







## Contact hours

|          | Day     | Time      | Location      |
|----------|---------|-----------|---------------|
| Lectures | Monday  | 1500 1700 | Ainsworth 102 |
| Studio   | Tuesday | 1000 1200 | Ainsworth 102 |
| Catia    | Tuesday | 1200 1300 | Ainsworth 204 |

## Summary of the course

The course will provide the student with an understanding of the aerospace design process.

## Aims of the course

The course builds on the principles taught in the science based classes and provides insight into the application of aeronautical engineering knowledge in a practical industrial environment. Students are shown methods used by practicing engineers in the design process and assisted in developing engineering judgement that will be useful to them throughout their careers. They are also introduced to the tools and data sources used by a modern practicing aerospace designer.

## 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.               | Carry out a simple aerospace detail design   | PE 1.5 PE 2.3 PE 3.2<br>PE 3.3 |
| 2.               | Understand how aerospace structures, flight dynamics, propulsion and systems interact with the design process          | PE 1.3 PE 3.2 PE3.3            |
| 3.               | Have a very basic ability to use CATIA, the design computer program that dominates the industry                        | PE 1.5 PE 2.2                  |
| 4.               | An ability to seek out sources if design data and evaluate their reliability and relationship to the safety regulators | PE 1.6 PE 3.1                  |

### 3. Teaching strategies

A number of teaching strategies are adopted in the teaching of this course. Each week there are three hours of lectures shared by academics with expertise in flight dynamics\propulsion, aerostructures, regulations and aerosystems. The aim of these lectures is to assist in the understanding of how the theoretical work undertaken on the course relates to the design of aerospace vehicles.

Two hours a week are spent in a studio environment. The aim of this time is to cultivate creative skills by undertaking a number of simple structural design tasks under supervision. This approach is adapted from the teaching methods developed for architectural students. A further hour is allocated in the computer lab for learning CATIA. This is taught by direct hands on practice where exercises are provided which when complete allow the required standard to be achieved. The undertaking of these tasks is entirely voluntary but there is a strong correlation that those who ignore this opportunity do poorly at the CATIA assignment. During this period the students will also be able to attend a demonstration of modern simulation in small groups if they wish.

### 4. Course schedule

| Topic              | Date     | Location      | Lecture Content     | Demonstration/Lab Content | Suggested Readings |
|--------------------|----------|---------------|---------------------|---------------------------|--------------------|
| Flt.Dyn. and Prop. | Wk. 1-12 | Mech.Eng. 102 | Design implications | N/A                       | As required        |
| Systems            | Wk 1-7   | Mech.En 0 1   |                     |                           |                    |

## 5. Assessment

### Assignments

| Assessment          | Weight | Learning outcomes assessed | Assessment criteria   | Due date and submission requirements | Marks returned |
|---------------------|--------|----------------------------|---|--------------------------------------|----------------|
| Aircraft assessment | 10%    | 2, 4                       | Research and assessment of material in public domain                    | Mon Wk 5, 1500                       | By Wk.7        |
| Flight systems      | 20%    | 1, 2, 4                    | A detailed design project   | Mon Wk 9                             | By Wk 12       |
| CATIA               | 20%    | 3, 4                       | Electronically submitted exercise showing understanding of capabilities | Tues Wk 13, 1700                     | On Request     |

### Class test

| Assessment | Weight | Learning outcomes assessed | Assessment criteria | Due date and submission requirements | Marks returned |
|------------|--------|----------------------------|---------------------|--------------------------------------|----------------|
|------------|--------|----------------------------|---------------------|--------------------------------------|----------------|

Flight mechanics/propulsion



## 6 resources for students

You will be expected to access and reference a number of texts throughout the course of this subject.





## Appendix A: Engineers Australia (EA) Stage 1 Competencies for Professional Engineers

|                                      | <b>Program Intended Learning Outcomes</b>   |
|--------------------------------------|---|
| <b>PE1: Knowledge and Skill Base</b> | 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 Judgment