UNSW SYDNEY | Australia's Global University

Mechanical and Manufacturing Engineering

Course Outline

Semester 1 2018

MANF9544

CONCURRENT PRODUCT AND PROCESS DESIGN

Contents

1. Staff contact details

Contact details and consultation times for course convenor

Name: Prof. S. Kara
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Tel: (02) 9385 5757
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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 demonstrator

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

Contact preferred via email; consultation by appointment only.

Please see the course Moodle.

2. Important links

- Moodle
- UNSW Mechanical and Manufacturing Engineering
- Course Outlines
- Student intranet
- UNSW Mechanical and Manufacturing Engineering Facebook
- UNSW Handbook

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.

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	Tuesday	6pm – 8pm	Ainsworth 102
Demonstrations	Tuesday	6pm – 9pm	Ainsworth 102

Please refer to your class timetable for the learning activities you are enrolled in and attend only those classes.

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 102	Lecture notes on Moodle
2	Product Development and Time-to-Market Concept	Trade-off Analysis in Product Development Exercise	Ainsworth 102	Lecture notes and reading material on Moodle
3	Operating Concurrent Engineering Teams	Team Problem Solving Exercise	Ainsworth 102	Lecture notes on Moodle
4	Quality Function Deployment – Part 1	QFD Exercise	Ainsworth 102	Lecture notes on Moodle
5	Quality Function Deployment – Part 2	QFD Exercise (Cont.)	Ainsworth 102	Lecture notes on Moodle
6	**Mid-Session Test 1**		Ainsworth 102	

Week	Topic	Demonstration/Lab Content	Location	Suggested Readings
7	Design for Manufacture (DFM)	None	Ainsworth 102	Lecture notes and reading material on Moodle
8	Design for Assembly (DFA)	DFA Exercise (a pump case	Ainsworth 102	Lecture notes and reading material on Moodle
9	Design for Environment (DFE)	Trade-off Analysis	Ainsworth 102	Lecture notes and reading material on Moodle
10	Manufacturing System Design	Assembly Sequence Generation Exercise	Ainsworth 102	Lecture notes and reading material on Moodle
11	Rapid Prototyping and Additive Manufacturing	None	Ainsworth 102	Lecture notes and reading material on Moodle
12	Organisation and Management of CE Teams	Team Exercise	Ainsworth 102	Lecture notes and reading material on Moodle
13	CE Practices and case studies (Industry speaker)	**Mid-Session Test 2**	Ainsworth 102	None

6. Assessment

Assessment overview

Assessment	Length	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Deadline for absolute fail	Marks returned
Mid-Session Tests	1 hour each	40% (2X20%)	1,2,3,4	Lecture material from weeks 1,2,3,4,5 (Test 1); Lecture material from weeks 6,7,8,9,10,11 (Test 2)	During weeks 5 and 12 respectively in the classroom	N/A	Two weeks after submission
Group Assignment 1	Max 5000 words	20%	1,2,3,4	Topics assessed include QFD	On week 6 during the lecture	N/A	Two weeks after submission
Group Assignment 2	Max 5000 words	20%	1, 2, 3, 4	Topics assessed include DFA	On week 9 during the lecture	N/A	Two weeks after submission
Group Assignment 3	Max 5000 words	20%	1, 2, 3, 4	Topics assessed include Assembly Sequence Generation	On week 11 during the lecture	N/A	Two weeks after submission

All assignments and the assessment criteria will be made available on Moodle.

Assignments

Presentation

All non-electric 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

Late submissions will be penalised 5 marks per calendar day (including weekends). An extension may only be granted in exceptional circumstances. Special consideration for assessment tasks 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.

Where there is no special consideration granted, the 'deadline for absolute fail' in the table above indicates the time after which a submitted assignment will not be marked, and will achieve a score of zero for the purpose of determining overall grade in the course.

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. 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.

7. Attendance

You are required to attend a minimum of 80% of all classes, including lectures, labs and seminars. It is possible to fail the course if your total absences equal to more than 20% of the required attendance. Please see the School intranet and the UNSW attendance page for more information.

8. 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. 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. Goeffrey 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

9. 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 providing more tutorials, introducing industry speakers and providing group-based assignments.

10. 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.

11. Administrative matters and links

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

Prof S. Kara
2 February 2018

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