



Mechanical and Manufacturing Engineering

# CourseOutline

Semester 2 2018

MECH9650

INTRODUCTION TO MICRO  
ELECTROMECHANICAL SY STEMS



# 1. Staff contact details

Contact hours

	Day	Time	Location
Lectures	Tuesdays	6pm - 7pm	Physics Theatre (K-K14-19)
Demonstrations and Lab	Tuesdays	7pm – 9pm	Physics Theatre (K-K14-19), Computer labs, UTL ( <i>announced on the day</i> )

Summary and Aims of the course

This course introduces the fundamentals of Micro Electromechanical systems (MEMS) and its applications in a wide range of devices and systems, as well as the design and simulation of these systems. MEMS is an enabling technology which has been penetrated into and begun to change the way major discipline do things, including biotechnology, storage technology, instrumentation, optical communications, telecommunications, MEMS device packaging, etc.

The aim of the course is to give the students hands on experience about the learning field of MEMs. This is a blended learning course meaning that the student’s learning will be largely self-driven in the time outside the scheduled face-to-face time. A broad introduction to the field of MEMs is provided and students will learn about diversity and significance of the field. A focus will be fabrication and microfluidics. By the end the students will understand, fabricate and compute their own MEMs system device for analysis.

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. Identify a range of technologies used in micro-fabrication and microfluidics and explain the manufacturing methods from a range of	PE1.1-PE1.6
2. Fabricate a micro-fluidics system or component using available school facilities by applying the theory learned	PE1.5, PE1.6, PE2.1

3. Compute micro-fluidics problems by applying the techniques, skills, d9.7(, d9(a m)3.4(i)-1.1(c)-1.7(r)0.7(818d9(a m)3.4.7(, d9.ng0.98 -0 d9(5 b6T 0.00

Learning Outcome	EA Stage 1 Competencies
Complete an end-to-end micro-	
5.	



## 6. Assessment

Assessment overview

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





## 10. Administrativemattersand 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](#)

# 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