UNSW AUSTRALIA

Course Outline

Semester 2 2015

Never Stand Still | Engineering | Mechanical and Manufacturing Engineering

MMAN2130

Manufacturing Design

Contents

1. Staff Contact Details

Course Convenor and Lecturer:

Nathan J Parrott
Office location
Tel: 0408 263 865
Email: admin@nathanparrott.com

Course Demonstrators:
Zhara Faraji Rad
Email: z.farajirad@unsw.edu.au

TAFE Workshop
Ian Frost
Email: Ian.G.Frost@tafensw.edu.au

Consultation concerning this course is available on Monday–Wednesday 0930–1700 whenever I am not otherwise engaged. Please use Moodle as a first resort for consultation. Strictly no consultations will be held on Thursday and Friday.

2. Course details

Credit Points:

This is a 6 unit-of-credit (UoC) course, and involves 7.5 hours per week (h/w) of 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.”

For a standard 24 UoC in the semester, this means 600 hours, spread over an effective 15 weeks of the semester (thirteen weeks plus stuvac plus one effective exam week), or 40 hours per week, for an average student aiming for a credit grade Various factors, such as your own ability, your target grade, etc., will influence the time needed in your case. Some students spend much more than 40 h/w, but you should aim for not less than 40 h/w on coursework for 24 UoC.

This means that, for this course, you should aim to spend not less than an additional 2.5 hours per week of your own time for the weeks where there are 7.5 hours of contact. This should be spent in making sure that you understand the material presented, completing the set tasks, further reading about the requirements for the project.

There is no parallel teaching in this course.

Contact Hours

	Day	Time	Location
Lectures	Tuesday	10:00 - 12:00	Electrical Eng G25 (K-G17-G25)
Demonstrations	Tuesday	12:00-13:30	Ainsworth Building 204 (K-J17-204)
	Tuesday	13:30 - 15:00	Ainsworth Building 204 (K-J17-204)
TAFE	Thursday	16:30 - 21:30	See Moodle/TAFE
	Thursday	16:30 - 21:30	See Moodle/TAFE

Summary of the Course

This subject introduces you to basic aspects of design and manufacturing, process selection, manufacturing processes, material properties/selection and the use of computers in the design process.

Aims of the Course

This is one of the introductory technology-based courses in the school. This course develops an appreciation of the concepts involved with product development and manufacture. The other subjects in the degree program further develop the theoretical and analysis methods for design and development.

This is a project-based course. The project selected allows you as a student to work individually and in a team environment to achieve the final objective, which is a workable product. In carrying out this work the student is exposed to design principles and drawing practices which includes Computer aided Design and Drafting, manufacturing processes and practical selection and limitations of manufacturing components and products. A continuing emphasis is placed on group work and report writing essential to engineering.

Student learning outcomes

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

Learning Outcome		**EA Stage 1 Competencies**
1.	Understand the importance and relevance of graphical communication in engineering.	PE1.4
2.	Be able to represent a three dimensional object in two dimensional space in accordance with AS-1100 technical drawing standards and conventions.	PE1.3, PE2.2
3.	Be able to interpret two dimensional engineering drawings and produce isometric sketches of relevant components.	PE1.3, PE2.2

4.	Be able to use the SolidWorks modeling software and application to create a range of engineering components in solid representation to create production drawings of engineering components in accordance with AS-1100 technical drawing standards.	PE1.3, PE2.2
5.	Be familiar with the basic engineering and physical properties of common engineering materials and how to select them for a given design.	PE1.3, PE1.5
6.	Be familiar with the link between product design, material selection and manufacturing.	PE1.3, PE2.4
7.	Able to understand some manufacturing processes and their capabilities.	PE1.3, PE2.4
8.	Able to work in a group to determine the manufacturing requirements and functionality of the product.	PE2.4, PE3.5,PE3.6
9.	Able to relate to economic requirements for manufacturing and thus optimise the production of the component.	PE2.4

3. Teaching strategies

This course is being conducted as a project based course in which the material being presented is related to the tasks that a student needs to attempt to achieve the final goal of the project. Therefore the presentation of the material will vary from week to week. Initially there will be lectures and problem solving classes to guide you through the project while in the later weeks you will be required to be self sufficient to finalise the project. However the project will be monitored over the different periods for the milestones achieved. Each of the milestones will be evaluated by a panel of members made up of academic, and workshop staff.

There will be laboratory work for hands-on experience in creating the design that you have developed. In relation to the product development it is expected that the students will be able to search for information and requisites for the development of the product using the web, library and books which are listed as resources for the product development.

4. Course schedule

All lectures in this course are given by Nathan Parrott unless stated otherwise.

Tuesday	10:00-12:00	G25 Electrical Engineering Building
CAD Labs	(check allocated time)	G16-17 Tyree Energy Building
TAFE	(check allocated time)	(see the information booklet on Moodle)

Wk	Topic	Date	Location	Lecture Content	Demonstration /Lab Content	Suggested Readings
1	Intro	28/07	G25 Electrical Engineering	*Introduction to MMAN2130, final enrolment, expectations and assessment, Sketching*	No CAD Labs	Solo Requirement Specification
2	Concept Sketching	04/08	G25 Electrical Engineering	*Techniques useful for concept sketching*	Introduction to SolidWorks	Solo Requirement Specification, Concept Sketch Assessment Guide
3	3D Part Modeling	11/08	G25 Electrical Engineering	*Creation of Engineering Drawings, Standards, dimensioning, datums and symbols*	2D Sketching	2D Engineering Drawing Assessment Guide
4	2D Drawings	18/08	G25 Electrical Engineering	*AS1100 standards, dimensioning*	3D Part Modeling	2D Engineering Drawing Assessment Guide
5	Engineering Drawing	25/08	G25 Electrical Engineering	*Review of standards, for fixings and influence on part design, standards for holes, etc., parts and material list*	Creating holes and notes	2D Engineering Drawing Assessment Guide
6	Limits Fits & Tolerances	01/09	G25 Electrical Engineering	*Limits, Fits and tolerances and their application in design.*	Aesthetics like threads and surface finishing	Manufacturability Review Assessment Guide

7	Process Planning 1	08/09	G25 Electrical Engineering	*Process Plan Assembly Plan BOM*	Assemblies and mating	Manufacturability Review Assessment Guide
8	Process Planning 2	15/09	G25 Electrical Engineering	*Design for Manufacturability, Material Selection and High Volume Manufacturing*	Generating BOM's	Manufacturability Review Assessment Guide
9	Material Selection	22/09	G25 Electrical Engineering	*Utilizing Material Index's*	CAD Test 1	Final Report Assessment Guide
10	Design for high volume Manufacture 1	29/09	G25 Electrical Engineering	*Design for Manufacturability, Material Selection and High Volume Manufacturing*	Patterning and mirroring	Final Report Assessment Guide
11	Design for high volume Manufacture 2	06/10	G25 Electrical Engineering	*Design for Manufacturability, Material Selection and High Volume Manufacturing*	CAD Test 2	Final Report Assessment Guide
12	Design for high volume Manufacture 3	13/10	G25 Electrical Engineering	*Design for Manufacturability, Material Selection and High Volume Manufacturing*	No Labs	Final Report Assessment Guide
13	No Lecture	20/10	G25 Electrical Engineering	*No Lecture: Prototype Testing*	*No Labs Prototype Testing*	NA

5. Assessment

You are assessed by way of a product development project which involves designing and manufacturing a product based on given functional specifications. This project will test your ability to demonstrate applied knowledge, which you will be expected to perform as an engineering student.

The weighting of the individual assessment components will be as follows with full details provided under Moode/Assignments.

Assessment	Deadline	Weight %	Learning Outcomes Assessed	Details
Concept Sketches	Week 3	2	1,2,3,4	Individual submission
Engineering Drawing	Week 6	13	1,2,3,4	Individual submission
Manufacturability Review	Week 9	12	5,6	Individual submission
Hands-on CAD test 1	Week 9	9	1,2,3,4	Individual assessment
Hands-on CAD test 2	Week 11	9	1,2,3,4	Individual assessment
Prototype Testing	Week 13	10	8	Group submission
Final Report	Week 13	25	5,6,7,8,9	Group submission
TAFE Assessments	TAFE will announce	20	5,6	Individual assessment

Assignments

Presentation

A standard specification is available from the School office to aid presentation of your assignments (in all courses). All submissions should have a standard School cover sheet. All submissions are expected to be professional, and clearly set out.

Submission

Assignments are due on Tuesday of the class in the week nominated below. Assignments should be submitted direct to me in class. (**No** submission via the assignment boxes at the School office).

Late submissions will be penalised 10% 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 convener***before the due date***. Special consideration for assessment tasks of 20% or greater must be processed through https://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 no final examination in this course.

Special Consideration and Supplementary Assessment

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

6. Expected Resources for students

(1) *Manufacturing Engineering and Technology*, S. Kalpakjian and S R Schmid. Prentice Hall
(2) *Engineering Drawing*, A. W. Boundy, McGraw Hill (7th Edition).
(3) *Material Selection in Mechanical Design,* Ashby, M., Elsevier.
(4) *Dimensioning and Tolerancing for Function and Economic Manufacture*, L. E. Farmer, Blueprint Publications.
(5) *Manufacturing Processes* B.H. Amstead, P.F. Ostwald and M.L. Begeman.
(6) *Materials and Processes in Manufacturing*, E.P. Degamo, J.P. Black and R.A. Kohser.
(7) *Product Design and Process Engineering*, B.W. Niebel and A.B. Draper.
(8) *Manufacturing Processes*, H.W. Yankee.
(9) Moodle based learning modules.

Additional materials provided in Moodle

Course will be administered by using Moodle. Therefore course administration and lecture materials will be uploaded to Moodle. Students are advised to use Moodle for class communications.

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 the revision of the simulation game and early start of the game preparation.

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: https://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 anhonours thesis) even suspension from the university. The Student Misconduct Procedures are available here: http://www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Further information on School policy and procedures in the event of plagiarism is presented in a School handout, Administrative Matters, available on the School website.

9. Administrative Matters

You are expected to have read and be familiar with *Administrative Matters*, available on the School website: www.engineering.unsw.edu.au/mechanical-engineering/sites/mech/files/u41/S2-2015-Administrative-Matters_20150721.pdf

This document contains important information on student responsibilities and support, including special consideration, assessment, health and safety, and student equity and diversity.

Nathan Parrott
July 2015

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