



Charles Sturt  
University

## Workplace Learning Host Training Manual

CSU Engineering  
Charles Sturt University

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## CSU Engineering Industrial Host Supervisor Guide



*Senior Cadet Engineer Andrew Day Inspects the bridge on the Six Foot Track, Cox River, NSW.*

# Contents

<b>Introduction</b> .....	<b>5</b>
Key Terms .....	5
Key Contacts .....	5
<b>Roles and Responsibilities</b> .....	<b>6</b>
Host Supervisors: .....	6
Cadet Engineers: .....	6
Academic Mentors (Charles Sturt Staff) .....	6
Duty of Care and Student Placement Agreement.....	7
Incident Reporting .....	7
<b>Supervision of Cadets</b> .....	<b>8</b>
Mentoring of Cadets .....	8
<b>CSU Engineering Course Structure</b> .....	<b>11</b>
Combined BTech / MEng (Civil) 5.5 years .....	12
<b>Subject Strands</b> .....	<b>13</b>
Project Based Learning (Challenge/Thesis/Portfolio).....	13
Performance Planning and Review.....	13
The Topic Tree .....	13
The Topic Tree Structure .....	14
Topic Tree Progression.....	14
<b>Workplace Learning (WPL)</b> .....	<b>16</b>
Purpose of Assessment in WPL .....	16
<b>The Placement Process</b> .....	<b>17</b>
Key Forms .....	17
Standard Arrangements .....	19
Host Requirements .....	19
Additional Information .....	19
<b>Workplace Expectations</b> .....	<b>20</b>
<b>Confidentiality Issues</b> .....	<b>20</b>
<b>Junior Cadets</b> .....	<b>21</b>
ENG281 Overview .....	21
ENG290 Overview .....	22
ENG 273 (Topic Tree) Overview.....	23
<b>Intermediate Cadets</b> .....	<b>24</b>
ENG 381 Overview .....	24

ENG 398 Overview .....	25
<b>Senior Cadets.....</b>	<b>26</b>
ENG481 overview .....	26
ENG490 Overview .....	27
<b>Professional Cadets .....</b>	<b>28</b>
ENG581 Overview .....	28
ENG592 Overview .....	29
ENG598 Overview .....	29
ENG571 Topic Tree Overview .....	30
<b>Conclusion .....</b>	<b>31</b>
<b>Extra Resources and links.....</b>	<b>31</b>

# Introduction

The Civil Engineering degrees offered by Charles Sturt University contain a large amount of work place learning. After 1½ years of on campus study, student engineers become **Cadet Engineers** and undertake year-long paid placements at Engineering organisations around the country and the around the world, where they work on real projects while continuing their engineering education. Every cadet is supervised and mentored by an engineer who guides them through their development.

This manual is designed for host organisations who have or who are considering taking a cadet engineer from CSU Engineering. It contains information about the course, the requirements and expectations for the host organisation and the cadets.

## Key Terms

- Student engineer - a student who is completing their on-campus studies (this takes place in the first 1½ years of the degree).
- Cadet engineer - a student who is on placement
  - Junior cadet - a student on their first placement
  - Intermediate cadet - a student on their second placement
  - Senior cadet - a student on their third placement
  - Professional cadet - a student on their fourth placement
- Host organisation - a organisation who is hosting a cadet engineer
- Host supervisor - the engineer supervising the cadet engineer
- WPL - Work Place Learning; learning by working in the industry
- PBL - Project Based Learning; learning by completing projects
- BEng - 4 year Bachelor of Engineering (Civil) degree
- BTech/Meng - 5.5 year Bachelor of Technology/Master of Engineering (Civil) degree

## Key Contacts

Name	Position	Contact Details
Jenny Grainger	Workplace Learning Officer	Phone: 02 6933 2481 Email: <a href="mailto:engineering-wpl@csu.edu.au">engineering-wpl@csu.edu.au</a>
Peter Thew	Senior Engineer in Residence, Workplace Learning Academic.	Phone: 0490 116464 Email: <a href="mailto:pthew@csu.edu.au">pthew@csu.edu.au</a>
Jim Morgan	Director Charles Sturt Engineering	Phone: 02 6338 6301 Email: <a href="mailto:jmorgan@csu.edu.au">jmorgan@csu.edu.au</a>

# Roles and Responsibilities

In the workplace learning arrangement, the host, cadet and CSU all have particular roles and responsibilities.

## Host Supervisors:

- Provide the cadet engineer the opportunity to grow professionally and to accept appropriate responsibilities in the workplace;
- Support the cadet to complete a learning contract in conjunction with the academic supervisor at the beginning of the placement;
- Expose the cadet engineer to a variety of engineering learning experiences - constructive rather than menial tasks;
- Provide the cadet engineer with constructive critique, ongoing feedback, guidance, and instruction.
- Conduct a suitable induction process for the cadet engineer, including WHS practices and what the cadet should do if they experience bullying, sexual harassment or other unsafe practices.
- Complete and submit assessment forms as required;
- Advise the cadet and university if the cadet's host supervisor is to change.
- Contact the university mentor about the cadet engineers' performance in the organisation at scheduled intervals, particularly if any issues or concerns cannot be resolved with the student.

## Cadet Engineers:

- Conduct themselves in a professional manner at all times during the placement.
- Take responsibility for their learning, which will be primarily self-directed;
- Work on their own initiative and develop their decision making and self-management skills;
- Complete a learning contract in conjunction with the academic and host supervisor at the beginning of the placement;
- Strive to meet the objectives and conditions agreed with in the learning contract;
- Follow the policies and duties outlined by the host organisation, fulfilling all scheduled commitments and arrangements agreed to with the host organisation, as per their employment.
- Perform/submit all work assignments/reports to the best of their ability;
- Maintain regular contact with the host organisation and university supervisors;
- Consult with the host supervisor regularly and especially in a timely fashion when confronted with problems that cannot be solved independently.

## Academic Mentors (Charles Sturt Staff)

- Maintain contact with host supervisors and cadet engineers
- Support both cadet engineers and supervisors, assist in complex or difficult situations, mediate, help adjust learning goals and provide professional development and support materials for hosts
- Ensure that cordial and satisfying relations are maintained for employers and students undertaking the placement
- Offer assistance, encouragement, support and professional direction to the cadet engineers during the placement.

## Duty of Care and Student Placement Agreement

The placement process has been designed as a three-way agreement between the cadet, the host organisation and the university. This means there should be communication not just between the cadet and the host organisation or the cadet and the university but between the host organisation and the university.

CSU WPL team will periodically touch base with both the cadet and the host supervisor to ensure there are no issues with the placement. We encourage host supervisors to approach CSU at any time with any concerns they may have relating to cadets' academic progression, workplace performance or welfare.

Charles Sturt University has a duty of care to all cadets on placement. As signatories to the Student Placement Agreement, host organisations have a duty of care to cadets as well.

Host supervisors should be aware of their duty of care responsibilities for cadets. These responsibilities are typically covered by a host organisations standard risk and WHS procedures.

For more information on CSU's requirements, the relevant policy can be found at:

<https://policy.csu.edu.au/document/view-current.php?id=351&version=3>

Also refer to the Student Placement Agreement terms and conditions.

## Incident Reporting

We recognise that cadets may be at increased risk of experiencing sexual harassment and/or bullying in the workplace due to their age and inexperience resulting in a power differential. Students of diverse gender or sexuality are at a higher risk, including female cadets in workplaces with a majority of male employees.

As cadets are employees of the host organisation, any workplace incident involving a cadet will be managed primarily under the host organisations incident management procedures, however CSU will also need to be notified in the event of any incident involving cadet engineers and can provide support as required.

For more information on CSU's requirements, the relevant policy can be found at:

<https://policy.csu.edu.au/document/view-current.php?id=518>

# Supervision of Cadets

The way cadets perceive the workplace learning environment has a profound effect on how well students engage and learn. Good supervision is the basis for cadet learning in the workplace and getting to know the cadet and developing a sense of trust are essential prerequisites for building good relationships.

In addition to establishing a good relationship with the cadet, the following characteristics are considered essential for good supervision:

- Supervisors should regularly engage with the cadets' learning requirements and performance;
- A clear description of the objectives of cadets learning while in the workplace is an important aspect of workplace learning;
- Supervisors should discuss these objectives based on cadets' level of knowledge and define the responsibilities of the cadet;
- Supervisors are involved in the setting and monitoring of academic goals for cadets across their placement;
- For good supervision to happen, supervisors need to be present.

The following quotes from our cadets describe the good supervision they experienced.

*'We discuss wider issues to help me place my work in the bigger picture'*

*'They're there when I need them'*

*'They take my training seriously'*

*'They treat me as part of the organisation and expect me to act as such'*

The best supervision often happens when a supervisor expects cadets to do a good job and shows faith in them. It can lead to cadets raising their game and wanting to work harder.

Affirmation is part of good supervision, but so is candour. Cadets appreciate supervisors who don't beat about the bush when a mistake occurs.

**It is expected that host organisations will involve students, providing them meaningful work that will lead to mutual benefit for both the cadet and the host organisation.**

## Mentoring of Cadets

Much of the role of a host supervisor is to act as a mentor to a cadet engineer. This involves providing advice and support as needed to the cadet. It also involves acting as a role model for the cadet.

The following are extracts from a study conducted into the effective habits of mentoring.

In summary these were:

1. Building a learning relationship
2. Engaging in learning dialogue
3. Being intentional
4. Making time to mentor
5. Valuing the role

The key to developing a learning relationship is building knowledge about each other's beliefs, values, aspirations, roles, working styles etc.



**WHAT STUDENTS SAY:**

*The relationship I have with my mentor makes a difference to the impact of our discussions. I now have confidence to ask for help.*

*When there is (a learning) relationship the challenging roles become supportive – the roles become interlocked.*

**WHAT MENTORS SAY:**

*The partnership was most useful for both parties as I was able to discuss and understand the direction my students want to go.*

*[Building a learning relationship] has made us more confident and comfortable to talk with each other about our practices and any problems that may come about.*

It is easy as a mentor to interact with cadets at a technical level. Whilst this is important, it is crucial that conversations also move to genuine co-inquiry, with a willingness to examine why we act as we do, what theoretical considerations underpin our practice, and also apply theory to practice.

**WHAT STUDENTS SAY:**

*[It is good] to have critical discussions to question reasons for my decisions.*

*[Dialogue] made me realise that I am on the same wavelength as my mentor and [helped me] to be more confident in what I believe is the right thing to do.*

*...discussing what I felt worked well, why I thought that way, alternatives that could be even more beneficial, what didn't work well, new or different ways of working with clients that would enhance my work.*

**WHAT MENTORS SAY:**

*The increased dialogue allowed me to give specific positive and constructive feedback on the student's practice and study skills.*

Being intentional right from the start will help to move the mentoring interactions to genuine learning dialogue and to create a transparent space within which to communicate.

**WHAT STUDENTS SAY:**

*The mentoring sessions have been more tightly focussed on the learning dialogue and professional development because of the research project.*

*The structure broke down my barriers to asking for help.*

*The set tasks [that were sent out] were the first time we had ever sat down and had a one-on-one together.*

*I wonder if more structure would result in a deeper level of communication surrounding my practice.*

**WHAT MENTORS SAY:**

*The tasks have greatly broadened and clarified the quality of dialogue and therefore made possible a far better level of relationship at all levels within the work context.*

*[Because of the tasks] I have had to consider the purposes and uses of supervision.*

*I looked forward to having structured content to discuss and explore together.*

Mentoring relationships take time; time to observe the cadet, time to reflect on those observations, time to critique practice, and time to talk with the cadet about the practice.

**WHAT STUDENTS SAY:**

*It was good to have regular meetings and to encourage thinking in a different way.*

*It was good to be able to sit down and talk to each other.*

*The person who was supposed to be my mentor was not there to observe me.*

An effective mentor uses every opportunity to learn more about mentoring practices and makes time in their work schedule for mentoring. They see their mentoring experience as a contribution to their own professional development and the profession as a whole.

# CSU Engineering Course Structure

Charles Sturt University offers two undergraduate and one post-graduate Civil Engineering degree courses.

- Bachelor of Technology/Master of Civil Engineering. 5.5 years including 4 years as a cadet
- Bachelor of Engineering (Civil). 4 years including 1 year as a cadet
- Master of Civil Engineering (Direct Entry).

The first 2.5 years of the combined degree and bachelor of engineering are the same and students may change between them up to this point.

Students also have the option to take a Bachelor of Technology exit after their undergraduate placements.

Direct entry to the Masters course as a professional cadet is available for students with appropriate prior qualifications. For more details on this, please visit the CSU Engineering website.

## Combined BTech / MEng (Civil) 5.5 years

This course takes five and half years in total duration consisting of

- 18 months full time study on-campus
- 2 years placement in industry (undergraduate – junior/intermediate)
- 2 years placement in industry (post-graduate – senior/professional)

This table shows the course progression, starting at the bottom and working upwards

Phase	Challenge/Portfolio/Thesis pillar	Performance Planning and Review pillar	Civil Engineering Topic Tree pillar
4th Placement - Professional Cadet	Engineering Capstone Thesis (ENG598) 32 pt	Engineering Portfolio - Professional (ENG592) 2 pt	Advanced Topics in Civil Engineering (ENG573) 16pts
		Performance Planning & Review - Professional Cadet (ENG581) 4pt	
3rd Placement - Senior Cadet	Engineering Portfolio - Senior Cadet (ENG490) 28 pt	Performance Planning & Review - Senior Cadet (ENG481) 6pt	Topic Tree - Senior Cadet Engineer (ENG473) - 24 pt
2nd Placement - Intermediate Cadet	Engineering Cornerstone Thesis (ENG398) 24 pt	Performance Planning & Review - Intermediate Cadet (ENG381) 6pt	Topic Tree - Intermediate Cadet Engineer (ENG373) - 24 pt
1st Placement - Junior Cadet	Engineering Portfolio - Junior Cadet (ENG290) 28 pt	Performance Planning & Review - Junior Cadet (ENG281) 6pt	Topic Tree - Junior Cadet Engineer (ENG273) - 24 pt
Face to Face - Student Engineer	Engineering Challenge 3 (ENG261) - 14pt	Performance Planning & Review Student Engineer (ENG181) - 4pt	Topic Tree - Student Engineer (ENG173) 36 pt
	Engineering Challenge 2 (ENG162) - 14 pt		
	Engineering Challenge 1 (ENG161) - 14pt		Topic Tree - Introductory (ENG171) 12 pt
	Engineering Challenge 0 (ENG160) - 2pt		

The course structure has 3 strands. On the left is Project based learning, in the centre is Performance planning and review, on the right is the topic tree.

# Subject Strands

## Project Based Learning (Challenge/Thesis/Portfolio)

The project based learning (PBL) subjects focus on learning by the delivery of engineering projects

- Whilst on campus student engineers work on *realistic* challenges
- Whilst in the workplace cadet engineers work on *real* projects
- The undergraduate PBL subjects culminate in a design focussed thesis
- The postgraduate PBL subjects culminate in a research focussed thesis
- Both thesis subjects are focused on delivering a tangible outcome for the host organisation

## Performance Planning and Review

The Performance Planning and Review (PPR) subjects support students' learning in the other parts of their degree

- Students set goals to be achieved over the course of the subject (one year)
- Most PPR subjects are aligned with a specific placement
- Students are assigned an academic mentor who, along with the workplace supervisor, assists with the setting of goals
- Generally modelled after a workplace performance management process

This is the smallest part of the degree (in terms of credit points and time)

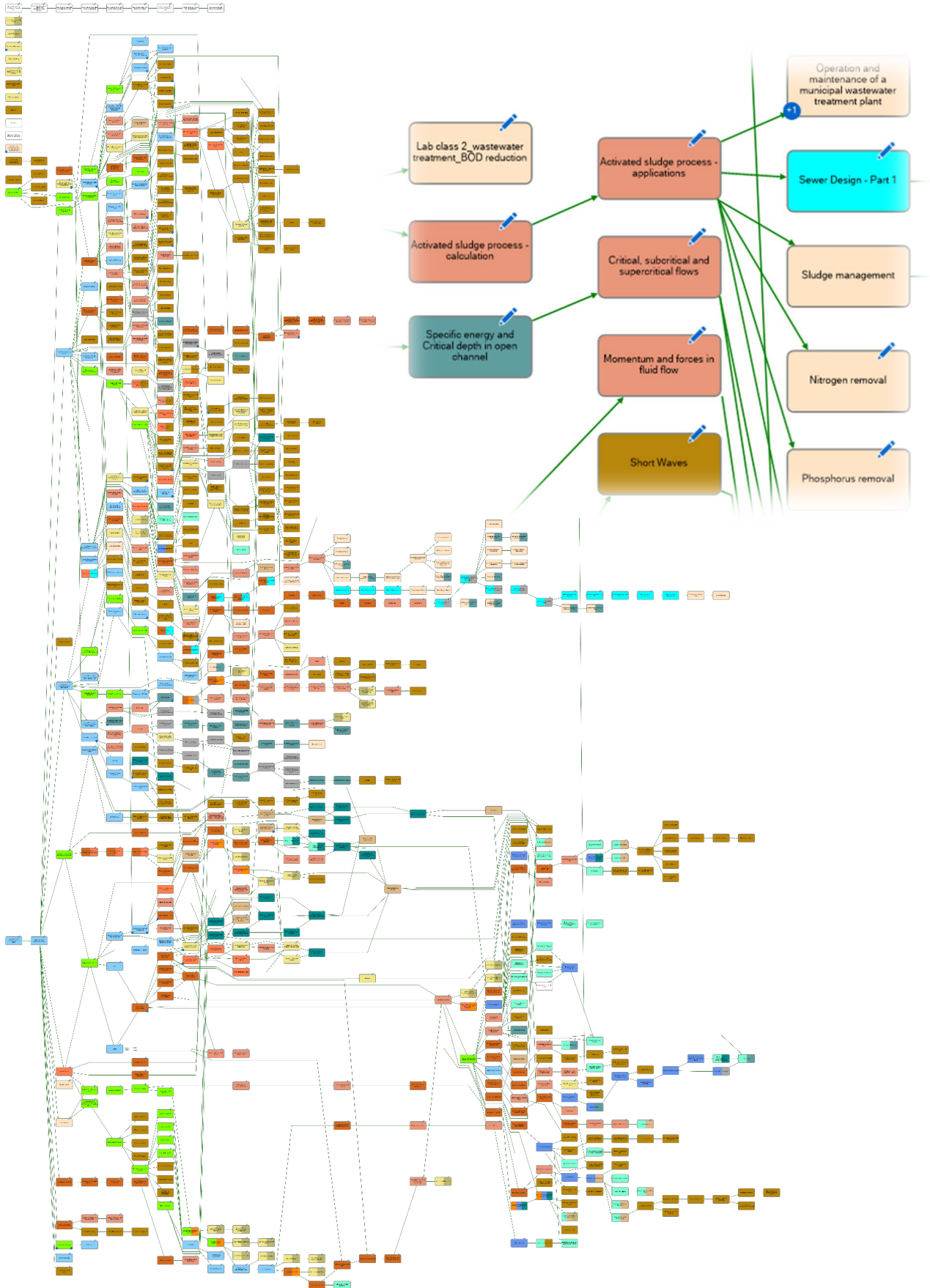
## The Topic Tree

The topic tree subjects contain all of the technical content of the CSU Engineering degree

- Each 'topic' is a roughly 3-hour online module on a particular topic
- Topics are arranged in pre-requisite links forming 'branches' of topics
- Arranged together all of the topics are known as the 'topic tree'
- Students must meet certain topic counts in order to progress through the degree
- Students must also complete mandatory topics in order to progress (known as schedules)

The topics are notionally arranged in subjects numbered #71 or #73.

# The Topic Tree Structure



## Topic Tree Progression

The topic requirements for progression through the degree are as follows:

Milestone	Topic Count Required
Before commencing First Placement	240 including schedule A
Before commencing Second Placement	360 including schedule A
Before commencing Third Placement	480 including schedule B
Before commencing Fourth Placement	600 including schedule C
Graduation	600 + one speciality schedule (S, G, W or Q)

Students on placement need to complete 2 – 3 topics per week in order to stay 'on track'.

- There are no exams in the CSU Engineering degree
- Topics are assessed through small scale assessment and students must demonstrate mastery of a topic's content (score > 75%) in order to 'pass' the topic
- Much of the assessment in the WPL subjects comes from cadets' experiences in the workplace
- The degree has been designed around a strong workplace learning component
- This means that host organisations and host supervisors play a critical role in the success of the degree and students' learning

# Workplace Learning (WPL)

Workplace learning (WPL) integrates the theory of learning with the practice of work. It has long been recognised that universities can't effectively prepare graduates for the workforce alone. There are some workplace situations that can't be taught in a classroom setting and the development of non-technical skills is particularly important for effective practice as an engineer, e.g. communication skills, teamwork skills, leadership skills. So we value workplace learning as a key part of the engineering degrees our students study.

Students are assessed on their workplace learning. As a host partner and mentor, it is important for host supervisors to provide input into what students will be assessed against whilst undertaking WPL

## Purpose of Assessment in WPL

### For the student

- To be guided and informed on their learning in the workplace; e.g. how do they apply the theory gained from university to an authentic work situation?
- To gain feedback on their progress
- To develop an understanding of appropriate industry standards
- To recognise their achievements and shortcomings

### For the host organisation:

- To be confident that their students have an appropriate level of skill for the tasks at hand;
- To ensure they are getting value for money

### For the university:

- To ensure students meet the required learning outcomes,
- As a quality assurance process.

### For the teachers and supervisors:

- To provide feedback to students on how they are progressing
- To improve workplace learning processes by analysing performance

### For the community:

- To know graduates have suitable knowledge and skills
- To demonstrate accountability

Generally speaking, host supervisors will be involved in the following assessment tasks for their cadet engineers:

- Assistance with the setting of workplace related goals
- Assessing progress towards agreed goals (Quarterly)
- Providing opportunities to demonstrate particular competencies
- Advice on thesis projects (if applicable)



# The Placement Process

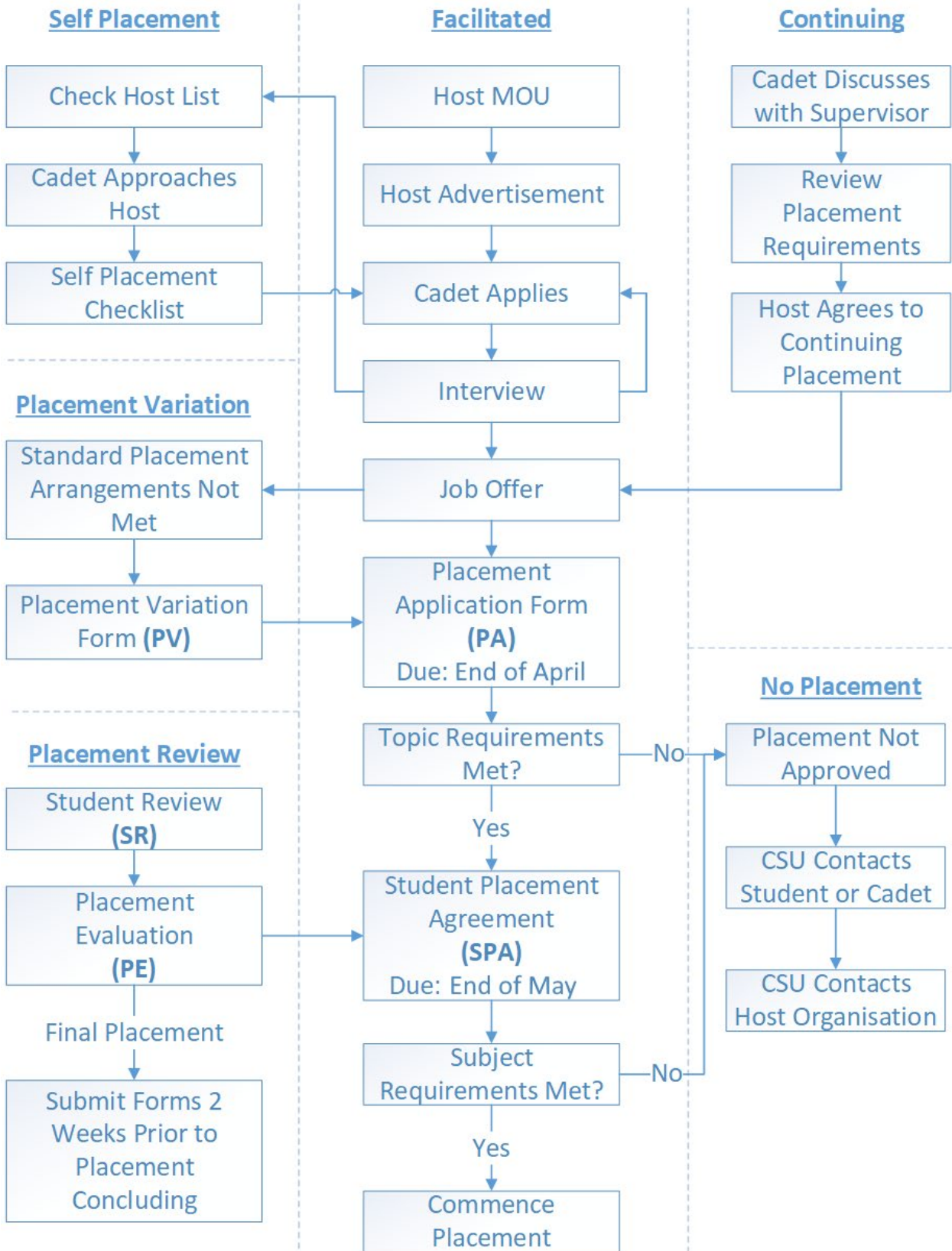
- The placement process is the structure that supports cadet engineers undertaking WPL
- It is expected that the placement experience will result in mutual benefit to the host organisation and to the development and employability skills of the cadet engineer;
- Cadets are employees of the host organisation and are expected to respect the confidentiality, privacy, activities and personnel of the host organisation during and after their placement;
- It is important to note that placement is not the same as employment:
  - A placement is between the cadet, the host organisation and the university
  - Employment is between a cadet and their host organisation

The placement process follows this process. Cadets may self-place (seek out and find their own placement), be facilitated (use our own jobs board to find a new host partner) or continue with the same host partner (for second and subsequent placements).

In order to track and facilitate this process, we have a number of steps for students. These steps are outlined in the diagram on the following page. The key steps in the documentation process are as follows:

## Key Forms

Form	Due Date (approx)	Notes
Memorandum of Understanding	Anytime prior to placement	For facilitated placements only
Placement Application	1 May	Intention to undertake placement
Student Placement Agreement	30 June	Formal placement contract
Student Review	After placement is complete	Student to complete
Placement Evaluation	After placement is complete	Host supervisor to complete



## Standard Arrangements

The standard arrangement for a Charles Sturt Engineering placement are:

- Placement duration of 52 weeks (nominally July - June), totalling 1500 hours of experience.
- Paid work for four days per week, totalling 28 - 32 hours per week.
- Paid study leave for one day per week, commensurate with standard hours per day.
- Total annual salary in accordance with the Charles Sturt Engineering placement benchmarking.

We acknowledge that not all host organisations can meet these requirements. We have a degree of flexibility. In this case the WPL team will work with the specific host organisation to ensure the cadet engineers duty of care is being met.

## Host Requirements

It is a requirement of the CSU WPL policy and our Engineers Australia accreditation that host supervisors have suitable levels of experience and qualifications:

Placement Level	Minimum Expectations of Host Qualifications
Junior Placement	2 years experience post graduation (BTech minimum)
Intermediate Placement	2 years experience
Senior Placement	BEng + 2 years experience
Professional Placement	2 years experience post graduation (BEng)

Note that there is provision for relaxation of the qualification requirements for supervisors with significant industry experience.

If your qualifications do not line up with these expectations, please contact us to discuss further

For future placements (2022 onwards) it is envisaged that the supervisor requirements will align with mandatory registration requirements.

## Additional Information

All information on the placement process can be found on the Engineering WPL website:

<https://bjbs.csu.edu.au/workplace-learning/engineering-students/host-organisation-information>

This website contains all of the key forms, along with general information on placement expectations for students and hosts:

- Host Organisation Guide Book
- Benchmark Salaries
- Placement Aims and Expectations

To discuss more specific queries contact the WPL team at: [engineering-wpl@csu.edu.au](mailto:engineering-wpl@csu.edu.au)

# Workplace Expectations

We have different expectations for each level of cadet. In summary:

Placement	
Junior	<ul style="list-style-type: none"><li>• Complete basic engineering design projects.</li><li>• Use well-established engineering tools and procedures to solve practical problems.</li><li>• Develop understanding of the culture of the engineering industry.</li><li>• Be an active member of workplace teams.</li></ul>
Intermediate	<ul style="list-style-type: none"><li>• Completion of a design focussed thesis project.</li><li>• Complete discipline specific engineering design projects.</li><li>• Use well-established engineering tools and procedures to solve complex problems.</li><li>• Demonstrate management of self and work-related tasks.</li></ul>
Senior	<ul style="list-style-type: none"><li>• Independently complete engineering projects.</li><li>• Use engineering processes to solve complex problems.</li><li>• Communicate effectively with professional and lay audiences.</li><li>• Demonstrate leadership of workplace teams.</li></ul>
Professional	<ul style="list-style-type: none"><li>• Develop new processes to solve complex engineering problems.</li><li>• Completion of a research focussed thesis project</li><li>• Demonstrate high level knowledge of a civil engineering discipline.</li><li>• Demonstrate effective leadership of a variety of teams.</li></ul>

## Confidentiality Issues

We recognise that many engineering companies deal with confidential information. We address this directly with students and set out our expectations accordingly. We are committed to ensuring that confidential information remains confidential.

- It is a requirement of many CSU Engineering subjects that cadet engineers use evidence from their workplace experience to support their studies (especially in ENG290 and ENG490, but also potentially in their thesis subjects). It is also important to ensure Commercial in Confidence (CIC) is maintained for host organisations
- Information that is shared for assessment may be used by CSU for external accreditation purposes
- CSU staff are required to maintain confidentiality at all times and declare any conflicts of interest
- Typically, if there is a concern from a host organisation in regards to a particular work item, we recommend cadets select another example. This is the cadet's responsibility to manage, but the host supervisor should provide oversight and direction. Alternatively a redacted example can be used, provided enough material remains to demonstrate the competence being claimed.

If you have any concerns in this matter, we are happy to discuss and/or make special arrangements where appropriate and required.

# Junior Cadets

The junior placement is the first of four placements that cadets undertake as part of their course. It occurs after the student has been at University full time for 1½ years. The junior placement introduces cadets to the engineering industry through a specific workplace.

The Junior placement is the first of four placements for the students in the combined Masters degree. It is the only placement for the students enrolled in the Bachelor of Engineering program.

In order to commence their junior placement, cadets have:

- Completed three project based learning (PBL) subjects whilst on-campus at CSU Engineering (ENG161, ENG162, ENG261)
- Completed an introductory performance planning and review (PPR) subject (ENG181)
- Completed at least 240 topics, including the compulsory Schedule A topics

Whilst on their junior placement, cadets will complete:

- A portfolio subject, drawing on their experiences in the workplace (ENG290)
- The first of their workplace based performance planning and review (PPR) subjects (ENG281)
- Around 120 topics, in order to stay on track with their topic progression (ENG273)

1st Placement - Junior Cadet	Engineering Portfolio - Junior Cadet (ENG290) 28 pt	Performance Planning & Review - Junior Cadet (ENG280) 6pt	Topic Tree - Junior Cadet Engineer (ENG273) - 24 pt
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## ENG281 Overview

ENG281 is the first PPR subject that students undertake in the workplace. It is designed to support cadets in their academic and workplace progression. The subject is designed to simulate a workplace performance planning process.

ENG281 involves cadets setting and reviewing a series of SMART goals over the subject. It also involves a series of reflective exercises on cadets' experiences in the workplace. (SMART = Specific, Measurable, Attainable, Relevant, Time Bound)

ENG281 commences in July and runs until the following June.

This subject was formerly called ENG280.

### The learning outcomes of ENG281 are:

- Set individual goals, produce action plans and revise them to manage workload in both industry and university;
- Articulate and interpret the codes of ethics, and apply norms of practice within the workplace;
- Demonstrate initiative through their work practices;
- Develop and explore their identity as a professional engineer;
- Apply communication skills effectively in groups and organisations; and
- Work effectively in teams with power differentials between members.

### **Host supervisors should support cadets studying ENG281 by:**

- Assisting with the setting of SMART goals, especially in defining the specifics of the goal, how it will be measured and when it will be delivered
- Align the goals set with expected workplace tasks
- Ensure opportunities are provided for cadets to progress towards their goals
- Comment on cadets' progress at periodic reviews:
  - Periodic Review 1 around 01 October
  - Periodic Review 2 around 28 January
  - Final Review 3 around early May

### **ENG290 Overview**

ENG290 is the first in a series of portfolio subjects that students undertake in their degree. The portfolio subjects are designed for cadets to demonstrate their competence in a range of areas, based on their work in industry.

The competencies they are assessed against are the Stage 1 competencies for professional engineers set by Engineers Australia. A key component of this subject is the use of examples from their practice in industry as a means of demonstrating competence

ENG290 commences in July and runs until the following June.

### **The learning outcomes of ENG290 are:**

- Describe and analyse workplace episodes in Professional Episode Reports;
- Document professional skills obtained and improved in the workplace;
- Use critical reflection to justify the compilation of appropriate artefacts to demonstrate developing engineering competence;
- Display a conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the technology domain;
- Practice engineering design processes in an industry context;
- Apply established engineering methods to well- and broadly-defined problems within the technology domain;
- Fluently apply a range of engineering tools to practical problems;
- Demonstrate effective communication through a range of different communication channels, such as technical report writing, oral presentations, engineering drawings, user manuals;
- Recognise information needs and locate, evaluate and use information effectively in a range of contexts, acknowledging the impact of that context upon the interpretation of that information;
- Identify the ethical dimensions of a range of engineering problems; and
- Describe how their work placement experiences have helped develop their identity as a CSU Engineer.

### **Host supervisors should support cadets studying ENG290 by:**

- Exposing cadets to tasks regarding application of standard engineering methods and tools
- Involving cadets in any engineering design tasks, up to and including given cadets responsibility for small design tasks
- Guiding cadets in appropriate professional communication methods
- Discussing the ethical dimensions of engineering problems with cadets
- Reviewing the evidence that cadets collect to demonstrate their development of given competencies

## ENG 273 (Topic Tree) Overview

As noted earlier, the technical part of the degree is delivered via our topic tree. Which students must progress through as they study.

In order to successfully complete ENG273, cadets must complete at least 360 topics. This equates to 120 topics per year, or 2 – 3 per week

Host supervisors are encouraged to discuss topic progression with cadets and to identify topics that align with a cadets workplace responsibilities

On their junior placement, this will typically include foundational topics in a particular workplace context

# Intermediate Cadets

The intermediate placement is the second of four placements that cadets undertake as part of their course.

The intermediate placement is the last placement undertaken at an undergraduate level. This placement involves cadets building on their knowledge from the junior placement.

At their commencement of the intermediate placement, cadets have been studying for 2½ years and must have

- Completed three project based learning (PBL) subjects whilst on-campus at CSU Engineering (ENG161, ENG162, ENG261)
- Completed the first placement portfolio subjects
- Completed two performance planning and review (PPR) subjects (ENG181 and ENG281)
- Completed at least 360 topics, including the compulsory Schedule A topics

Whilst on their intermediate placement, cadets will complete:

- A thesis subject, in conjunction with a major design conducted in the workplace (ENG398)
- The second of their workplace based performance planning and review (PPR) subjects (ENG381)
- Around 120 topics, in order to stay on track with their topic progression (ENG471)

2nd Placement - Intermediate Cadet	Engineering Cornerstone Thesis (ENG399) 24 pt	Performance Planning & Review - Intermediate Cadet (ENG380) 6pt	Topic Tree - Intermediate Cadet Engineer (ENG373) - 24 pt
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## ENG 381 Overview

ENG381 (formerly called ENG380) is the second PPR subject that students undertake in the workplace. It is also the last PPR subject undertaken at an undergraduate level. It is designed to support cadets in their academic and workplace progression. The subject is designed to simulate a workplace performance planning process.

ENG381 involves cadets setting and reviewing a series of SMART goals over the subject and involves a series of reflective exercises on cadets' experiences in the workplace

All subjects in this stage commence in July and run until the following June.

### The learning outcomes of ENG380 are:

- Identify and develop their accountabilities as a practicing engineer, and to appraise how they meet these responsibilities;
- Apply systematic project management approaches to engineering work;
- Reflect on work practices and professional conduct as an engineer, and to identify strengths and areas for improvement; and
- Work effectively in a variety of teams, and engage in leadership responsibilities.



### **Host supervisors should support cadets studying ENG381 by:**

- Assisting with the setting of SMART goals and align these goals with expected workplace tasks
- Ensure suitable learning opportunities are provided for cadets:
  - Manage engineering projects or major tasks in a project that involve the application of project management tools
  - Conduct safety / design audits of workplace tasks or projects
  - Learn and apply new engineering tools and techniques
  - Opportunities to lead engineering tasks or (small) teams with minimum supervision
- Comment on cadets' progress at periodic reviews:
  - Periodic Review 1 in late October
  - Periodic Review 2 in early February

### **ENG 398 Overview**

ENG398 is a Design Thesis that students undertake in their degree. It is known as the 'cornerstone thesis' and is the last major component of a student's undergraduate studies. A key component of this subject is the integration of the thesis with workplace needs, which allows some of the study load to be shared by the workplace

The expectation is that a student will spend, on average, 10 hours per week on their thesis for the full year of placement.

### **ENG398 Learning Outcomes**

- Define a complex engineering problem accurately and comprehensively in a workplace context and creatively apply systematic approaches to pro-active conduct and management of engineering projects as part of a team;
- Apply systems thinking and specialist engineering bodies of knowledge in sustainable and socially responsible engineering practice;
- Communicate the problem definition, design processes and outcomes clearly and effectively to both technical and non-technical audiences and project a creative, innovative, entrepreneurial, and pro-active disposition;.
- Demonstrate in-depth knowledge and understanding of engineering design practices, reflective applications and contextual factors impacting on multi-disciplinary engineering challenges and creative application of systematic engineering synthesis and design processes;
- Formulate an appropriate method for investigating a complex civil engineering problem and correctly and innovatively apply established engineering methods and design processes to create a solution; and
- Use and manage information in a professional and ethical manner. Analyse raw information and draw appropriate conclusions in context with due consideration of the knowledge, methods, and assumptions within the engineering discipline.

### **Host supervisors should support cadets studying ENG399 by:**

- Identify a suitable design problem from the workplace for the design thesis
- Supervise the technical design
- Provide necessary resources and materials required for the design e.g., design manuals, software, technical supervision, and time allocation.
- Provide feedback for specific technical issues identified in the thesis
- Attend the thesis defence at EngFest in June
- Implement the thesis outcome in the workplace, if applicable

# Senior Cadets

The senior placement is the third of four placements that cadets undertake as part of their course. The senior placement is the first placement undertaken at a postgraduate level. The senior placement involves cadets building on their experience from their junior and intermediate placements.

- General expectations of a senior placement are that cadets will:
  - Independently complete engineering projects.
  - Use engineering processes to solve complex problems.
  - Communicate effectively with professional and lay audiences.
  - Demonstrate leadership of workplace teams.

In order to commence their senior placement, cadets have successfully completed an intermediate cadetship with all that entails plus completed around 480 topics from the topic tree, including the compulsory schedule A and B topics

Whilst on their senior placement, cadets will complete:

- One portfolio subject, drawing from their experiences in the workplace (ENG490)
- The third of their workplace based performance planning and review (PPR) subjects (ENG481)
- An additional 120 topics to bring their total to 600 topics, including schedule C (ENG473)

3rd Placement - Senior Cadet	Engineering Portfolio - Senior Cadet (ENG490) 28 pt	Performance Planning & Review - Senior Cadet (ENG480) 6pt	Topic Tree - Senior Cadet Engineer (ENG473) - 24 pt
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## ENG481 overview

ENG481 is the third PPR subject that students undertake in the workplace. It is also the first PPR subject undertaken at a postgraduate level. It is designed to support cadets in their academic and workplace progression, as well as determine their longer term academic and career goals. The subject is designed to simulate a workplace performance planning process

ENG480 involves cadets setting and reviewing a series of SMART goals over the subject. Each smart goal is drawn from a specific area of practice, aligned with the subject learning outcomes.

### The learning outcomes of ENG481 are:

- Set individual goals, produce action plans and revise them to manage workload in both industry and university;
- Identify and articulate the key features that demonstrate the effective planning and management of engineering projects;
- Identify and articulate the norms of practice within the work place;
- Demonstrate initiative through their work practices;
- Develop and explore their identity as a professional engineer;
- Apply communication skills effectively in groups and organisations; and

- Demonstrate leadership of teams with varying levels of expertise

**Host supervisors should support cadets studying ENG480 by:**

- Identifying opportunities for cadets in relation to each of the areas of practice (Due late July):
  - Leadership of teams
  - Professional identity
  - Management of engineering projects
  - Professional accountabilities of practice
  - Continuing professional development
- Assisting with the setting of SMART goals and align these goals with expected workplace tasks
- Discuss industry best practice approaches with cadets, and model these approaches in the workplace
- Provide a review of a cadets progress towards their agreed goals

## ENG490 Overview

ENG490 is a subject in the portfolio stream that students undertake in their degree. The portfolio subjects are designed for cadets to demonstrate their competence in a range of areas, based on their work in industry

The competencies they are assessed against are the Stage 1 competencies for professional engineers set by Engineers Australia. A key component of this subject is the use of examples from their practice in industry as a means of demonstrating competence.

**The learning outcomes of ENG490 are:**

- Appropriately apply mathematics, numerical analysis, statistics, computer, and information sciences which underpin the engineering discipline;
- Critically apply established engineering methods in complex engineering problem solving;
- Critically analyse the application of a range of engineering techniques, tools and resources in solving practical problems;
- Creatively and critically apply systematic engineering synthesis and design processes and practices and appraise contextual factors impacting on the engineering discipline;
- Demonstrate and evaluate their accountability in the ethical delivery of engineering projects;
- Demonstrate effective communication in professional and lay domains through a range of different communication channels, such as technical report writings, oral presentations, engineering drawings, user manuals;
- Use and manage information professionally and ethically;
- Collaborate, share and co-create information with others to arrive at effective solutions to complex problems; and
- Evaluate how working as a reflective practitioner has improved their professional identity;

**Host supervisors should support cadets studying ENG490 by:**

- Exposing cadets to tasks involving the detailed application of engineering methods and tools
- Giving cadets accountability for the delivery of engineering design tasks or projects
- Guiding cadets in appropriate professional communication methods, including external stakeholder engagement
- Providing cadets with leadership opportunities
- Discussing the ethical dimensions of engineering problems with cadets
- Reviewing the evidence that cadets collect to demonstrate their development of given competencies

# Professional Cadets

The professional placement is the last of four placements that cadets undertake during their course. The professional placement aligns with a cadets choice of specialisation (Geotech, structural ,water quality or water resources).

The professional placement involves cadets building on their knowledge from all preceding placements. The general expectations of a professional placement are that cadets:

- Develop new processes to solve complex engineering problems.
- Complete a research focussed thesis project
- Demonstrate high level knowledge of a civil engineering discipline.
- Demonstrate effective leadership of a variety of teams.

In order to commence their professional placement, cadets must have successfully completed all the requirements of their senior placement.

Whilst on their professional placement, cadets will complete:

- A thesis subject, in conjunction with a major research project related to their work placement (ENG598)
- The last of their workplace based performance planning and review (PPR) subjects (ENG581)
- The last of their portfolio subjects (ENG592)
- Additional topics, or other studies in order to acquire specialisation specific knowledge (ENG573)

## ENG581 Overview

ENG581 is the last PPR subject that students undertake in their degree. It is designed to support cadets in their academic and workplace progression, as well as determine their longer term academic and career goals. The subject is designed to simulate a workplace performance planning process.

ENG581 involves cadets setting and reviewing a series of SMART goals over the subject. Each smart goal is drawn from a specific area of practice, aligned with the subject learning outcomes

ENG581 commences in July and runs until the following February. Unlike most subjects, it is not a full year duration.

### The learning outcomes of ENG580 are:

- Apply systematic approaches to the conduct and management of engineering projects;
- Project a pro-active disposition in professional communication;
- Manage their self, and their professional conduct as a reflective practitioner; and
- Demonstrate effective strategies in a variety of team roles, including leadership roles, in teams of varying levels of experience, power and expertise.

### Host supervisors should support cadets studying ENG580 by:

- Assisting with the setting of SMART goals and align these goals with expected workplace tasks
- Ensure suitable learning opportunities are provided for cadets to:
  - Execute and lead projects with minimal supervision; including coordinating with clients, addressing health and safety or QA requirements, financial management etc.
  - Communicate with clients independently; through preparation of report and documents, participation in client meetings etc.

- show leadership with accountability to and for others
- Review and sign off on cadets' professional development review (Due late December)

## ENG592 Overview

ENG592 is the final portfolio subject that students undertake in their degree. It is also designed to be the final subject that students study in their degree. It is designed to prepare cadets to graduate and enter the engineering industry. The subject pulls together all of the learning from all other subjects that students have undertaken. It involves cadets assessing themselves against the Engineers Australia Stage 1 competencies and involves a practice run at a chartered status interview. ENG 592 commences in March and runs until June each year – ie in the second half of the professional placement.

### The learning outcomes of ENG592 are:

- Practice ethically as a graduate engineer;
- Reflect upon their practice as professional engineers and their preparedness to enter the profession as independent, autonomous professionals;
- Have undergone the assessment process for chartered status, and demonstrated progress towards achieving CPEng recognition; and
- Manage a portfolio of evidence to enable them to effectively evidence their capabilities to a technical audience.

### Host supervisors should support cadets studying ENG592 by:

- Assisting cadets in developing their final portfolios
- Helping to provide opportunities to fill any identified gaps in cadets competencies
- Encourage cadets in the need for lifelong learning and continuing professional development
- Provide guidance on career aims past graduation

## ENG598 Overview

ENG598 is the second of two major thesis subjects that students undertake in their degree. It is known as the 'capstone thesis' and is the last major component of a student's postgraduate studies.

Students undertake research into a subject related to their work placement and their chosen specialisation. The expectation is that a student will spend, on average, 10 hours per week on their thesis

A key component of this subject is the integration of the thesis with workplace needs, which allows some of the study load to be shared by the workplace

ENG598 is a full year subject starting in July each year.

### The learning outcomes of ENG599 are:

- Plan and execute original research in accordance with established research methodologies based upon the theory underpinning the engineering discipline;
- Critique and use specialist bodies of knowledge within the engineering discipline and demonstrate the capacity to independently generate new knowledge in the context of existing literature and new developments in engineering;
- Apply knowledge of systems thinking methodologies and engagement as a platform for creative, sustainable and socially responsible research and engineering practices;
- Reflectively apply communication and technical research skills to justify, critique and interpret theoretical propositions, methodologies, conclusions and professional decisions to specialist and non-specialist audiences;

- Identify and act on areas for improvement in civil engineering, initiate to develop innovative solutions and evaluate and report their potentials; and
- Use and manage information in a professional and ethical manner, and discern, analyse and appraise raw information, and draw appropriate conclusions in context with due consideration of the knowledge, methods, and assumptions within the engineering discipline.

**Host supervisors should support cadets studying ENG599 by:**

- Identify a suitable challenge from the workplace for the research thesis
- Provide necessary resources and materials required for the research e.g. historical data, support for lab experiments and data collection, and necessary time allocation.
- Provide support to publish the research outcome
- Attend the thesis defence at EngFest in June
- Implement the thesis outcome in the workplace, if applicable.

### **ENG571 Topic Tree Overview**

Prior to commencing their professional placement, cadets will have completed 600 topics, including schedules A, B and C. During their professional placement, the topics a cadet studies are focussed on their chosen specialisation.

Cadets must complete an agreed study plan which can include:

- Additional specialisation specific topics
- Other agreed study, including industry short courses or modules from other institutions

Host supervisors are encouraged to discuss topic progression with cadets and to identify topics that align with a cadets workplace responsibilities.

# Conclusion

Thank you for agreeing to be host to one or more of our engineering cadets. The work place learning is a key component of the engineering education our cadets will receive and a major feature which sets CSU apart from other Engineering degrees in Australia and around the world.

CSU Engineering has been recognised in a study by MIT (2019) as one of the emerging leaders in engineering education. This is due in part to our emphasis on work place learning and the important role that it plays. We depend on your for this success.

We aim to produce engineers who are technically excellent, grounded in reality, experienced and practical and ready to tackle the challenges ahead.

This document seeks to lay out the requirements and expectations of host engineers and help you mentor, guide and help educate your cadet engineer.

If you have any questions on any aspects, Please do not hesitate to get in touch with one of our staff.

## Extra Resources and links

Name	Position	Contact Details
Jenny Grainger	Workplace Learning Officer	Phone: 02 6933 2481 Email: <a href="mailto:engineering-wpl@csu.edu.au">engineering-wpl@csu.edu.au</a>
Peter Thew	Senior Engineer in Residence	Phone: 0490 116464 Email: <a href="mailto:pthew@csu.edu.au">pthew@csu.edu.au</a>
Jim Morgan	Director Charles Sturt Engineering	Phone: 02 6338 6301 Email: <a href="mailto:jmorgan@csu.edu.au">jmorgan@csu.edu.au</a>

Workplace Learning: Get Engaged: <https://wplgetengaged.wordpress.com/>

Mentoring guide:

<https://cloudstor.aarnet.edu.au/plus/s/Od6wNC1Re1xRA5y>

Engineering WPL website:

<https://bjbs.csu.edu.au/workplace-learning/engineering-students/host-organisation-information>