

Faculty of Engineering



**School of Minerals and Energy Resources
Engineering**

Course Outline

PTRL4951, 4952, 4953 (UG Research Thesis)

and

PTRL9451, 9452, 9453 (PG Research Thesis B)

Dr Stuart Clark

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1. INFORMATION ABOUT THE COURSE

Course Code:	PTRL4951-3, PTRL9451-3	Term:	T2, 2020	Level:	UG & PG	Units/Credits	4 UOC each
Course Name:	Research Thesis A,B and C						

Course Convenor:	Dr Stuart Clark						
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Contact times	By Appointment						

1.1. Course Description

The thesis provides an opportunity for you to bring together engineering principles learned over your previous years of study and apply these principles to innovatively solve problems such as the development of a specific design, process and/or the investigation of a hypothesis. Thesis projects are complex, open-ended problems that allow room for your creativity, and the acquisition, analysis and interpretation of results. There are multiple possible solutions or conclusions at the outset and sufficient complexity to require a degree of project planning. The thesis requires you to formulate problems in scientific or engineering terms, manage a technical project and find solutions by applying scientific and engineering methods. You will also develop their ability to work in a research and development environment. You must identify a supervisor and project prior to enrolling in the Research Thesis A course.

Research Thesis A, B and C (PTRL4951,4952 and 4953 (UG) or PTRL9451,9452 and 9453 (PG)

1.2. Pathways

Full Year Students

This is the suggested path. Students complete a thesis subject each term and complete deliveries at the end of each term.

2 Term Students

This is optional for students with high WAM or at the supervisor's discretion. Students must complete Thesis A to a satisfactory level **before** being permitted to enrol in Thesis B and C.

1 Term Students

This option is only available for special cases and **must** be approved by the course convenor before being accepted.

1.3. Course Paths and Delivery Deadlines

Thesis Part		Thesis A	Thesis B		Thesis C		
Delivery		Interim Report	Progress Report	Reflections Video	Research Presentation	Participation	Thesis
Weighting		10%	8%	2%	15%	5%	60% (dual marked)
		Deadline					
Paths	Full Year First term, Thesis A then second term, Thesis B then third term Thesis C	T1, W10	T2, W10	T2, W10	T3, W10	N/A	T3, W10
	2 Terms* First Thesis A then Thesis B&C in a single term	T1, W10	T2, W3	T2, W3	T2, W10	N/A	T2, W10
	1 Term** A&B&C in a single term	T1, W3	T1, W7	T1, W7	T1, Exam Period	N/A	T1, Exam Period
* Only possible with supervisor permission ** Only possible with course convenor permission							

The weeks above are meant as a guideline for each term and only apply to the term enrolled. Actual dates for assignments are available on the Moodle site accessed via the Moodle icon on the MyUNSW homepage.

Full Year (Recommended Path)

This option allows the best experience of research in thesis. You will progress through the year conducting a literature review, gaining key learnings in software and/or laboratory equipment and collecting results and presenting progress before finally writing your thesis. Each term enrol in a single Research Thesis course and then (after satisfactory progress) progress to the next Research Thesis topic. You will receive EC grades in A and B until you complete Thesis and then these grades will be updated with your final thesis grade.

Research Thesis A, B and C (PTRL4951,4952 and 4953 (UG) or PTRL9451,9452 and 9453 (PG))

2 Terms (with Supervisor Permission Only)

If your supervisor accepts, you can do the Research Thesis in 2 terms by first completing Thesis A satisfactorily and then progressing to complete B&C in a single term. You will receive an EC grade for Thesis A until you complete B&C. You may withdraw from Thesis C and complete in the full year stream (subject to key census and withdrawal dates at UNSW).

1 Term (with Course Convenor Permission Only)

With the Research Thesis Course Convenor's permission, you may enrol in Thesis A, B and C in a single term. However, this is only allowed in exceptional circumstances to students that the Course Convenor feels that it is reasonable to complete the thesis in a single term.

1.4. Grades

You will receive grades for each item as you progress. If you are taking the thesis over more than 1 term, you will receive an 'EC' grade on your transcript until Thesis C is complete. Once your thesis C marks are complete, your marks are summed up and each of the 4 UoC Thesis subjects will get the same grade (failures will still remain on your transcript).

1.5. Failure

You will fail Thesis A or B if the grades on the total deliveries for that subject do not receive over 50. If you fail Thesis A or B, you will need to retake the subject in a subsequent term and will not be able to pass to the next thesis subject until the grade is a pass mark. At the course convenor's discretion, you may be given the opportunity to resubmit one or more of the deliveries for that thesis part. In such cases, the maximum mark obtainable for that delivery will be 50/100.

Passing Thesis C requires an overall grade of 50 or more as well as a Thesis mark of 50 or more. Failing Thesis C will result in the grades for Thesis A and B being marked as failures as well. At the course convenor's discretion, the student may have the chance to resubmit deliveries from Thesis C. The maximum mark obtainable for such resubmitted non-thesis deliveries is 50/100 while the Thesis itself may receive a final mark higher than 50/100.

1.6. Course Completion

Each component of Research Thesis A, B and C has separate assessment components. Successful completion of Research Thesis A will be required to progress to B (or B and C if taken concurrently). Successful completion of B is required to progress to C. Only enrolment continuing grades (EC) will be given after A and B completion, if they are successful. When Thesis C is complete, the assessments for Thesis A, B and C will be added and the same mark will be applied to the three component courses. Course completion requires submission of all assessment items; failure to submit all assessment items can result in the award of an Unsatisfactory Failure (UF) grade for all three Thesis courses.

2. AIMS, LEARNING OUTCOMES AND GRADUATE ATTRIBUTES

2.1. Course Aims

Research thesis aims to deliver high quality, research-intensive experience for students who would like to explore an open-ended research question. Research thesis fulfils the key criteria in Level 8 - Bachelor Research Thesis A, B and C (PTRL4951,4952 and 4953 (UG) or PTRL9451,9452 and 9453 (PG)

2.2. Learning Outcomes

At the conclusion of this course, students should be able to:

- LO1. Develop a design or a process or investigate a hypothesis following industry and professional engineering standards.
- LO2. Critically reflect on a specialist body of knowledge related to their thesis topic.
- LO3. Apply scientific and engineering methods to solve an engineering problem.
- LO4. Analyse data objectively using quantitative and mathematical methods.
- LO5. Demonstrate oral and written communication in professional and lay domains.
- LO6. Complete a risk assessment associated with a project.

3. REFERENCE RESOURCES

The relevant resources will be provided by the supervisor however a general overview can be obtained from the following. For help with research and literature reviews, the UNSW library page is a great place to start. They also have research help zones to drop in an ask for help.

3.1. Moodle FAQ and Forums

The Moodle page should have a Frequently Asked Questions (FAQ) page and a forum. Seeking clarifying questions using the forums may get a faster response than using email. The answer you receive will also benefit other students.

3.2. Reference Materials

Resource	Webpage
UNSW Library – featuring research help zone and many other services!	UNSW Library Services
Scopus Literature Search	scopus.com
Google Scholar Literature Search	scholar.google.com.au

3.3. Online Materials

Society	Webpage
American Association of Petroleum Geologists	geobyte.com
American Petroleum Institute – For Petroleum Standards	api.org
Australian Petroleum Production & Exploration Association	appea.com.au

Australian Society of Exploration Geophysicists	aseg.org.au
Earthbyte Group (Large datasets and software for geoscience)	earthbyte.org
European Association of Geoscientists & Engineers	eage.org
Petroleum Exploration Society of Australia	pesa.com.au
Society of Exploration Geophysicists	seg.org
Society of Petroleum Engineers (SPE)	spe.org
Society of Petrophysicists & Well Log Analysts	spwla.org
Geoscience Australia	ga.gov.au

3.4. Other Resources (if applicable)

The University and the Faculty provide a wide range of support services for students, including:

- UNSW Learning Centre (<http://www.lc.unsw.edu.au>)
- Counselling support - <http://www.counselling.unsw.edu.au>
- Library training and support services - <http://www.library.unsw.edu.au/>
- OnePetro – (<http://www.onepetro.org>)

3.5. Online Resources

There are numerous articles / information sources on reservoir engineering on the web. Many of them are sound, but many are either very lightweight or contain errors. Be very careful in your choice of web sources. Remember, UNSW librarians are usually happy to help you locate articles or make suggestions regarding possible material to help you in your academic work. You can also access basic online help at <http://www.library.unsw.edu.au/>

3.6. Submission Styles and Templates

The Moodle site should have style guides, templates and introductory videos for each of the submission components for Research Thesis A, B and C. Please contact the Course Convener if you require any assistance with these templates.

4. COURSE CONTENT AND LEARNING ACTIVITIES

In the first week, you are expected to identify a supervisor who will give you guidance and mentoring through the process of the Research Thesis. You, as the student, are expected to organise regular meetings with your supervisor, give her drafts of your work for her feedback and discuss the scope, resources and feasibility of your project with her. Should you fail to find a supervisor yourself, one will be allocated to you by the Course Convener.

5. COURSE ASSESSMENT

5.1. Assessment Summary

The following learning outcomes are assessed over the course of Thesis A, B and C:

- LO1. Develop a design or a process or investigate a hypothesis following industry and professional engineering standards.
- LO2. Critically reflect on a specialist body of knowledge related to their thesis topic.
- LO3. Apply scientific and engineering methods to solve an engineering problem.
- LO4. Analyse data objectively using quantitative and mathematical methods.
- LO5. Demonstrate oral and written communication in professional and lay domains.
- LO6. Complete a risk assessment associated with a project.

Thesis	Assessment task	Weight	Assessment	Learning outcomes assessed
Thesis A	1	N/A	Supervisor Approval Form	1, 2, 3, 4
	2	10%	Interim Report	1,2,5,6
Thesis B	3	8%	Progress Report	3,4,5,6
	4	2%	Reflections Video	3,4,5,6
Thesis C	5	5%	Overall Participation Thesis A, B and C	All
	6	15%	Research Presentation	1, 2, 3, 4, 5
		60%	Final Thesis Report	1, 2, 3, 4, 5

6. ASSESSMENT LIMITS

Your assessments have page (reports) and length (recordings) limits. Please try to fit your content within these limits unless your supervisors require to exceed them. Bibliography and appendices are not counted towards pages limits.

Thesis	Assessment task	Assessment	Limit
Thesis A	1	Supervisor Approval Form	N/A
	2	Interim Report	10 pages
Thesis B	3	Progress Report	5 pages
	4	Reflections Video	3 min
Thesis C	5	Overall Participation Thesis A, B and C	N/A
	6	Research Presentation	6 min
		Final Thesis Report	10 pages

7. ASSESSMENT CRITERIA

The assessment criteria provide a framework for you to assess your own work before formally submitting major assignments to your course convenor. Your course convenor will be using this framework to assess your work and as a way to assess whether you have met the listed learning outcomes and the graduate attributes for your program. We ask that you don't use the assessment criteria guidelines as a checklist, but as a tool to assess the quality of your work. Your course convenor will also be looking at the quality, creativity and the presentation of your written assignment as they review the framework. Rubrics, wherever applicable, will be provided at the time of the assignment release.

7.1. Thesis A

Interim Report

Criterion	Rubric	Weighting
Literature Review	The student clearly answers what is the problem to be solved and what is its significance. Gaps in the literature should be explained and the hypotheses and aims clearly stated.	50%
Project Plan	The student clearly explains how they will answer the research question and how will they use their resources (time, computing power, laboratory equipment etc.) to answer the question in the time allocated. The student clearly indicates areas for which they will undertake training or upskilling.	20%
Risk Assessment	The student has shown a clear risk assessment of the feasibility of the different areas of the project. Preliminary results are indicated and knowledge about the tasks during the thesis, their relative importance, dependencies and likely success is used to show a high probability for success for the project.	20%
Document Presentation	The document is well presented with clear diagrams showing the progression of the project, milestones and dependencies. The document is well-written and citations are consistently and correctly formatted according to the guidelines.	10%

7.2. Thesis B

Progress Report and Updated Plan

Criterion	Rubric	Weighting
Progress Report	<ul style="list-style-type: none"> Has training, upskilling and resources been acquired? What results have been achieved so far? How do the results fit with the literature gap identified in Thesis A? 	70%
Updated Plan for the remainder of Thesis	<ul style="list-style-type: none"> Proposed Solution/Experimental Methodology Thesis timeline – for last term – noting changes Justification of time allocation for each task Available resources identified Required training and upskilling identified 	20%
Document Presentation	<ul style="list-style-type: none"> Report or slide structure and layout English skills – spelling, grammar Data presentation (if applicable) Clarity of writing Citations consistent and correctly formatted 	10%

Reflections Video

Criterion	Rubric	Weighting
Reflections on Progress	The student clearly articulates the learning achieved during the process and her enthusiasm for the topic and reflects upon the original hypothesis and the need for altering or clarifying it.	100%

7.3. Thesis C

Final Thesis Report

Criterion	Rubric	Weighting
Literature Review/Background	The student should be able to explain the broader context for the work, the rationale for doing it and how important it is.	10%
Execution of the Research Project	The work should be complete and well-reasoned with detailed and well explained results	50%
Conclusions and Value Added	The conclusions should logically follow from the results and be well reasoned. The work should be innovative in at least one respect: extending our knowledge, developing new methods or extending existing ones into new areas.	20%
Document presentation	<ul style="list-style-type: none"> Report or slide structure and layout English skills – spelling, grammar Data presentation (if applicable) Clarity of writing Citations consistent and correctly formatted 	20%

Participation Mark

Criterion	Rubric	Weighting
Participation	The student has communicated well, been well organised and has been the driving force behind the project. The student has contributed significantly in discussions with the supervisor and team members (if applicable).	10%

Research Presentation

Criterion	Rubric	Weighting
Context	The student should be able to explain the broader context for the work, the rationale for doing it and how important it is.	10%
Methods	The methods used should be concisely explained in a clear manner to a non-specialist engineer. The student should show a clear understanding of why the methods are applicable	30%
Results and Conclusions	The work should be innovative in at least one respect: extending our knowledge, developing new methods or extending existing ones into new areas.	20%
Presentation	The slide structure and layout should be clear and logical. Figures should be clear, legible and relate to the point at hand.	40%

8. STUDYING A COURSE IN UNSW MINERALS AND ENERGY RESOURCES ENGINEERING

8.1. How We Contact You

At times, the School or your course convenors may need to contact you about your course or your enrolment. Your course convenors will use the email function within Moodle or we will contact you on your @student.unsw.edu.au email address.

We understand that you may have an existing email account and would prefer for your UNSW emails to be redirected to your preferred account. Please see these instructions on how to redirect your UNSW emails: <https://www.it.unsw.edu.au/students/email/index.html>

8.2. How You Can Contact Us

We are always ready to assist you with your inquiries. To ensure your question is directed to the correct person, please use the email address below for:

Enrolment or other admin questions regarding your program:
<https://unswinsight.microsoftcrmportals.com/web-forms/>

Course inquiries: these should be directed to the Course Convenor.

8.3. Computing Resources and Internet Access Requirements

UNSW Minerals and Energy Resources Engineering provides blended learning using the on-line Moodle LMS (Learning Management System). It is essential that you have access to a PC or notebook computer. Mobile devices such as smart phones and tablets may compliment learning, but access to a PC or notebook computer is also required. Note that some specialist engineering software is not available for Research Thesis A, B and C (PTRL4951,4952 and 4953 (UG) or PTRL9451,9452 and 9453 (PG)

Mac computers. It is recommended that you have regular internet access to participate in forum discussion and group work. To run Moodle most effectively, you should have:

- Broadband connection (256 kbit/sec or faster)
- Ability to view streaming video (high or low definition UNSW TV options)

More information about system requirements is available at www.student.unsw.edu.au/moodle-system-requirements

8.4. Accessing Course Materials Through Moodle

Course outlines, support materials are uploaded to Moodle, the university standard Learning Management System (**LMS**). In addition, on-line assignment submissions are made using the assignment dropbox facility provided in Moodle. All enrolled students are automatically included in Moodle for each course. To access these documents and other course resources, please visit:

www.moodle.telt.unsw.edu.au

8.5. Assignment Submissions

The School has developed a guideline to help you when submitting a course assignment.

We encourage you to retain a copy of every assignment submitted for assessment for your own record either in hardcopy or electronic form. All assessments must have an assessment cover sheet attached.

8.6. Late Submission of an Assignment

Full marks for an assignment are only possible when an assignment is received by the due date.

We understand that at times you may not be able to submit an assignment on time, and the School will accommodate any fair and reasonable extension. We would recommend you review the UNSW Special Consideration guidelines – see following section. Late penalties will apply to submissions at a rate of 2% per day.

8.7. Special Consideration

You can apply for special consideration through [UNSW Student Central](#) when illness or other circumstances interfere with your assessment performance. Sickness, misadventure or other circumstances beyond your control may:

- Prevent you from completing a course requirement,
- Keep you from attending an assessable activity,
- Stop you submitting assessable work for a course,
- Significantly affect your performance in assessable work, be it a formal end-of-semester examination, a class test, a laboratory test, a seminar presentation or any other form of assessment.

We ask that you please contact the Course Convenor immediately once you have completed the special consideration application, no later than one week from submission.

More details on special consideration can be found at: www.student.unsw.edu.au/special-consideration

8.8. Course Results

For details on UNSW assessment policy, please visit: www.student.unsw.edu.au/assessment

In some instances, your final course result may be withheld and not released on the UNSW planned date. This is indicated by a course grade result of either:

Research Thesis A, B and C (PTRL4951,4952 and 4953 (UG) or PTRL9451,9452 and 9453 (PG)

- WD – which usually indicates you have not completed one or more items of assessment or there is an issue with one or more assignment; or
- WC – which indicates you have applied for Special Consideration due to illness or misadventure and the course results have not been finalised.

In either event it would be your responsibility to contact the Course Convener as soon as practicable but no later than five (5) days after release of the course result. If you don't contact the convener on time, you may be required to re-submit an assignment or re-sit the final exam and may result in you failing the course. You would also have a NC (course not completed) mark on your transcript and would need to re-enroll in the course.

8.9. Students Needing Additional Support

The Student Equity and Disabilities Unit (SEADU) aims to provide all students with support and professional advice when circumstances may prevent students from achieving a successful university education. Take a look at their webpage: www.studentequity.unsw.edu.au/

8.10. Academic Honesty and Plagiarism

Your lecturer and the University will expect your submitted assignments are truly your own work. UNSW has very clear guidelines on what plagiarism is and how to avoid it. Plagiarism is using the words or ideas of others and presenting them as your own. Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. The University has adopted an educative approach to plagiarism and has developed a range of resources to support students. All the details on plagiarism, including some useful resources, can be found at www.student.unsw.edu.au/plagiarism.

All Mining/Petroleum Engineering students are required to complete a student declaration for academic integrity which is outlined in the assignment cover sheets. By signing this declaration, you agree that your work is your own original work.

If you need some additional support with your writing skills, please contact the Learning Centre or view some of the resources on their website: www.lc.unsw.edu.au/. The Learning Centre is designed to help you improve your academic writing and communication skills. Some students use the Centre services because they are finding their assignments a challenge, others because they want to improve an already successful academic performance.

Importantly: Parts of the literature review (Thesis A) can be used for the final report (Thesis C). However, think carefully about what you have learnt in the meantime - what literature is still relevant and what is not, what fits with your story and what does not. Please make sure that the number of text directly borrowed from Thesis A does not exceed **20 %** of your final thesis.

8.11. Continual Course Improvement

We are continuously improving our courses based on student feedback, and your perspective is valuable. We encourage all students to share any feedback they have any time during the course to the course convener or your supervisor – if you have a concern, please contact us immediately.