

Engineering Final Year Projects: **Proposal Writing**

What your proposal should do

Your proposal should provide a factual and accurate account of your design or research project. Your main goal is to logically communicate:

- What problem you will investigate and how. (Why—based on previous sources.)
- What you plan to design or find.

Elements of the proposal

Abstract

1. Introduction
 - 1.1. Motivation
 - 1.2. Objectives
 - 1.3. Significance
2. Proposed Approach
3. Timeline
4. Risk Assessment
5. Progress to Date
6. Conclusion
7. References

Abstract overview

- **WHY?** State problem's background & your main objectives. (What will you investigate? Why?)
- **HOW?** Describe procedures & methods. (What will you do? How?)
- **WHAT?** Summarise anticipated results. (What will you find out?)
- **SO WHAT?** State hoped for conclusions & their potential significance. (What will your results mean?)

(University of Wisconsin-Madison, 2012; Winckel & Hart, 2002)

Abstract example

Combustion of biomass fuels is now a potential major source of renewable energy. One current issue with using biomass fuels is the moisture content, which in its raw form can exceed 50% of the total mass. The combustion process becomes less efficient when the moisture content rises. One method of reducing this moisture content is to preheat the inlet air of the biomass combustor. An additional beneficial outcome to this process is a reduced level of harmful emissions.

This project will involve extensive research into the effects of moisture and testing methods used to measure moisture content in biomass fuels. It is proposed that developing an inline preheater, which will raise the inlet air temperature to approximately 110°C, can aid in removing excess moisture in the fuel before the combustion phase. This will require CFD modelling using Ansys Fluent, carrying out tests and experiments, and further investigations into the effects of drying on moisture content of solid biomass fuels.

Abstract elements

- Main objectives--What will be investigated? Why?

Combustion of biomass fuels, because it's a potential source of renewable energy.

- Methods--What will be done? How?

Research and experiments; lit review and CFD modelling using Ansys Fluent.

- Summarise anticipated results. (What will you find out?)

Effects of drying on solid biomass fuels' moisture content.

- State major conclusions and significance. (What will your results mean? So what?)

How to better combust biomass fuels, which might replace fossil fuel consumption.

Abstract writing process

- Summarises your proposal's essential information
- Write it last
- Condense the main point of each section of your report into one sentence (it's fine to repeat—the language should match what's in the rest of your proposal)
- Combine into one or two paragraphs
- Add transitional language and phrases so that it flows
- Cut it down to 100 words or less
- Test how well you wrote it by asking another student or engineer who is unfamiliar with your project to read it and see if they understand your chosen topic area, what you plan to do, and why

Introduction overview

An introduction should:

- Outline the background theory relevant to your experiment.
- Review the current literature in order to justify your proposal.
- Explain the relevance of the experiment/research.
- State your objectives.

Introduction

1.1 Motivation

Provide the reason for undertaking this project and explain why this project is important. Provide sufficient background information and describe the current state of the art.

- Why should this project be undertaken?
- Why is it important?
- What's happening in this field currently that's relevant?

Motivation examples

- **Rocket launch** costs, currently at ~\$10,000 per kg of payload and \$20 million for a single passenger, make large-scale commercial use and human exploration of the solar system unlikely. Maglev-based launch systems provide one of the best **hopes for the further exploration of space and its productive use**.
- **The honeybee** is the world **ecosystem's most important** animal **pollinator**, responsible for pollinating over 90% of global commercial pollination services, and 35% of the world's food crops. This effects \$2 billion in revenue per year for Australia, and \$198 billion worldwide. Colony populations are **currently under threat** from pest infestation, necessitating improved **surveillance programs** to help manage the health of honeybee colonies.

Introduction

1.2 Objectives

Define the objectives of this project. Identify the scope and the assumption. State the requirements (e.g. customer requirements, product requirements, system requirements, algorithm requirements, etc.)

- What are the goals of the project?
- What is the scope—how big, including/excluding which areas?
- What assumptions are you working from?
- What will the project require?

Objectives example

There are three main objectives for semester 1, 2014.

I. Undertake a significant **review of literature** into biomass fuels and the effect that moisture and drying has on the efficiency of the combustion process. This will include researching relevant peer-reviewed journal and conference paper articles.

II. Develop an **appreciation of the standard test methods used** to express and measure moisture content with respect to solid biomass fuels.

Objectives example

III. **Design, optimise, and develop a preheater** that has the capacity to heat the inlet air to approximately [...] if the required parameters and specifications are met. The heater must be designed to allow [...].

Semester 2, 2014 will involve **investigating the effects of drying on the moisture content of the biomass pellet fuel.** Through further research and carrying out experiments on the pellet fuels using the preheater, parameters such as bulk density, unit density and the increase or decrease of ignition propagation rate with respect to moisture content can be examined.

Introduction

1.3 Significance

Describe the significance or the expected benefits of this project. Explain how the objectives will advance the current state of the art.

- What makes this project significant; why is worth doing?
- What's the benefit of what you will find out?
- How will the end goals advance what we know or how we practice in this field?

Proposed Approach

2. Proposed Approach

- How you are planning to solve the problem
- Simplified methodology
- Equipment needed, materials, system requirements, set up, procedure

Stages of a Methods section



1. Equipment / materials

2. Equipment set-up
written explanation and/or figure

3. Procedure

Timeline & R.A.

3. Timeline

- Gantt chart or similar
- + 1 paragraph explanation

4. Risk Assessment

- Covered previously

Gantt Chart - Project Schedule

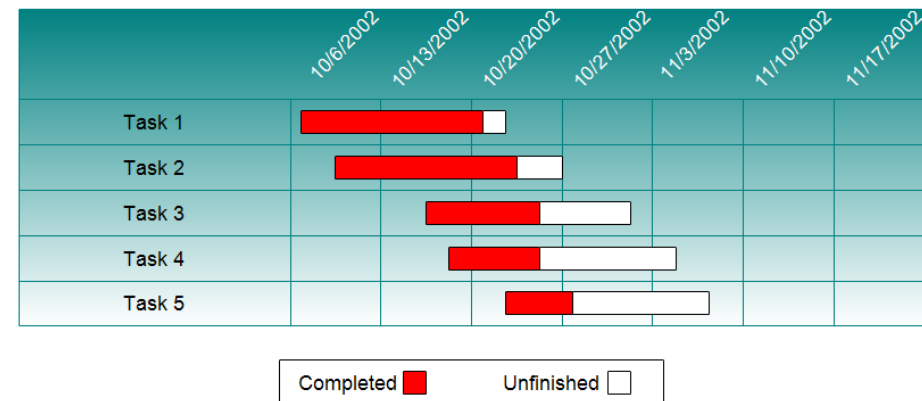


Table 2 Semester 1 timeline

Week	Task
Week 1 - 24/02	•Research topic
Week 2 - 03/03	•Research topic •Begin proposal •Prepare objectives
Week 3 - 10/03	•Complete draft proposal •Begin Ansys Fluent Tutorials •Start preliminary calculations
Week 4 - 17/03	•Source heating elements •Continue with calculations/proposal •Continue Ansys tutorials
Week 5 - 24/03	•Begin CFD modelling •Proposal due

Progress & Conclusion

5. Progress to Date

- Leave blank if just starting this semester
- Or explain what you've done so far (if applicable/summer start)

6. Conclusion

- 1 – 2 paragraphs summing up
- Highlights main objective of project
- Briefly restates the main motivation and significance of the project
- Sums up proposed approach and risks
- Links back to the introduction (repeats key terms!)

Conclusion example

As there is a growing need to find alternatives to fossil fuels, biomass fuels are becoming increasingly more attractive as a renewable energy source. Although biomass fuels are currently being used as an effective energy source there are a number of issues that need to be overcome to improve its efficiency. One of these is to reduce the moisture content of the biomass fuel.

It is believed that by developing an inline preheater for the current biomass combustor will aid in drying of the fuel, in turn reducing the overall moisture content of the pellets. This will assist in increasing the efficiency of the combustor and help to reduce harmful emissions. If positive, the results from this project can be used to develop the use of preheating systems in larger scale combustors which may help biomass fuels to become a more viable and cost effective option in the future.

References

7. References

- ~10 sources
- Academic/professional, peer-reviewed, recent
- In-text & end-text: APA, IEEE, or consistent
 - APA (Chai, 2015, p. 177)
 - <http://ecu.au.libguides.com/referencing>
 - IEEE [5]
<http://www.ieee.org/documents/ieeecitationref.pdf>
- Don't forget to use the Engineering Subject Guides
 - <http://ecu.au.libguides.com/cat.php?cid=32118>
- Citation tools

The research & writing process

- Keep a separate list of research questions and prioritise them according to most/least essential.
- Keep a master document of search terms & key topic vocabulary.
- Use “subject terms” in library database.
- Check in with your adviser often with questions.
- Meet/email with subject librarian for help finding appropriate sources (Karen Lycett, k.lycett@ecu.edu.au)
- Stay on top of where you are with a master project mgmt plan.
- Use outlines!

The research & writing process cont'd

- Start with recent articles that overview the state of current research about your topic area.
- If what you've read doesn't make sense to you, that will be obvious in what you write.
- *Future tense* when discussing your plans:
 - "This project **will involve**..."*
 - "This phase **will assess**..."*
- *Present tense* when discussing theories, equipment, etc.:
 - "Bragg's Law for diffraction **is** ..."*
 - "The scanning microscope **produces** micrographs..."*

Need some research help?

Subject Librarian for Engineering:

Karen Lycett k.lycett@ecu.edu.au

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Welcome to the Civil Engineering Subject Guide




The aim of this guide is to provide a starting point for library research and an outline of the key resources available at ECU Library relevant to Civil Engineering.

Significant new resources, both print & online, will be added on a regular basis and we welcome any feedback.

[Comments \(0\)](#)

Subject Guide



Karen Lycett

Contact Info
(Wednesday, Thursday & Friday)
[Send Email](#)

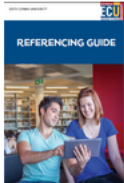
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Referencing (APA Style)

[ECU Library Referencing Subject Guide](#)

[ECU Referencing Guide:](#)



[APA style guide to electronic references](#)

Key Resources

Need information for your assignment. Here are the key databases for Civil Engineering:

- [ASCE Library](#)
The ASCE (American Society of Civil Engineering) Library is an online tool for locating articles of interest across all areas of civil engineering.
- [Engineering collection](#)
Covers all broad engineering fields, including Civil engineering, Engineering of railroads & roads, Mining & related operations, and Sanitary & municipal engineering as well as specialist engineering areas. The Engineering Collection provides indexes a range of journal articles, conference papers, working papers and other grey literature sourced from the Engineers Australia library collection and is produced in collaboration with Engineers Australia.
- [ICE Journals](#)
The ECU Library now provides access to ICE (Institution of Civil Engineers, UK)

Credits

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[Comments \(0\)](#)

Feedback

Need some writing help?

Drop-In Assignment Labs: Bring in your draft assignments to ask questions/get help with your **referencing, academic style, formatting**, etc.

Weeks	Day	Time	Location
3 – 12	Tuesdays	12.00 – 1.00 pm	JO 2.107
4 – 11	Thursdays	2.00 – 3.00 pm	ML 3.102

ELP Drop-In Assignment Labs: Bring a few pages to get help with your **sentence structure, grammar, spelling, punctuation**, etc.

Weeks	Day	Time	Location
4-12	Monday	11.30 – 12.30 pm	See schedule
4-12	Tuesday	10.00 – 11.00 am	See schedule
4-12	Thursday	2.00 – 3.00 pm	See schedule

Learning Advisers

Undergraduate:	Postgraduate:	Numeracy:	English:
Julia Wexler	Teresa Lawrence	Ron Monson	Alejandra Speziali
j.wexler@ecu.edu.au	t.lawrence@ecu.edu.au	r.monson@ecu.edu.au	a.speziali@ecu.edu.au
JO 4.208c ML 13.106d	JO 4.208d ML 13.106d	JO 4.208a	JO 4.219
6304 5162	6304 2576	6304 2671	6304 5629

References & further reading

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