



Mechanical and Manufacturing Engineering

Course Outline

Term 2 2019

MMAN4200

ADDITIVE MANUFACTURING

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1. Staff contact details

Contact details and consultation times for course convenor

Name: Dr Xiaopeng Li (Course convenor)

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Email: xiaopeng.li@unsw.edu.au

Contact hours

	Day	Time	Location
Lectures	Tuesday	9:00am – 10:00am	Colombo Theatre C (K-B16-LG05)

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. Understand the fundamental basis and nature of additive manufacturing techniques	PE1.1, PE 1.3, PE1.5, PE2.2, PE3.6
2. Explain the principles and develop a system	

Date	Topic	Lecture content	Demonstration/lab content	Suggested readings
Week 3	Polymer additive manufacturing	Current additive manufacturing techniques for printing polymers, printing mechanisms, advantages and limitations	Review of previous lecture and exercises	Moodle lecture notes
Week 4	Ceramic additive manufacturing	Current additive manufacturing techniques for printing ceramics, printing mechanisms, advantages and limitations	Review of previous lecture and exercises	Moodle lecture notes
Week 5,6,7	Lab project			
Week 8	A project study and design	A case study based on polymer, metal or ceramics additive manufacturing using printers in the school lab	Project presentations	Moodle lecture notes
Week 9	Additive manufacturing process optimisation and design for additive manufacturing	Principles and strategies for additive manufacturing process optimisation; and software and design of advanced structures	Review of previous lecture and exercises	Moodle lecture notes

6. Assessment

Assessment overview

Assessment	Group Project? (# Students per group)	Length	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Deadline for absolute fail	Marks returned
Online quizzes	No	1 to 5 questions every week (week 2,3,4,9,10)	10%	1, 2	Weekly lecture	Fortnightly, via Moodle	N/A	After the quiz closes
Assignment 1	No	Max 3000 words plus 10 references	25%	1, 2, 4	Lectures 1 to 4	Week 8	N/A	Week 11
Lab project	Yes (5 max)	1 or 2 days	25%	1, 2, 3, 4	Refer to assignment details	Week 8	N/A	Week 11
Final exam	No	2 hours	40%	1, 2, 4	All course content from week 1 to 10	Exam period, date TBC	N/A	Upon release of final results

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

Assignments

Assignment 1 requires each student or a group of students (depending on the number of the enrolled students) to write an essay based on given topics about additive manufacturing. The topics will be provided to the students in week 4.

For the Lab project, students will be divided into several groups and a small, flexible project will be given to each group. Each project will be focused on polymer or metal additive manufacturing where y

- 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. 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](#) page.

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:

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

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