



Mechanical and Manufacturing Engineering

Course Outline

Term 1 2019

MANF9544

CONCURRENT PRODUCT AND PROCESS DESIGN

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1. Staff contact details

Contact details and consultation times for course convenor

Name: Prof Sami Kara
Office location: Ainsworth Building, 301A
Tel: (02) 9385 5757
Email: S.Kara@unsw.edu.au
Moodle: <https://moodle.telt.unsw.edu.au/login/index.php>

Consultation concerning this course is available on Tuesday 1300 –1700 whenever the lecturer is not otherwise engaged.

Contact details and consultation times for additional lecturers/demonstrators/lab staff

Name: Dr Shiva Abdoli
Office location: Ainsworth Building, 301
Tel: (02) 9385 6851
Email: s.abdoli@unsw.edu.au

Please see the course [Moodle](#).

2. Important links

- [Moodle](#)
- [Lab Access](#)
- [Computing Facilities](#)
- [Student Resources](#)
- [Course Outlines](#)
- [Engineering Student Support Services Centre](#)

3. Course details

Credit points

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

Contact hours

	Day	Time	Location
Lectures	Tuesday	6pm – 8pm	Ainsworth 202 (K-J17-202)
Demonstrations	Tuesday	8pm – 9pm	Ainsworth 202 (K-J17-202)

Summary and Aims of the course

This course introduces the core activities of concurrent development of products, processes, systems, and quality. Therefore, this course is a core part of the MEngSc program in Manufacturing Management and relates its contents to other courses in the program, such as Manufacturing Strategies, Managing Manufacturing Operations and Production Technologies.

The need for companies to develop products that the customer wants and to do this in the shortest possible time has become one of the main success factors on the market. Concurrent Product and Process Development is one of the key strategies that address this problem of fast product development and customer satisfaction by taking into account economic and environmental objectives. It needs new techniques and design tools to be adopted, and it requires a change of the traditional departmental separation of tasks in a company.

Therefore, this course aims to provide an understanding of the integrative nature of concurrent product and process development in a team work environment, and how it affects all subsequent activities in production.

Student learning outcomes

This course is designed to address the learning outcomes below 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.	Have gained knowledge in the interdisciplinary field of concurrent product development.	PE1.3, PE1.5
2.	Have gained the capacity for critical thinking and problem solving, have experienced collaborative and multi-disciplinary work.	PE2.3, PE3.6
3.	Learned to appreciate the difficulties of change, and acquired skills of effective communication.	PE2.3, PE3.6
4.	Have gained knowledge in the inter-disciplinary field of concurrent product development.	PE1.3, PE1.5

4. Teaching strategies

The subject will be presented in the form of lectures and problem-solving classes. Each weekly class will consist of a 1-1.5 hrs lecture followed by a problem solving class example or case study related to the material covered in the lecture

5. Course schedule

Week	Topic	Demonstration/Lab Content	Location	Suggested Readings
1	Introduction and definitions		Ainsworth 202	Lecture notes on Moodle
2	Product Development and Time-to-Market Concept	Trade-off Analysis in Product Development Exercise	Ainsworth 202	Lecture notes and reading material on Moodle
3	Quality Function Deployment	QFD Exercise	Ainsworth 202	Lecture notes on Moodle
4	Design for Manufacture (DFM)	None	Ainsworth 202	Lecture notes and reading material on Moodle
5	Design for Assembly (DFA)	DFA Exercise (a pump case)	Ainsworth 202	Lecture notes and reading material on Moodle
6	Design for Environment (DFE)	Trade-off Analysis	Ainsworth 202	Lecture notes and reading material on Moodle
7	Manufacturing System Design	Assembly Sequence Generation Exercise	Ainsworth 202	Lecture notes and reading material on Moodle
8	Rapid Prototyping and Additive Manufacturing	None	Ainsworth 102	Lecture notes and reading material on Moodle
9	Organisation, Management and Operating of CE Teams	Team Problem Solving Exercise	Ainsworth 202	Lecture notes on Moodle
10	CE Practices and case studies (Possible Industry speaker)	None	Ainsworth 202	None

6. Assessment

Assessment overview

Assessment	Group Project?	If Group, # Students per group	Length	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Deadline for absolute fail	Marks returned
Group assignment 1	Yes	4	1000 words	15%	1, 2, 3 and 4	Topics assessed include Quality Function Deployment	Will be released on the 5 th March and submission on the 17 th March via Moodle	Midnight Sunday 24 th March	Two weeks after submission
Group assignment 2	Yes	4	5000 words	45%	1, 2, 3, and 4	Topics assessed include Quality Function Deployment	Will be released on the 17 th March and submission on the 2 nd April via Moodle	Midnight Sunday 7 th April	Two weeks after submission
Test 1	No	N/A	90 min	40%	1 and 4	Lecture material from week 1 to 8	In week 9, during the class	N/A	Two weeks after the test

Assignments

The assessment tasks will be provided during the class on the dates described in the *Assessment overview* table. The assessment tasks and their detail will be provided on Moodle at <https://moodle.telt.unsw.edu.au/login/index.php>

Presentation

All non-electronic 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 and should be treated with due respect. Presenting results clearly gives the marker the best chance of understanding your method; even if the numerical results are incorrect.

Submission

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of 20 percent (20%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day.

Work submitted after the 'deadline for absolute fail' is not accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These are clearly indicated in the course outline, and such assessments receive a mark of zero if not completed by the specified date. Examples include:

- a. Weekly online tests or laboratory work worth a small proportion of the subject mark,
or
- b. Online quizzes where answers are released to students on completion, or
- c. Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date, or
- d. Pass/Fail assessment tasks.

Marking

Marking guidelines for assignment submissions will be provided at the same time as assignment details to assist with meeting assessable requirements. Submissions will be marked according to the marking guidelines provided.

Examinations

You must be available for all tests and examinations in this course. Final examinations for

each course are held during the University examination periods: February for Summer Term, May for T1, August for T2, and November/December for T3.

Please visit myUNSW for Provisional Examination timetable publish dates.

For further information on exams, please see the [Exams](#) webpage.

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 available 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 [Engineering Student Support Services Centre](#) prior to the examination. Calculators not bearing an "Approved" sticker will not be allowed into the examination room.

Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that has interfered with your assessment performance, you are eligible to apply for Special Consideration. For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's [Special Consideration page](#).

7. Expected resources for students

Textbooks

A subject manual will be uploaded on the Moodle as a softcopy. This manual includes all the necessary lecture materials and the readings at the end of each unit. Since the manual was updated recently, the previous version of the manual is not recommended. Copies of the current version are also available at the library for student barrowing.

Suggested Additional Readings

1. Thomas A. Salomone: "What every Engineer should know about CONCURRENT ENGINEERING", Marcel Dekker, 1995.
2. James L. Nevins, Daniel E. Whitney: "Concurrent Design of Products and Processes", A Strategy for the Next Generation in Manufacturing, McGraw-Hill Publishing Company, 1989. (good textbook but out of print)
3. Andrew Kusiak: "Concurrent Engineering", Automation, Tools, and Techniques, John Wiley & Sons Inc., 1993.
4. John Corbett, Mike Dooner, J. Meleka, C. Pym: "Design for Manufacture", Strategies, Principles, and Techniques, Addison-Wesley Publishing Company, 1991.
5. Paul G. Ranky: "Concurrent/Simultaneous Engineering", Methods, Tools and Case Studies.

6. CIMware Limited, Guildford, England, 1994.
7. Geoffrey Boothroyd, Peter Dewhurst, Winston Knight: "Product Design for Manufacture and Assembly", Marcel Dekker, 1994.
8. Geoffrey Boothroyd, Peter Dewhurst: "Product Design for Assembly", Handbook, Boothroyd Dewhurst Inc, 1991.
9. Kim Clark, Stephen Wheelwright: "Managing New Product and Process Development" and "Revolutionizing Product Development", Free Press, New York, 1993.
10. Sammy G. Shina: "Successful Implementation of Concurrent Engineering Products and Processes." Van Nostrand Reinhold, New York, 1994.
11. Ben Wang: "Integrated Product, Process and Enterprise Design." Chapman & Hall, 1997.

UNSW Library website: <https://www.library.unsw.edu.au/>

Moodle: <https://moodle.telt.unsw.edu.au/login/index.php>

8. Course evaluation and development

Feedback on the course is gathered periodically using various means, including the UNSW myExperience 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 better tutorial content, assessment procedure.

9. 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, visit: 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

10. Administrative matters and links

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

- [Attendance](#)
- [UNSW Email Address](#)
- [Computing Facilities](#)
- [Special Consideration](#)
- [Exams](#)
- [Approved Calculators](#)
- [Academic Honesty and Plagiarism](#)
- [Student Equity and Disabilities Unit](#)
- [Health and Safety](#)
- [Lab Access](#)
- [Makerspace](#)
- [UNSW Timetable](#)
- [UNSW Handbook](#)
- [UNSW Mechanical and Manufacturing Engineering](#)

Appendix A: Engineers Australia (EA) Competencies

Stage 1 Competencies for Professional Engineers

	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