of perspectives,
- reflecting on your own experience and knowledge in the light of new learning,
- exchanging views and challenge each other's thinking in structured learning environment,
- analysing case studies and relate learnings to your own context working collaboratively on a hypothetical project.

Lectures, tutorials and assessments in the course are designed to cover the core knowledge areas in Quality Engineering. They do not simply reiterate the texts, but build on the lecture topics using examples and cases taken directly from industry to show how the theory is applied in practice and the details of when, where and how it should be applied.

Lectures and Tutorials are designed to develop several graduate attributes by creating an environment where information sharing, discussions, teamwork, communication, task completions and project role playing will take place. Since each of you may have come from a different professional and academic background, your experiences are drawn on to illustrate various aspects of cases covered, and this helps to increase motivation and engagement.

A team of around three to four students in UNSW Blackboard will be set and each team will be assigned to a two case assignments. Your Web lecturers have access to your team's discussions will offer guidance when and where necessary. A mixture of activities may include: Case role-plays, individual allocation to particular questions and several other activities to enhance your learning experience.

Lecturers will provide you with feedback and discussion on the assignment, and to understand the concepts and problems in greater depth.

4. Course schedule

Date	Lecture Content (Ainsworth G03) 18:00-21:00	Relevant Problems and Exercises	Workshop (Ainsworth G03)
Week 1 Thu 3/3/16	Perspectives and scope of Quality Engineering (Chapter 1) and Issue analysis		No workshops in Week 1
Week 2 Thu 10/3/16	Quality Theory (Chapter 2) and KFS analysis		General discussion
Week 3 Thu 17/3/16	Global Supply Chain Quality, Quality Standards (Chapter 3)	Chapter 1, Questions: 6, 11, 16, 17, 18 Chapter 2, Questions: 6, 16, 18 Chapter 3: Questions: 9, 15, 16, 17	Fedex
Week 4 Thu 24/3/16	Strategic Quality Planning (Chapter 4)	Chapter 4, Questions: 10, 11, 12, 15, 18 Chapter 4: Problems 1 to 4	Ames Rubber Chaparral Steel
Week 5 Thu 7/4/16	Voice of the Customer (Chapter 5)	Chapter 5, Questions: 2, 13, 15, 18	
Week 6 Thu 14/4/16	Voice of the Market (Chapter 6)	Chapter 6, Questions: 3, 5, 7, 10,11, 19, 21 Chapter 6: Problems 1, 3, 5, 6	
Week 7 Thu 21/4/16	Quality in Product and Process Design and Quality Function Deployment (Chapter 7)	Chapter 7, Questions: 6, 9, 11, 16, 17 Chapter 7: Problems 1 to 6	Ford Taurus
Week 8 Thu 28/4/16	Managing Supplier Quality in the Supply Chain, Failure Analysis (Chapter 9)	Chapter 9, Questions: 9, 10, 11, 16, 18, 20 Chapter 9 OC Addendum: Problems 1, 3, 5, 7, 9, 14, 16, 20	

Week 9 Thu 5/5/16	The Tools of Quality and Statistical Process Control (Chapters 10 and 11)	Chapter 10, Questions: 17, 18, 20 Chapter 10: Problems 13, 14, 17, 18, 20, 22, 23, 26	Honeywell
Week 10 Thu 12/5/16	Statistical Process Control for Attributes (Chapter 12)	Chapter 11, Questions: 4, 9 Chapter 11: Problems 1, 2, 4, 5, 7, 8, 10, 13, 21, 22, 26	
Week 11 Thu 19/5/16	Six-Sigma Management and Tools (Chapter 13)	Chapter 12, Questions: 2, 7 Chapter 12: Problems 1, 3, 10, 14, 15, 16, 17, 20, 21, 22, 24, 27, 31	Neimann Marcus
Week 12 Thu 26/5/16	Implementation and Validation (Chapters 14 and 15)	Chapter 13, Questions: 1, 5, 7, 8, 9, 10 Chapter 13: Problems 1, 5, 6, 9, 10, 12	
Week 13 Thu 2/6/16	Summary of the course		

5. Assessment

You will be assessed by a final examination as well as your continuous participation in completing two major web-based assignments. They may involve calculations, descriptive material and discussions. The assessments are based to allow you to obtain an understanding of the material being taught and will allow you to apply the concepts learnt in the course.

In order to achieve a Satisfactory performance in this course, you need to both achieve a composite mark of **at least 50** and a satisfactory level of performance in all assessments.

Assessment overview

Assessment	Length	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Marks returned
Group assignment 1 / Case Study	3000 words	25%	1, 2 and 4	Material up to and including week 6	Week 8	Two weeks after submission
Group assignment 2 / Case Study	3000 words	25%	1,2,3 and 4	All material with a focus on statistical process control	Week 13	Upon release of final results
Final exam	2 hours	50%	1, 2, 3 and 4	All course content from weeks 2-12 inclusive.	Exam period, date TBC	Upon release of final results

Assignments

The dates for the assignments will be communicated to you in class and provided on Moodle as the course progresses.

The assignments will be posted on Moodle and an announcement made about due date for the assignments. Completed assignments will be handed in hard copy by the end of the week the assignment is due. The assignments support the learning outcomes by incorporating an appropriate mix of activities such as issue analysis, fact based data analysis that support the design of appropriate solutions and strategies. The assignments also support collaborative team work and integration of different ideas and components into an overall coherent quality management strategy.

Criteria

The following criteria will be used to grade assignments:

On-line case study discussions:

- Timely Interaction with your team members.
- Quality and appropriateness of on-line communications between you and other team members (note: frequency of communication is relevant but quality of contributions scores much higher).
- Evidence that your contributions help the team focus on the core issues and solutions.
- Identification of key facts and the integration of those facts in a logical development
- Clarity of communication—this includes development of a clear and orderly structure and the highlighting of core arguments

Written reports:

- Analysis and Evaluation of assignments by integrating knowledge gathered in lectures, tutorials and textbook.
- Sentences in clear and plain English—this includes correct grammar, spelling and punctuation
- Correct referencing in accordance with the prescribed citation and style guide
- Appropriateness of analytical techniques used
- Accuracy of numerical answers
- All working shown
- Use of diagrams, where appropriate, to support or illustrate the calculations
- Use of graphs, were appropriate, to support or illustrate the calculations
- Use of tables, where appropriate, to support or shorten the calculations
- Neatness

Presentation

All submissions should have a standard School cover sheet which is available from this course's Moodle page.

All submissions are expected to be neat and clearly set out. Your results are the pinnacle of all your hard work. Presenting them clearly gives the marker the best chance of understanding your method; even if the numerical results are incorrect.

Submission

Late submissions will be penalised 5 marks per calendar day (including weekends). An extension may only be granted in exceptional circumstances. Where an assessment task is worth less than 20% of the total course mark and you have a compelling reason for being unable to submit your work on time, you must seek approval for an extension from the course convenor ***before the due date***. Special consideration for assessment tasks of 20% or greater must be processed through student.unsw.edu.au/special-consideration.

It is always worth submitting late assessment tasks when possible. Completion of the work, even late, may be taken into account in cases of special consideration.

Examinations

There will be a two (2) hour final examination scheduled at the end of session, covering all material and all chapters in the prescribed textbook.

You must be available for all tests and examinations. Final examinations for each course are held during the University examination periods, which are June for Semester 1 and November for Semester 2.

Provisional Examination timetables are generally published on myUNSW in May for Semester 1 and September for Semester 2

For further information on exams, please see the Exams section on the intranet.

Calculators

You will need to provide your own calculator, of a make and model approved by UNSW, for the examinations. The list of approved calculators is shown at student.unsw.edu.au/exam-approved-calculators-and-computers

It is your responsibility to ensure that your calculator is of an approved make and model, and to obtain an "Approved" sticker for it from the School Office or the Engineering Student Centre prior to the examination. Calculators not bearing an "Approved" sticker will not be allowed into the examination room.

Special Consideration and Supplementary Assessment

For details of applying for special consideration and conditions for the award of supplementary assessment, see the School intranet, and the information on UNSW's Special Consideration page.

6. Expected resources for students

Prescribed textbook

The prescribed textbook for this course is:

Thomas, Foster, Managing Quality – Integrating the Supply Chain, Prentice Hall, 2007. ISBN: 0132239965.

Additional materials provided in Moodle

This course uses UNSW Blackboard which list of assignments, answers to the numerical questions, suggested answers to case studies and assignments and weekly discussion forum.

The discussion forum will be extensively used by Web lecturers of the course throughout the session. Each of you will be assigned to a group by Week 5.

Your Web lecturer has access to your team's discussions and will offer guidance when and where necessary. A mixture of activities may include: Case role plays, individual allocation to particular questions and several other activities to enhance your learning experience.

Logging on to UNSW Moodle using the following Web address:

https://ssologin.unsw.edu.au/cas/login?service=https%3A%2F%2Fmoodle.telt.unsw.edu.au%2Flogin%2Findex.php%3FauthCAS%3DCAS

Library information may be obtained by accessing the URL given below:
http://info.library.unsw.edu.au/web/services/services.html

7. Course evaluation and development

Feedback on the course is gathered periodically using various means, including the Course and Teaching Evaluation and Improvement (CATEI) process, informal discussion in the final class for the course, and the School's Student/Staff meetings. Your feedback is taken seriously, and continual improvements are made to the course based, in part, on such feedback.

In this course, recent improvements resulting from student feedback include updated case study materials and course notes.

8. Academic honesty and plagiarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.*

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism: student.unsw.edu.au/plagiarism The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

If plagiarism is found in your work when you are in first year, your lecturer will offer you assistance to improve your academic skills. They may ask you to look at some online resources, attend the Learning Centre, or sometimes resubmit your work with the problem fixed. However more serious instances in first year, such as stealing another student's work or paying someone to do your work, may be investigated under the Student Misconduct Procedures.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis) even suspension from the university. The Student Misconduct Procedures are available here: www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Further information on School policy and procedures in the event of plagiarism is available on the intranet.

9. Administrative Matters

All students are expected to read and be familiar with School guidelines and polices, available on the intranet. In particular, students should be familiar with the following:

- Attendance, Participation and Class Etiquette
- UNSW Email Address
- Computing Facilities
- Assessment Matters (including guidelines for assignments, exams and special consideration)
- Academic Honesty and Plagiarism
- Student Equity and Disabilities Unit
- Health and Safety
- Student Support Services

Erik van Voorthuysen and Ron Chan
February 2016

Appendix A: Engineers Australia (EA) Professional Engineer Competency Standards

	Program Intended Learning Outcomes
PE1: Knowledge and Skill Base	PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals
	PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing
	PE1.3 In-depth understanding of specialist bodies of knowledge
	PE1.4 Discernment of knowledge development and research directions
	PE1.5 Knowledge of engineering design practice
	PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice
PE2: Engineering Application Ability	PE2.1 Application of established engineering methods to complex problem solving
	PE2.2 Fluent application of engineering techniques, tools and resources
	PE2.3 Application of systematic engineering synthesis and design processes
	PE2.4 Application of systematic approaches to the conduct and management of engineering projects
PE3: Professional and Personal Attributes	PE3.1 Ethical conduct and professional accountability
	PE3.2 Effective oral and written communication (professional and lay domains)
	PE3.3 Creative, innovative and pro-active demeanour
	PE3.4 Professional use and management of information
	PE3.5 Orderly management of self, and professional conduct
	PE3.6 Effective team membership and team leadership