Double Degree

Mechanical Engineering (Honours) / Science

4483  |  240 Units of Credit

Overview

This program is not available to international or Defence sponsored students.

The School of Engineering and Information Technology (SEIT) and the School of Physical, Environmental and Mathematical Sciences (PEMS) offer a dual degree program which qualifies students for two degrees after the equivalent of five years of successful full-time study leading to the award of the degrees Bachelor of Engineering (Mech) (Honours) and Bachelor of Science (BE (Mech) (Hons) BSc).

The School of Engineering and Information Technology (SEIT) will administer the program. Students should seek advice from the relevant School Office in the first instance, or from Student Administrative Services, UNSW Canberra.
<table>
<thead>
<tr>
<th>Faculty</th>
<th>UNSW Canberra at ADFA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campus</td>
<td>Canberra</td>
</tr>
<tr>
<td>Study Level</td>
<td>Undergraduate</td>
</tr>
<tr>
<td>Typical duration</td>
<td>5 Years</td>
</tr>
<tr>
<td>Academic Calendar</td>
<td>UNSW Canberra Calendar</td>
</tr>
<tr>
<td>Minimum Units of Credit</td>
<td>240</td>
</tr>
<tr>
<td>Award(s)</td>
<td>Bachelor of Engineering (Honours) - BE (Hons) Bachelor of Science - BSc</td>
</tr>
</tbody>
</table>
Learning Outcomes

4474 - Mechanical Engineering (Honours)

1. Students will be able to relate a quantitative, theory-based understanding of the sciences and engineering fundamentals of mechanical engineering (encompassing design, manufacture, kinematic, aerodynamic, thermal, and structural analysis, and instrumentation and control of mechanical systems).

2. Students will be able to appropriately select and apply the mathematical, statistical, programming and computational tools and techniques which underpin mechanical engineering.

3. Students will demonstrate a comprehensive understanding of mechanical systems and sub-systems, and articulate directions of future research and knowledge development in mechanical engineering.

4. Students will synthesise engineering design practice, contextual factors, norms and accountabilities in and the limitations on mechanical engineering.

5. Students will define, conduct experiments on and analyse complex, open-ended problems and apply appropriate methods for their solution.

6. Students will demonstrate proficiency in applying systematic engineering synthesis and design processes, and critically evaluating and effectively communicating the results and implications to all audiences.

7. Students will be able to operate in collaborative environments, as leader or member of interdisciplinary teams.

8. Students will demonstrate independence, creativity and ethical conduct, and explain the importance of user-focused and sustainable solutions.

4415 - Science
1. understand the content of their discipline and its interdisciplinary context. Students should be able to adequately determine the scope of their scientific discipline, its key insights, and what it adds to an understanding of the world. Students should be able to apply disciplinary knowledge and skills to solve problems.

2. engage in scientific practice with technical competence and adequate discipline-specific knowledge. Students should have the ability to construct new concepts and create new understanding through the process of inquiry, critical analysis, problem-solving, and scientific research.

3. demonstrate professional motivation and a capacity for creativity and long-term intellectual development. Students should have the ability to take responsibility for their own learning, motivated by curiosity and an appreciation of the value of knowledge.

4. communicate effectively and appropriately in a professional context (intra and inter disciplinary), or in a broader social context. Students should be able to speak competently about scientific issues in their discipline, and explain these issues to specialists and lay-people.

5. contribute positively to collaborative scientific research. Students should demonstrate a capacity for self-management, teamwork and leadership. Students should be capable of open-minded, objective and reasoned analysis, in order to achieve common goals and further the learning of themselves and others.

6. make appropriate and effective use of information and digital information-technology relevant to their discipline. Students should be familiar with important sources of information in their discipline and important tools of search and analysis.

7. reflect critically upon broad ethical ideas and specific codes of conduct in order to behave in accordance with ethical practice and social responsibility. Student should be able to reflect critically on their responsibilities within a professional community or broader social community.

Graduate Capabilities:
For more information on Graduate Capabilities, please click on this link.
Stand Alone Programs

Click on the link below to find out more about each individual program.

Program 4474
Mechanical Engineering (Honours)

Program 4415
Science
Double Degree Structure

Students must complete 240 UOC.

Bachelor of Engineering (Mechanical) (Honours)/Bachelor of Science majoring in Mathematics and Statistics

1. Bachelor of Engineering (Mechanical) (Honours) - 144 UOC
2. Bachelor of Science majoring in Mathematics and Statistics – 72 UOC
3. Double Counted Courses: ZPEM1303, ZPEM1304, ZPEM2309, ZPEM2310 – 24 UOC

Bachelor of Engineering (Mechanical) (Honours)/Bachelor of Science majoring in Physics

1. Bachelor of Engineering (Mechanical) (Honours) - 144 UOC
2. Bachelor of Science majoring in Physics – 78 UOC
3. Double Counted Courses: ZPEM1303, ZPEM1501, ZPEM1304 – 18 UOC

Majors

4415 - Science

Students must complete one of the majors below.

MAJOR:

AMATA1 | 48 UOC
Mathematics and Statistics

APHYA1 | 48 UOC
Physics

ZITEK1 | 48 UOC
Computer Science

Computer Science (ZITEK1):

Only available to students enrolled in the Bachelor of Engineering (Electrical) (Hons)/Science (4482).

Mathematics and Statistics (AMATA1)
- ZPEM1301 Mathematics 1A and ZPEM1302 Mathematics 1B are substituted by ZPEM1303 Engineering Mathematics 1A and ZPEM1304 Engineering Mathematics 1B.

- ZPEM2311 Mathematical Modelling and ZPEM2303 Mathematical Tools for Science are substituted by ZPEM2309 Engineering Mathematics 2A and ZPEM2310 Engineering Mathematics 2B.

- Students take the Level 3 Core Courses ZPEM3301 Topics in Mathematics, ZPEM3311 Mathematical Methods, and ZPEM3313 Applied Nonlinear Dynamics.

**Level 1 Core Courses**

4474 - Mechanical Engineering (Honours)

Students must take 48 UOC of the following courses.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>UOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZEIT1102</td>
<td>6</td>
</tr>
<tr>
<td><strong>Introduction to Programming</strong></td>
<td></td>
</tr>
<tr>
<td>ZEIT1501</td>
<td>6</td>
</tr>
<tr>
<td><strong>Engineering Practice and Design</strong></td>
<td></td>
</tr>
<tr>
<td>ZEIT1503</td>
<td>6</td>
</tr>
<tr>
<td><strong>Engineering Mechanics</strong></td>
<td></td>
</tr>
<tr>
<td>ZEIT1504</td>
<td>6</td>
</tr>
<tr>
<td><strong>Introduction to Mechanical and Aeronautical Engineering</strong></td>
<td></td>
</tr>
<tr>
<td>ZPEM1303</td>
<td>6</td>
</tr>
<tr>
<td><strong>Engineering Mathematics 1A</strong></td>
<td></td>
</tr>
<tr>
<td>ZPEM1304</td>
<td>6</td>
</tr>
<tr>
<td><strong>Engineering Mathematics 1B</strong></td>
<td></td>
</tr>
<tr>
<td>ZPEM1307</td>
<td>6</td>
</tr>
<tr>
<td><strong>Computational Problem Solving</strong></td>
<td></td>
</tr>
<tr>
<td>ZPEM1501</td>
<td>6</td>
</tr>
<tr>
<td><strong>Physics 1A: Mechanics, Waves and Thermodynamics</strong></td>
<td></td>
</tr>
</tbody>
</table>
### Level 2 Core Courses

**4474 - Mechanical Engineering (Honours)**

Students must take 48 UOC of the following courses.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>UOC</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZEIT2500</td>
<td>6</td>
<td>Thermofluids</td>
</tr>
<tr>
<td>ZEIT2501</td>
<td>6</td>
<td>Mechanical and Electronic Design</td>
</tr>
<tr>
<td>ZEIT2503</td>
<td>6</td>
<td>Fluid Mechanics</td>
</tr>
<tr>
<td>ZEIT2504</td>
<td>6</td>
<td>Mechanics of Solids</td>
</tr>
<tr>
<td>ZEIT2700</td>
<td>6</td>
<td>Mechanics of Machines</td>
</tr>
<tr>
<td>ZINT2501</td>
<td>6</td>
<td>Engineering Materials and Chemistry</td>
</tr>
<tr>
<td>ZPEM2309</td>
<td>6</td>
<td>Engineering Mathematics 2A</td>
</tr>
<tr>
<td>ZPEM2310</td>
<td>6</td>
<td>Engineering Mathematics 2B</td>
</tr>
</tbody>
</table>

### Level 3 Core Courses

**4474 - Mechanical Engineering (Honours)**

Students must take 36 UOC of the following courses.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>UOC</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZEIT3500</td>
<td>6</td>
<td>Engineering Structures</td>
</tr>
</tbody>
</table>
Level 4 Core Courses

4474 - Mechanical Engineering (Honours)

Students must take 24 UOC of the following courses.

ZEIT4500 | 6 UOC
Engineering Project A

ZEIT4501 | 6 UOC
Engineering Project B

ZEIT4505 | 6 UOC
Mechanical and Aeronautical Engineering Management

ZEIT4700 | 6 UOC
Mechanical Design 2

Technical Electives

4474 - Mechanical Engineering (Honours)
Students must take at least 12 UOC of the following courses.

- **ZEIT4001** | 6 UOC  
  Engineering Structures 2

- **ZEIT4003** | 6 UOC  
  Computational Fluid Dynamics

- **ZEIT4005** | 6 UOC  
  Naval Architecture

- **ZEIT4006** | 6 UOC  
  Structural Integrity Assessment

- **ZEIT4007** | 6 UOC  
  Rotorcraft Engineering

- **ZEIT4008** | 6 UOC  
  Integrated Mechanical Design

- **ZEIT4011** | 6 UOC  
  Occasional Elective 1

- **ZEIT4012** | 6 UOC  
  Occasional Elective 2

- **ZEIT4014** | 6 UOC  
  Impact Dynamics

- **ZEIT4504** | 6 UOC  
  Electrical and Mechanical Plant

- **ZEIT4703** | 6 UOC  
  Land Mobility and Weapons

One of the following:

- **ZEIT4503** | 6 UOC
Science Electives

4415 - Science

Students complete between 12 UOC - 36 UOC in Science electives depending on the specific Engineering Discipline and Science Major combination.

4480 BEng (Aero) / BSc:
- Students majoring in Maths & Stats complete any 36 UOC in Science electives as listed below.
- Students majoring in Physics complete any 12 UOC in Science electives as listed below. ZPEM3103 Quantum Theory and Applications in Spectroscopy is recommended.

4481 BEng (Civil) / BSc:
- Students majoring in Maths & Stats must complete ZPEM1102 Chemistry 1B and a total of 36 UOC in Science electives as listed below.
- Students majoring in Physics complete any 12 UOC in Science electives as listed below. ZPEM3103 Quantum Theory and Applications in Spectroscopy is recommended.

4482 BEng (Elec) / BSc:
- Students majoring in Computer Science complete any 24 UOC in Science electives as listed below.
- Students majoring in Maths & Stats must complete ZPEM1502 Physics 1B and a total of 36 UOC in Science electives as listed below.
- Students majoring in Physics complete any 18 UOC in Science electives as listed below. ZPEM3103 Quantum Theory and Applications in Spectroscopy is recommended.

4483 BEng (Mech) / BSc:
- Students majoring in Maths & Stats complete any 36 UOC in Science electives as listed below.
- Students majoring in Physics complete any 12 UOC in Science electives as listed below.
ZPEM3103 Quantum Theory and Applications in Spectroscopy is recommended.

any Engineering and Information Technology course

any Physical, Environmental & Mathematical Sciences course

General Education

4415 - Science

Students must take at least 6 UOC of the following courses, normally taken in the fourth or fifth year of study.

One of the following:
ZGEN2222 6 UOC
Introduction to Strategic Studies

ZGEN2801 6 UOC
Strategy, Management and Leadership

One of the following:
ZGEN2215 6 UOC
Law, Force and Legitimacy

ZGEN2240 6 UOC
Introduction to Military Ethics

Level 4 Maturity Requirements

4474 - Mechanical Engineering (Honours)

Students may not attempt the following courses until they have successfully completed 102 UOC of their engineering program (excluding general electives).

any level 4 course

ZINT2100 Cyber Security

4483 - Mechanical Engineering (Honours) / Science

For students majoring in Maths & Stats, ZINT2100 Cyber Security may be taken in
Year 2, 3, 4 or 5 as required. For students majoring in Physics, ZINT2100 Cyber Security may be taken in Year 3, 4 or 5 as required.

**Maturity Requirements**

4483 - Mechanical Engineering (Honours) / Science

- Students must complete 36 UOC of Level 1 courses before undertaking Level 2 courses.
- Student must complete 72 UOC of Level 1/2 courses before undertaking Level 3 courses.
- Students must complete 102 UOC of their engineering program (excluding General Education courses) before undertaking Level 4 courses.

**Technical Electives**

4474 - Mechanical Engineering (Honours)

Students may choose to focus their studies by taking elective courses in the following areas of interest:

Marine
ZEIT4702 Instrumentation (6 UOC)
ZEIT4005 Naval Architecture (6 UOC)
ZEIT4504 Electrical & Mechanical Plant (6 UOC)
ZEIT4705 Marine Project (6 UOC)

Land-based
ZEIT4702 Instrumentation (6 UOC)
ZEIT4504 Electrical & Mechanical Plant (6 UOC)
ZEIT4703 Land Mobility and Weapons (6 UOC)
ZEIT4704 Land Vehicles (6 UOC)

**Sample Double Degree(s)**

To access sample program(s), please visit:

**4483 Mechanical Engineering (Honours)/Science Sample Program**

Please read the Double Degree Program rules as some specific rules apply to particular Double Degree combinations.

**Enrolment Disclaimer**

Unless advised otherwise by your program authority, you should follow the rules for the handbook for the year you commenced your program. You are also responsible
for ensuring you enrol in courses according to your program requirements. myUNSW enrolment checks that you have met enrolment requirements such as pre-requisites for individual courses but not that a course will count towards your program requirements.
Program Fees

At UNSW fees are generally charged at course level and therefore dependent upon individual enrolment and other factors such as student's residency status. For generic information on fees and additional expenses of UNSW programs, click on one of the following:

Domestic Students
Commonwealth Supported Students
International Students
Pre-2019 Handbook Editions

Access past handbook editions (2018 and prior)

Pre-2019 Handbook Editions
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Authorised by Deputy Vice-Chancellor (Academic)
CRICOS Provider Code 00098G
ABN: 57 195 873 179