



UNSW

# Course Outline

Semester 1, 2015

**MMAN3200**

**Linear Systems and Control**

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## Course Outline

### MMAN3200 Linear Systems and Control

#### 1. COURSE STAFF

##### Contact details and consultation times for the lecturing staff

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Consultation times with Dr Vulovic will be announced later.

Consultations are possible outside the set times, but a prior appointment with the lecturer is recommended. Face-to-face consultations are the preferred form, while Moodle discussion, phone or email should only be used as a last resort and only for resolving simple or more general issues.

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 you should aim to spend not less than about 10 h/w on this course, i.e. an additional 4 h/w of your own time. This should be spent in making sure that you understand the lecture material, completing the set assignments, further reading about the course material, and revising and learning for the examination.

### **Timetable**

Lecture 1: Tue 13:00 – 15:00 Burrows Theatre

Lecture 2: Fri 16:00 – 18:00 Burrows Theatre

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filtering and many more that involve describing systems and signals in the frequency domain.

### **Expected student learning outcomes**

By the end of this course it is expected that you will:

- learn how to create linear mathematical models of a variety of systems;
- learn how to analyse linear time invariant continuous systems;
- learn how behaviour of systems can be described in the complex domain;
- understand the relationships between the time and complex domains;
- master the block-diagram technique;
- improve your analytical abilities and understanding of different systems and components.
- learn how to evaluate the stability of the systems using state space;
- be introduced to the area of signal processing.

### **Graduate attributes**

UNSW's graduate attributes are shown at

<https://my.unsw.edu.au/student/atoz/GraduateAttributes.html>

UNSW aspires to develop graduates who are rigorous scholars, capable of leadership and professional practice in a global community. The university has, thus, articulated the following Graduate Attributes as desired learning outcomes for ALL UNSW students.

UNSW graduates will be

1. Scholars who are:
  - (a) understanding of their discipline in its interdisciplinary context
  - (b) capable of independent and collaborative enquiry
  - (c) rigorous in their analysis, critique, and reflection
  - (d) able to apply their knowledge and skills to solving problems
  - (e) ethical practitioners
  - (f) capable of effective communication
  - (g) information literate
  - (h) digitally literate
2. Leaders who are:
  - (a) enterprising, innovative and creative
  - (b) capable of initiating as well as embracing change
  - (c) collaborative team workers
3. Professionals who are:
  - (a) capable of independent, self-directed practice
  - (b) capable of lifelong learning
  - (c) capable of operating within an agreed Code of Practice

4. Global Citizens who are:
- (a) capable of applying their discipline in local, national and international contexts
  - (b) culturally aware and capable of respecting diversity and acting in socially just/responsible ways
  - (c) capable of environmental responsibility
- = Developed in this course

In this course, you will be encouraged to develop graduate attributes 1(b), 1(c), 1(d), 1(f), 1(g), 3(a), 4(a) and 4(b) by undertaking the selected activities and knowledge content. These attributes will be assessed within the prescribed assessment tasks, as shown in the assessment table on Page 6.

You will be supported in developing the above attributes through:

- (i) the design of academic programs;
- (ii) course planning and documentation;
- (iii) learning and teaching strategies; and
- (iv) assessment strategies.

### **3. RATIONALE FOR INCLUSION OF CONTENT AND TEACHING APPROACH**

This course is included to give you the understanding as well as the analytical skills related to control theory and its applications.

Effective learning is supported when you are actively engaged in the learning process and by a climate of enquiry, and these are both an integral part of the lectures and demonstrations.

You become more engaged in the learning process if you can see the relevance of your studies to professional, disciplinary and/or personal contexts, and the relevance is shown in the lectures and assignments by way of most examples being drawn from real applications.

to illustrate the significance of the theory. For most classes lecture notes will be available on-line and beforehand. Students are encouraged to ask questions during the classes.

Demonstrations are designed to provide you with the practical aspect of the analytical concept presented in lectures. Demonstration example sets, which will





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.

- 10 Frequency based control system design - Bode plot.  
Lab 2
- 11 State-space notation. Canonical forms in state space. **Lab 1 report due.**
- 12 State space design and system responses.  
Lab 2
- 13 Contingency time. Revision. **Lab 2 report due.**

The schedule shown may be subject to change at short notice to suit exigencies.

## 7. ACADEMIC HONESTY AND PLAGIARISM

Plagiarism is using the words or ideas of others and presenting them 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 booklet which provides essential information for avoiding plagiarism: <https://my.unsw.edu.au/student/academiclife/Plagiarism.pdf>

There is a range of resources to support students to avoid 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. Information is available on the dedicated website Plagiarism and Academic Integrity website: <http://www.lc.unsw.edu.au/plagiarism/index.html>

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 a honours 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 for Engineering Students* (see the *Administrative Matters for Engineering Students* booklet).

## 8. RESOURCES FOR STUDENTS

**Textbook:** Ogata, K. "Modern Control Engineering" (Copies are

suitable for the course. This should enable us to run two labs which in turn should give you a better appreciation of the theoretical work presented in lectures.