

Quick Summary and Rationale of the changes to Flinders Engineering Programs since the 2016 accreditation

This summary appears in the main document under Section AP.

Biomedical Engineering

- Bachelor of Engineering (Biomedical) (Honours)
- Master of Engineering (Biomedical)
- Bachelor of Engineering (Biomedical) (Honours), Master of Engineering (Biomedical)
- Bachelor of Engineering (Mechanical) (Honours), Master of Engineering (Biomedical)

In short, very little has changed in these programs. The minor changes have been as follows:

1. The topic ENGR9742 Standards, Ethics and Compliance has undergone a name change to Systems Engineering and now includes additional study in Systems Engineering. This displaces the content on standards and compliance, which was necessarily cross-disciplinary, which has migrated to the discipline specific capstone and other topics, such as, in the case of biomedical engineering, ENGR7781 Innovation in Medical Devices. The material on ethics remains in the topic.
2. The topic ENGR3704 Project Management for Engineering and Science will be replaced by ENGR9704 Engineering Management for 2022 to facilitate a new combined degree with our new Master of Engineering Management program. A new academic has been employed to take responsibility for this content.
3. The BEng(Hons) and MEng Course Rules used to reference a list of elective topics of which some were designated as appropriate for the Biomedical degree. It was considered easier for the students if the table was deleted and the specific topics added to each course rule. There was no implications for the program of study.

Civil Engineering

- Bachelor of Engineering (Civil) (Honours)
- Master of Engineering (Civil)
- Bachelor of Engineering (Environmental) (Honours), Master of Engineering (Civil)

In short, very little has changed in these programs. The minor changes have been as follows:

1. The topics ENGR7951 Advanced Infrastructure Design 1 and ENGR7872 Advanced Infrastructure Design 2 have undergone name changes to Advanced Infrastructure Design: Transport and Structural Engineering and Advanced Infrastructure Design: Geotechnical and Water Engineering, respectively. This adjustment is to provide

further clarity on topic content and avoid students incorrectly assuming ENGR7951 is a prerequisite for ENGR7872.

2. The topic ENGR9742 Standards, Ethics and Compliance has undergone a name change to Systems Engineering and now includes additional study in Systems Engineering. This displaces the content on standards and compliance, which was necessarily cross-disciplinary, which has migrated to the discipline specific capstone and other topics, such as, in the case of civil engineering, ENGR7781 Innovation in Medical Devices. The material on ethics remains in the topic.
3. The topic ENGR3704 Project Management for Engineering and Science will be replaced by ENGR9704 Engineering Management for 2022 to facilitate a new combined degree with our new Master of Engineering Management program. A new academic has been employed to take responsibility for this content.
4. The BEng(Hons) and MEng Course Rules used to reference a list of elective topics of which some were designated as appropriate for the Civil degree. It was considered easier for the students if the table was deleted and the specific topics added to each course rule. There was no implications for the program of study. In addition, the new topic ENGR7891 Fatigue and Fracture Analysis was developed and introduced in Mechanical Engineering which is added to this list as it is considered a suitable final year elective topic for Civil Engineering.
5. A new combination with the new Environmental Engineering degree has been established.

Electrical and Electronic Engineering

- Bachelor of Engineering (Electrical and Electronic) (Honours)
- Bachelor of Engineering (Electrical) (Honours) – Phasing Out
- Bachelor of Engineering (Electronics) (Honours) – Phasing Out
- Bachelor of Engineering (Computer and Network Systems) (Honours) – Phasing Out
- Master of Engineering (Electrical and Electronic) – New course
- Master of Engineering (Electronics) – Phasing Out
- Bachelor of Engineering (Robotics) (Honours), Master of Engineering (Electrical and Electronic) – New course
- Bachelor of Engineering (Robotics) (Honours), Master of Engineering (Electronics) – Phasing Out
- Bachelor of Engineering (Electrical and Electronic) (Honours), Master of Engineering (Mechanical)

The list below details the changes in the Electrical and Electronic Engineering program.

1. Three undergraduate Bachelor of Engineering (Honours) degrees have been merged to form a new Bachelor of Engineering (Electrical and Electronic) (Honours) degree with four majors. Three of the majors map directly onto the previous degrees and the four provides a pathway for the new Bachelor of Engineering Technology (Electronic Systems and Security) to progress to full Professional Engineer. All existing students have been given the option of transitioning to the new award.

2. The postgraduate Master of Engineering (Electronics) has been replaced with a Master of Engineering (Electrical and Electronic) with three minors – Electrical, Electronic and Robotics and Computer Vision.
3. In the past, Flinders offered a combined BEng(Electrical) with BEng(Mechanical). Despite being a long combination, it was fairly popular. We have replaced that by a combined BEng(E&E) with MEng(Mechanical). As always, no topics are dropped in the combination and the duration is thus 5.5 years.

Apart from this major change, some more minor changes have also been implemented:

4. The topic ENGR9742 Standards, Ethics and Compliance has undergone a name change to Systems Engineering and now includes additional study in Systems Engineering. This displaces the content on standards and compliance, which was necessarily cross-disciplinary, which has migrated to the discipline specific capstone and other topics, such as, in the case of Electrical and Electronic engineering, ENGR7851 Advanced Electronic Design, ENGR7762 Renewable Energy Systems, ENGR7731 Computer Architecture and ENGR7782 Systems and Security in the Information Age. The material on ethics remains in the topic.
5. The topic ENGR3704 Project Management for Engineering and Science will be replaced by ENGR9704 Engineering Management for 2022 to facilitate a new combined degree with our new Master of Engineering Management program. A new academic has been employed to take responsibility for this content.

Electronic Systems and Security

- Bachelor of Engineering Technology (Electronic Systems and Security)
- Bachelor of Engineering Technology (Electronic Systems and Security), Bachelor of Science (Physics)

This is a new program and is Flinders only degree offered for accreditation at the Engineering Technologist level.

Overview

This is a new course that has been created as a result of a dramatic shortage of engineers working in the field of Electronic Warfare. It is unique in Australia. While a number of other organisations were consulted, this course is primarily the product of a close relationship between Defence Science and Technology (DST) and Flinders resulting in a project to enhance the flow of graduates (at all levels – BEngTech through to PhD) and to enhance our research capacity.

Flinders has worked closely with DST for many years across a number of areas and this course was first conceived at the start of 2019 as an offshoot of discussions in the field of Electronic Warfare (although the course uses the term *Electronic Systems and Security* as this term is more general).

Name of the Award

We settled on a Bachelor of Engineering Technology for the following reasons:

1. The relative narrowness of the course meant that it suited the guidelines for a Bachelor of Engineering Technology better than a Bachelor of Engineering (Honours).
2. The desire for students to complete a Bachelor of Science (Physics) at the same time.
3. The need to satisfy the graduate demand as soon as possible.

Notwithstanding this, graduates of the Bachelor of Engineering Technology can continue and complete a Bachelor of Engineering (Electrical and Electronic) (Honours) as we have also included an Electronic Systems and Security major within that degree.

The term *Electronic Systems and Security* was selected in preference to the term *Electronic Warfare* for two reasons. First, the term Electronic Systems and Security is seen as a little broader providing graduates with options beyond the defence industry, and second, the name was seen as more saleable.

Design of the Award

The award has been designed with three objectives:

1. It must satisfy the graduate demands of the industry. To do this we consulted heavily with DST and others.
2. It must facilitate a combined degree with a Bachelor of Science (Physics). The award thus allows alternate physics topics in first year so that students are able to add (or subtract) the physics award.
3. It must facilitate students continuing to finish a Bachelor of Engineering (Electrical and Electronic) (Honours) in as shorter extra time as possible. The award thus contains topics in the early years that are not directly relevant to the EW industry but exist in the BEng(E&E)(Hons).

The course includes three topics that are specific to the BEngTech:

[ENGR2705 Working in Secure and Sensitive Professions \(0 units\)](#)

[ENGR3891](#) Electromagnetic Technologies, Systems and Security (4.5 units)

[ENGR7782](#) Systems and Security in the Information Age (4.5 units)

and an engineering project and work integrated learning practicum to be undertaken at DST and other EW organisations. All other topics have been taken from other existing degrees, particularly the Bachelor of Engineering (Electrical and Electronic) (Honours), the Bachelor of Science (Physics) and the Bachelor of Computer Science (Artificial Intelligence).

Staffing and Benchmarking

The \$5M funding for the project included the funding for a Chair in Electronic Systems and Security (Professor Sam Drake started in January) and one further position to be identified. It also allows for scholarships to be paid for the duration of the course.

In terms of quality assurance, we are liaising with the South Australian defence industry company DEWC (<https://www.dewc.com>) and through them (and DST) with their School of Information Operations which is working with the Leonardo Academy in Lincoln, UK.

Environmental Engineering

- Bachelor of Engineering (Environmental) (Honours)
- Bachelor of Engineering (Environmental) (Honours), Bachelor of Science (Environmental Science)
- Bachelor of Engineering (Environmental) (Honours), Master of Engineering (Civil)

This is a new program.

Overview

This is a new course that has been created as a result of industry demand. Indeed, the proposal was first put forward from the Industry Advisory Board. It fits well with Flinders strength in Environmental Science, particularly in water resource management, and is particularly appropriate to the South Australian environment (See Section 2.1.2.3).

Name of the Award

While we did consider other names, particularly with Flinders strengths in water resource management, we settled on a Bachelor of Engineering (Environmental) (Honours) as the term is the accepted term across Australia.

Notwithstanding this as a separate degree, we are also aware that some students are undecided between civil engineering and environmental engineering so have also created a combined Bachelor of Engineering (Environmental) (Honours) with Master of Engineering (Civil) for high performing students. This combination does not sacrifice any topic materials in the combination.

Design of the Award

The award has been designed with three objectives:

1. It must satisfy the graduate demands of the industry. To do this we consulted heavily with civil engineering firm and others. The EA guidelines on the construction of Environmental Engineering degrees were also a great help.
2. It must facilitate a combined degree with a Bachelor of Science (Environmental Science). Again, we believed that some students would be torn between the two degrees so we facilitated the combination.

The course includes three topics that are specific to the BEng(Environmental)(Hons):

ENGR2882 Waste Management (4.5 units)

ENGR3901 Sustainable Engineering (4.5 units)

ENGR7971 Advanced Environmental Engineering Design (4.5 units)

plus engineering projects and work integrated learning practicums to be undertaken at appropriate organisations. All other topics have been taken from other existing degrees, particularly the Bachelor of Engineering (Civil) (Honours), the Bachelor of Science (Environmental Science) and the Master of Environmental Management.

Staffing and Benchmarking

We have been fortunate in the Professor Adrian Werner has recently transferred to the Engineering Group. His expertise is in Civil and Environmental Engineering and his ARC Future Fellow expires at the right time for him to help with the new topics. We are also negotiating for industry scholarships to be paid to students in the course.

In terms of quality assurance, this course will be benchmarked closely and in particular, industry involvement in the course will be a priority.

Materials Engineering

- Master of Engineering (Materials)
- Bachelor of Science (Chemical Sciences), Master of Engineering (Materials)

The list below outlines the changes in the Materials Engineering program. In comparison with other programs, it has not changed much.

1. The topic ENGR9742 Standards, Ethics and Compliance has undergone a name change to “Systems Engineering” and now includes additional study in Systems Engineering. This displaces the content on standards and compliance, which was necessarily cross-disciplinary, which has migrated to the discipline specific capstone and other topics, such as, in the case of mechanical engineering, ENGR7811 Advanced Mechanical Design. The material on ethics remains in the topic.

Mechanical Engineering

- Bachelor of Engineering (Mechanical) (Honours)
- Master of Engineering (Mechanical) – New course
- Bachelor of Engineering (Mechanical) (Honours), Master of Engineering (Biomedical)
- Bachelor of Engineering (Electrical and Electronic) (Honours), Master of Engineering (Mechanical)

The list below details the changes in the Mechanical Engineering program. It includes some minor changes together with the establishment of our new Master of Engineering (Mechanical) course:

1. The topic ENGR9742 Standards, Ethics and Compliance has undergone a name change to “Systems Engineering” and now includes additional study in Systems Engineering. This displaces the content on standards and compliance, which was necessarily cross-disciplinary, which has migrated to the discipline specific capstone and other topics, such as, in the case of mechanical engineering, ENGR7811 Advanced Mechanical Design. The material on ethics remains in the topic.
2. The topic ENGR3704 Project Management for Engineering and Science will be replaced by ENGR9704 Engineering Management for 2022 to facilitate a new combined degree with our new Master of Engineering Management program. A new academic has been employed to take responsibility for this content.

3. The BEng(Hons) used to reference a list of elective topics of which some were designated as appropriate for the Mechanical degree. It was considered easier for the students if the table was deleted and the specific topics added to each course rule. There was no implications for the program of study. In addition, three new topics were developed and introduced, mainly for Mechanical Engineering to provide more specialised electives as options for students in their honours level:
 - a. ENGR7861 Applied Acoustics
 - b. ENGR7891 Fatigue and Fracture Analysis
 - c. ENGR7921 Materials Selection in Design
4. A new Master of Engineering (Mechanical) course was developed offering a great range of mechanical engineering areas including solids, energy, design, materials, control, fluids, and mechanisms.

Robotics Engineering

- Bachelor of Engineering (Robotics) (Honours)
- Bachelor of Engineering (Robotics) (Honours), Master of Engineering (Electrical and Electronic) – New course
- Bachelor of Engineering (Robotics) (Honours), Master of Engineering (Electronics) – Phasing Out

Very little has changed in this program. The minor changes have been as follows:

1. The topic ENGR9742 Standards, Ethics and Compliance has undergone a name change to Systems Engineering and now includes additional study in Systems Engineering. This displaces the content on standards and compliance, which was necessarily cross-disciplinary, which has migrated to the discipline specific capstone and other topics, such as, in the case of robotics engineering, ENGR7712 Autonomous Systems. The material on ethics remains in the topic.
2. The topic ENGR3704 Project Management for Engineering and Science will be replaced by ENGR9704 Engineering Management for 2022 to facilitate a new combined degree with our new Master of Engineering Management program. A new academic has been employed to take responsibility for this content.
3. The BEng(Hons) Course Rule used to reference a list of elective topics of which some were designated as appropriate for the Robotics degree. It was considered easier for the students if the table was deleted and the specific topics added to each course rule. There was no implications for the program of study.
4. The combined degree now links to the new Master of Engineering (Electrical and Electronic).

Software Engineering

- Bachelor of Engineering (Software) (Honours)

There have been a few changes to this program as follows:

1. The first year has been altered to include more first year computing material at the expense of engineering physics, materials and statics. While the common first year for all engineering programs is attractive to enable student mobility, the need to better align to the new SFIA standard meant that space had to be found for the other material. The result is a stronger but more independent Software Engineering degree.
2. The topic ENGR9742 Standards, Ethics and Compliance has undergone a name change to Systems Engineering and now includes additional study in Systems Engineering. This displaces the content on standards and compliance, which was necessarily cross-disciplinary, which has migrated to the discipline specific capstone and other topics, such as, in the case of robotics engineering, ENGR7791 Software Engineering 4. The material on ethics remains in the topic.
3. The topic ENGR3704 Project Management for Engineering and Science will be replaced by ENGR9704 Engineering Management for 2022 to facilitate a new combined degree with our new Master of Engineering Management program. A new academic has been employed to take responsibility for this content.
4. The BEng(Hons) Course Rule used to reference a list of elective topics of which some were designated as appropriate for the Software degree. It was considered easier for the students if the table was deleted and the specific topics added to each course rule. There was no implications for the program of study.