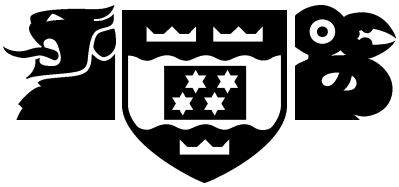
VICTORIA UNIVERSITY OF WELLINGTON
Te Whare Wananga o te Upoko o te Ika a Maui



School: School of Engineering and Computer Science
Te Kura Mātai Pūkaha, Pūrorohiko

PO Box 600
Wellington
New Zealand

Tel: +64 4 463 5341
Fax: +64 4 463 5045
Internet: office@ecs.vuw.ac.nz

Handbook — 2019

ENGR489, ELCO489, CGRA489, and COMP489 (Individual Research Project)

Contents

Chapter 1

Introduction

The ENGR/COMP/ELCO489, and CGRA489 project courses consist of an individual project done under the supervision of one (or more) academic staff. Projects are also offered in partnership with industry - in which case supervision is shared with an industry supervisor. The underlying aim of the project is to show-case the skills learnt during your degree, and to demonstrate your independent and critical thinking. The project will involve designing, implementing and evaluating a solution to a complex engineering problem (ENGR489) or research problem (COMP489, CGRA489, ELCO489). You will present a series of written reports on your project, and conclude with an oral presentation that may include a practical demonstration (where appropriate).

1.1 Aims and Scope

The aim of this document is to provide a comprehensive guide to the ENGR/COMP /ELCO489, and CGRA489 courses, for both students and staff. In particular, the document sets out the requirements of the course and clarifies the way in which student projects will be assessed and supervised.

1.2 Engineering versus Science

An important consideration is the distinction between the project courses taken as part of the BE and those taken as part of the BSc(Hon) or postgraduate diploma. The former requires students to undertake a suitable *engineering* project, whilst the latter require a suitable *research* project. There are many similarities between these two types of project, but there are also some important differences.

This document will highlight the differences between what is expected for an **ENGR** project, and that of a **COMP** or **ELCO** project. In summary, the main differences are:

- **ENGR** projects are expected to solve real-world problems using technically innovative solutions. **ENGR** projects must show an emphasis on design and provide evidence of the effectiveness of the devised solutions through appropriate evaluation. Students are expected to demonstrate craftsmanship in the design and implementation of their solution, and to use engineering processes and/or notations appropriate for their specialisation.

- **COMP** or **ELCO** projects are based on planning and implementation of an experimental protocol, and collect, analyse and interpret data through research. Such projects

should aim to make novel contributions to the academic research literature but not necessary. **COMP** or **ELCO** students are expected to demonstrate mathematical rigour (where appropriate), and use scientific experimentation to make critical observations. The literature survey for **COMP** or **ELCO** projects will typically draw on research papers in journals and conferences.

NOTE: Students should consult with their supervisor(s) and/or the course coordinator if they are unsure as to whether their project is an appropriate **ENGR** , **COMP** or **ELCO** project.

1.3 Design, Implement and Evaluate

A typical project can be thought of as designing, implementing and evaluating an *artifact*. The term artifact refers to that which is delivered by the project, and may represent something concrete (such as an electromechanical device) or something more abstract (e.g. a mathematical proof or a taxonomy). In more detail, the three main stages are:

- **Design.** This is the process of taking a problem and devising a suitable solution by considering the various options available. One may design a concrete artifact, such as a software or hardware system. Or, the design component of a project may be less tangible. For example, designing an experiment to make some crucial observations about an existing system. **ENGR** projects in particular should investigate multiple possible solutions so that engineering tradeoffs can be discussed.

- **Implementation.** This is the process of taking a given design and fleshing out the details to the point where a working system forms. Considerable skill is often required to use appropriate tools and techniques to make this happen. For example, software development practices, such as testing, will be necessary to deliver a working software system. Likewise, constructing an electrical circuit board may be a necessary step in delivering a hardware system.

- **Evaluation.** This is the process of reflecting on the artifact produced, primarily for the purpose of demonstrating it is "good" in some sense. For example, consider a tool for finding software bugs. Important questions to answer here include: *Does the tool find all possible errors? How long does the tool take to find errors? What are the tool's capabilities and limitations?* Such questions are typically answered through experimental observation of the artifact in operation.

Finally, it should be noted that there is no formal requirement to undertake these stages in any given order. For example, software development processes, such as agile or XP, dictate a more fluid approach. Nevertheless, these components should still be evident within the project.

1.4 Project Timeline

The following provides a rough overview of the project timeline, and identifies the main points of interest.

Week 1	Students rank projects using project allocation system.
Week 2	Project allocation performed by course coordinator.
Week 3	Students meet with supervisor(s) and begin work.
Week 4 (end of)	**Students agree on project proposals with their supervisors**
week 5	Work continues; students meet regularly with supervisors.
...	...
Week 12 Monday (3 June)	**Students submit their preliminary report.**
Mid-Year Break	Work continues around examinations. Students meet with supervisors where possible.
Week 1	Students give presentation on preliminary report
...	Work continues; students meet regularly with supervisors.
Week 7 (end of)	Students submit a draft of their final report.
Week 10	ENGR489 students submit a project snapshot. Not assessed at this point.
Week 12 (end of)	**Students submit final report. Students submit presentation slides.**
First Friday of T2 Exam Period	**Students present their work during conference day.**

Chapter 2

Project Allocation

The first stage of the ENGR489, ELCO489 and COMP488/489 courses is the allocation of projects to students. This process attempts to allocate students to the projects they prefer. Indeed, it is in the interests of both students and staff that this is done as accurately, and quickly as possible. Once the allocation is complete, students must produce a project proposal in conjunction with their supervisor(s).

2.1 Choosing a Project

The online Project Allocation System (PAS) is used by both staff and students to register and rank projects. Prior to the start of Trimester 1, staff upload descriptions of the projects they wish to supervise. The PAS system contains only a brief description of each projects. During pick week students are encouraged to speak to potential supervisors to gain a better idea of what is involved.

The algorithm we use for matching students to staff and projects is a variation on the Deferred Acceptance Algorithm (DAA) – specifically we use a simplified version of the the North American Medical Placement system which allocates about 20 thousand students to internships every year. The nice thing about this algorithm is that it produces stable matches and is strategy proof - that is, misleading the system about your rankings (e.g., to try and get a better allocation) will only lead to you getting a worse outcome.

Once everyone's rankings are complete, we run the algorithm and we're done. Well, almost. Unfortunately there may be left over students and projects where the algorithm expended all the students choices without finding them a project (because the supervisors they chose were fully allocated to other students). In this case we enter what is called the *scramble* - which really means we just assign the remainders manually.
There are several important points to make about the PAS system:

- **Students cannot pick more than two projects (excluding the industry projects) from any given (primary) supervisor**. If you do this, you will get an error message and the system will not add your selection. If you wish to change your project selection, you will need to remove one of your previous choices first. This helps to ensure that student preferences are diverse, and do not single out specific supervisors. For example, without this restriction, a given student may only select projects from one supervisor, hoping to ensure they are allocated that supervisor. However, if several students adopt this strategy for the same supervisor, then a problem arises as each supervisor may only take on a limited number of students (typically 1 or 2 students).

- **Students must rank at least seven different projects** If you wish to alter your project

rankings (otherwise it is in order you added them to your list) just drag and drop the projects in your list to reflect your preference order. Once you have picked at least 7 projects you will be able to use the submit button to register your choices. If you pick less than 7, the submit button will not be displayed and when we run the algorithm, you will go directly to the scramble (see above). This means that everyone else will get their choices before you.

- **Staff rank the student-project selections**. Each primary supervisor for a project you have ranked, will in turn rank your selection against all other selections by other students. This ranking will include consideration into your suitability for any specific project, along with the supervisor's own preference for that project (we limit the number of projects a supervisor can be allocated, given those limits, they may prefer to have project widget allocated over project gadget).

- **Privacy** All student rankings and staff rankings are kept private. Academic staff will **not** see student rankings, and students will not see staff rankings. Therefore you can feel free to rank your most preferred projects without fear of offending a staff member.

- **Some projects have co-supervisors listed**. Depending on the particular staff involved, some supervisors will share equally in supervision, whereas others may choose to have a co-supervisor who can provide additional expertise for a project - but play a lesser role in the supervision as a whole. Usually, all administrative aspects of the project are the responsibility of the primary supervisor.

- **Industry projects**. Industry projects have an academic staff listed as either primary or secondary supervisor. However, they will be the student's first point of contact in relation to all aspects of the project.
  A student can pick as many industry projects from a supervisor and are not counted as part of **"maximum of two projects"** constraint discussed above.

  Please Note: COMP488/489 students are not eligible to choose an industry project without prior approval from the course coordinator.

Unfortunately, despite all of these recommendations, we cannot guarantee that every student will be allocated to a project they prefer. In the unlikely event of a student being allocated to a project that they believe is not suitable for them, they should immediately contact the course coordinator.

2.2 Proposal

Once the allocation of students to projects is complete, students are expected to meet with their supervisors and put together a *project proposal*.

NOTE: it is the student's responsibility to contact their supervisor and arrange an appropriate meeting time.
Students are required to submit a report (no more than three pages) for the proposal stage by the end of week 4. Generally, the report should include the following topics:

- An overview of the problem being addressed by the project.

- A statement regarding the proposed solution to the problem.

- A statement regarding the proposed evaluation method.
- A discussion of any ethical considerations around the project.
- A statement regarding any budgetary requirements, including appropriate justification.
- A statement regarding any risks or hazards that the project poses (either in the development itself, or in using the final artifact).
- A discussion of any other requirements for the project to be successfully completed. This might be access to particular equipment or rooms, special IP issues etc.
- Provide a proposed project time line, in the form of a Gantt chart (or similar).

A small amount of funding is available for every project (the exact amount depends on the specialisation, and should be clarified by the course coordinator). The funding is primarily to help purchase items necessary for the project, although it can be used for other purposes (e.g. as prizes for user-experiments or surveys). Students must justify their budgetary requirements in the proposal report.

2.2.1 Assessment Process

Constructive feedback should be given two weeks after the report submission deadline. The examiners are expected to read the report and give feedback to the supervisors.

The aim of this process is to identify: firstly, whether the project is viable and sensible for the given specialisation; secondly, whether there are any obvious issues which must be addressed. Where necessary, some comments will be communicated to the student by the supervisor.

2.3 Intellectual Property Agreement

All students are required to submit a signed intellectual property agreement along with their proposal report. The purpose of the intellectual property agreement is simply to identify those parties who are stakeholders in the project.

Chapter 3

Supervision and You

As this is likely your first experience with an individual supervised project, it can be difficult to calibrate your expectations against your supervisor's. This section aims to describe what you should be getting from your supervisor, and what your supervisor should be getting from you. If your experience under supervision differs widely from the guidelines given in this chapter, you should first discuss this with your supervisor and if it cannot be resolved to your satisfaction please bring your query to the 489 coordinator. The earlier issues are identified and resolved, the better things will be handled. There is little we can do to resolve long standing problems a few weeks out from submission.

3.1 Supervisors Responsibilities

It is the responsibility of your supervisors to guide you through the academic requirements of your project. Supervisors will:

- meet with you regularly
- provide you with academic guidance and scholarly direction
- assess your progress and give you written feedback
- act as guides to University facilities
- make sure you comply with the Universitys administrative regulations.

3.1.1 Regular Meetings

It is expected that you and your supervisor will meet in person regularly and individually:

- For a project supervised by a VUW staff member we would expect the minimum to be a 30 minute individual meeting each week. You may agree with your supervisor to different arrangements that better suit the nature of the project, but the above should be considered a working minimum.
- For a project supervised by an industrial supervisor and VUW supervisor, we would expect a weekly supervision meeting with the industrial supervisor. The VUW supervisor would not be expected to attend every meeting, although may, but a combined meeting at least every fortnight should be considered a working minimum.

3.1.2 Academic Guidance

Your supervisors will provide guidance on a range of academic matters. These include:

- the standards required for an honours project
- planning your research
- skills you will need to acquire
- research resources
- methodology
- undertaking a literature review
- ethical, legal, professional and safety issues

Throughout, your supervisors will bear in mind the expectations of examiners.

3.1.3 Assessing Your Progress and Feedback

Supervisors will assess your progress and provide you with constructive feedback throughout your project. They will need to ensure that you possess the understanding and abilities to:

- carry out your project as envisioned
- complete your work on time, meeting the various deadlines for assessment.
- Provide prompt feedback on your work. The university guideline for feedback is 3 weeks, ECS aims for a 2 week turnaround.

3.1.4 Support

Your supervisor(s) is also there to support you. If you encounter problems of any kind, you should feel free to discuss them with them - especially if it could have an impact on your project work. The 489 coordinator is also available to help and offer support in such situations, especially if you are not comfortable discussing matters directly with your supervisor. If they can't help, they will be able to direct you to various student support services run by the university – a guidline to these services will be linked from the course homepage.

3.2 Your Responsibilities as a Project Student

You will need to abide by the university regulations governing your degree.

3.2.1 Planning and Actively Pursuing Your Work

You have an obligation to devote sufficient time to your work, to complete each phase on time, and to avoid activities that interfere with your satisfactory and timely completion of the project. You should expect to spend at least 10 hours per week on your project, spread over the 30 weeks that the course runs (i.e. including mid-trimester breaks, and the mid-year break). It can be quite challenging to maintain steady progress and dedicate the time as course loads increase during the trimester, however, it is important that you manage your

time well so that you can devote at least the minimum hours each week to the project. You will get little benefit from your supervisor if you treat your project as a series of crunches. Certainly they will not be able to provide timely feedback or appropriate guidance in this situation.

3.2.2 Ethics

It is expected that you conduct your research in an ethical manner. All forms of academic misconduct will be treated very seriously. You must:

- where appropriate, discuss ethics with your supervisors
- familiarise yourself with the Universitys ethical guidelines
- obtain approval from the relevant ethics committee for work involving human or animal subjects.

The link to Ethics application process is available on the 489 Wiki.

3.2.3 Safety & Health

The university's approach to health and safety is based on risk management. There is a significant strengthening of level of responsibility for students and supervisors. Students must discuss with supervisors and show in the project proposal report (due at the end of week 4) that they have identified safety risks and developed a plan to manage them.
Students are expected to be aware of the Health and Safety at Work Act 2015. See : `http://www.business.govt.nz/worksafe/hswa`.

Students need to discuss with their supervisors and fill out the health and safety plan available on the ECS Wiki. They need to fill 'ECS Project Information Form'and 'Project Description and Safety Plan'. A sample can be found on the Wiki.

Please Note: For any work that takes place off VUW areas, the students need fill 'ECS Off Campus Activity Plan'. Please contact Roger Cliffe for the form.

ALL filled Health and Safety forms must be emailed to ecs-safety@ecs.vuw.ac.nz.

Chapter 4

Preliminary Report

At the conclusion of the first trimester, students are expected to submit a preliminary report which outlines the progress they have made, and identifies any outstanding issues where feedback is required. This report should be considered a first step towards the final report - including a good treatment of the introduction and related/background work. However, as a primary purpose of the preliminary report is to give the examination committee the opportunity to comment on the student's progress (and identify any areas of concern), it will also include sections on work done, requests for feedback, and a revised timeline.

Students are also required to give a 5 minute presentation at the beginning of trimester 2 to talk about their progress and to get feedback.

4.1 Suggested Organisation

A sensible outline for the preliminary report is as follows:

- **Introduction / Proposal Review.** This should briefly outline the project and if necessary reevaluate the original plan in light of what has been learned in the interim. In particular, any significant deviations in the problem being addressed, or the solution being developed should be clearly highlighted and justified.
- **Background Survey**. This should discuss any existing solutions to the given problem, and may reference academic papers, books and other sources as appropriate. Care should be taken to identify key differences between these solutions, and that being developed in the project.
- **Work Done.** This should discuss what progress has been made on designing, implementing and evaluating the artifact. Care must be taken to ensure that any discussion of technical points are clearly explained, with diagrams being used where appropriate. In many cases, the evaluation proper will not yet have begun. However, it is important to demonstrate that sufficient thought has been given to the evaluation.
- **Future Plan.** This should highlight the main components which remain to be done, and provide a proposed time-line in which this will happen. In putting together a time line, students must take into account upcoming examinations, coursework deadlines and other disruptions.
- **Request for Feedback.** This should highlight any difficulties currently faced, and make specific requests for guidance from the examination committee. For example, a student may be unsure how best to evaluate their artifact, and would appreciate suggestions for alternative methods.

The report does not have to confirm exactly to the above structure. For example, in some cases, students may wish to present preliminary experimental results, or include a more detailed literature survey.

NOTE: in the event of an aegrotat application, the preliminary report may be used (in conjunction with the snapshot submission) as a significant assessment item.

4.2 Getting help with writing

Students struggling with writing and presentation should seek help from the student learning support as early as possible. `http://www.victoria.ac.nz/st_services/slss/`.

4.3 Format

The following points clarify the main requirements of the preliminary report:

- The report should be written using the ECS report templates provided (available for latex and MS Word).
- The report is expected to be around 8 pages in length. As a rough breakdown, a page of introduction and three to four pages on background/related work. An additional page each on progress and future plans would be appropriate. Longer (or shorter) reports are permitted, but students are advised to ensure all necessary detail is provided.
- The report should be written in such a way that any 4th year student in your specialisation can understand. Since the report will be assessed by a panel of examiners (i.e. not just the supervisor), it is critical that all examiners can properly understand what has been achieved.
- The report should include the original project proposal as an appendix.

Finally, the preliminary report must be submitted via the *online submission system* on or before the given due date (which is usually set as the last day of trimester one).

4.4 Project Snapshot

All ENGR489 students are required to submit a snapshot of their project artefacts (software or hardware) at the end of week 10 of Trimester 2. This snapshot may be used to assist in judging the quality / quantity of the engineering work conducted. Examples of project snapshots may include: (i) photographic evidence, (ii) recorded video, (iii) software code (iv) a combination of (i), (ii) and (iii) or (iv) evidence deemed appropriate by academic supervisors.

4.5 Assessment Process

The preliminary report will be read by three examiners, one of which is the primary supervisor. Students are required to give a 5 minute presentation at a specialisation meeting of the primary supervisor. Constructive feedback should be given after the presentation. We may record the sessions, so students can reference feedback. The presentations will be scheduled in the first week of trimester 2.

The examiners are expected to attend outside specialisations. If the examiners can not come to the presentation, they should read the preliminary reports and give feedback to the supervisors. The supervisor is responsible for collating feedback from the other examiners, and communicate it to the student after the presentation.

For ENGR 489, the marks from your preliminary report will count towards 20% of the final grade. For COMP/ELCO/CGRA 489, the marks from your preliminary report is indicative of your final grade.

Chapter 5

Final Report

The final report constitutes the most important component of the individual project. This is where you will set out what exactly it is you have done, why you have done it and how it can improve things.

5.1 Format

The following points clarify the main requirements of the final report:

- The report should be written using the ECS report templates provided (available for latex and MS Word). Fonts should be no smaller than 11pt.
- The report must contain a table of contents.
- the report is expected to contain no more than 20,000 words and no more than 40 pages including diagrams. Reports which are longer than this will need to be justified to the supervisor and the course coordinator, or risk being penalised for excessive length.
- The report should be written in such a way that any 4th year student in your specialisation can understand. Since the report will be assessed by a panel of examiners (i.e. not just the supervisor), it is critical that all examiners can properly understand what has been achieved.
- Material from the preliminary report and/or project proposal may be used directly in the final report.

The final report must be submitted via the online submission system on or before the given due date (which is usually set as the last day of trimester two). Extensions will be granted only in exceptional circumstances. These *must* be arranged in advance through discussion with project supervisors **and the course coordinator**.

Take some care with the format of your final document. Remember that we have to print the document and you can easily make that very hard for us. Here are some things to think about:

- Word files are terrible. Make a pdf and submit that instead.
- Check the size of your submitted file. Your file does *not* need need to be more than a couple of megabytes.
- Try to use vector graphics (ideally eps or pdf), rather than raster formats (jpg, png etc.). Not only will this look better it will produce a smaller file that will be easier to print.

- You do *not* need to use super high resolution graphics. Our printer can't reproduce them anyway, so anything greater than 300dpi or so is a waste.
- Don't use some strange printer driver.

5.2 Suggested Organisation

The structure of your report should be tailored to your project. However, a sensible outline for the final report is as follows:

- **Introduction.** The purpose here is to introduce the problem being solved, to motivate why it is a problem one should care about, and to outline the solution developed during the project. *Remember*: the introduction is the first part of the report an examiner will read. If he/she finishes reading it without a proper understanding of the problem being solved or what has been done, then they will almost certainly struggle with understanding the remainder. You should attempt to make the project goals and associated specifications as clear and as quantifiable as possible. These goals and specifications should inform everything else that follows, so it is important to establish them in the examiners mind.
- **Background / Related Work.** The background should cover any important terminology and/or concepts used in the remainder of the report, and should demonstrate an understanding of previous works which are relevant. *Remember:* A good related work section does not just provide a list of previous works, accompanied with short summaries. Wherever possible it must extract real insight from these works, painting a picture of how they relate to each other and the project.
- **Design.** The aim here is to identify the key trade-offs in any design work you have undertaken. When solving a complex problem, there are normally many different approaches one can take — each with its own advantages and disadvantages. It is expected that students will have initially considered a range of different solutions, and will then have narrowed these down. The reasons why a particular approach was discounted should be documented here. *Remember:* appropriate design notation (e.g. UML diagrams) can be very helpful in conveying different aspects of a design.

  It is vital that your design not be carried out in a vacuum. Your design should be motivated very clearly by your goals and specifications. Make sure that it is clear why you took the decisions that you did. Do not give the impression that you settled on a design because it "felt right" or that you tinkered around until you found something that worked.
- **Implementation.** The aim here is to explain the technical aspects of the project. The challenge is to ensure the text is clear and understandable. This is not easy, as ideas and concepts involved are often complex in nature. Nevertheless, if an examiners cannot understand how the implementation works, he/she cannot award marks for it. If this happens, the student is fault for poor communication. *Remember:* nothing is so complicated that it cannot be clearly explained. Classic pitfalls include: long convoluted sentences, use of long words, too much time spent discussing irrelevant details, poor organisation of sections, subsections and paragraphs, and too few diagrams or examples.
- **Evaluation.** The purpose of the evaluation section is to demonstrate whether you did or did not satisfy the project goals or specifications. If you can tie the performance

of your design to some real specification then your evaluation is much stronger. "My code runs in 29 ms" is much weaker than "my code runs within the 30 ms window allowable for real-time performance of the…".

In many cases the evaluation of a project requires significant extra work to design and build test harnesses. These should be explained so that the validity and scope of the evaluation can be understood.

Make liberal use of graphs and other figures. They are much more effective at communicating many results than are words.

- **Conclusions and Future Work.** Future work should *not* just be a list of things that you would have done if you had a little more time. Talk about new things that are possible now that you have finished your project. What projects could a '489 student tackle next year if they started from your end point?
- **Bibliography.**

5.3 Assessment

The primary purpose of the final report is to clearly and succinctly detail the design, implementation and evaluation of any artifact developed. The report should be written in a professional nature, as appropriate for the discipline and degree.

5.3.1 Process

The final report will be read by three examiners, one of whom is the primary supervisor. Where possible, the examining committee will remain the same as for the preliminary report. **Examiners must complete their marking in a timely fashion, so that the committee can meet and determine a final grade for the student**. In determining the final grade, the examining committee may take into consideration those (indicative) grades awarded for other assessment items.

5.3.2 Criteria

The final report will be assessed using the following criteria:

- **Quality of work.** This should include but not limited to
  - **Motivation and Problem Statement.** *Does the report clearly identify the problem being solved, and motivate the reason a solution would be valuable?* For **ENGR** students, greater emphasis is placed on connection with real-world problems. For **COMP** or **ELCO** students, greater emphasis is placed on connection with existing academic research problems.
  - **Design.** *Does the report provide clear evidence of design?* This includes, but is not limited to: the identification of necessary constraints imposed by external forces (e.g. budget, operating environment, off-the-shelf components, etc); the discussion and resolution of various (high-level) design decisions encountered during the project; discussion of the high-level architecture; and, discussion of any experimental work performed to help decide between design decisions. For **ENGR** students, greater emphasis is placed on using diagrams and notation appropriate for the given specialisation.
  - **Implementation.** *Does the report provide clear evidence of technical competence?* In particular, that a sensible and well-crafted solution to the problem is given in concise, clear language using diagrams where appropriate. For **ENGR** students, greater emphasis is placed on craftsmanship and technical innovation. For **COMP** or **ELCO** students, greater emphasis is placed on academic rigour within the context of existing (academic) research.
  - **Evaluation.** *Does the report provide clear evidence that an appropriate (e.g. experimental) investigation of the artifact was conducted?* For example, to demonstrate that it is fit-for-purpose, or efficient (in some sense), or to confirm a hypothesis, or to discover hitherto unknown properties. For **ENGR** students, greater emphasis is placed on demonstrating the artifact is fit-for-purpose through experiment or other appropriate means. For **COMP** or **ELCO** students, greater emphasis is placed on the use of scientific experiment (e.g. to make critical observations), and mathematical rigour where appropriate (e.g a proof of correctness).
  - **Critical Thinking.** *Does the report provide clear evidence of critical thought?* This should be evident throughout the report and includes, but is not limited to, the following aspects: understanding technical issues from different perspectives; appreciating limitations of the artifact developed; consideration as to how the artifact could be further improved.
- **Presentation.** *Is the report written in an appropriate and professional manner, with due consideration given to presentation?* This includes, but is not limited to: overall report structure; spelling and grammar; consistent bibliography layout including all necessary information (e.g. journal/conference title, page numbers, year, author names, article title); presentation and layout of figures and tables; minimum requirements of written English.

These criteria are, by definition, subject to the examiner's individual interpretation. In any case where an examiner is uncertain regarding some aspect of the criteria or process, the course coordinator should be consulted.

Chapter 6

Presentation Day

The presentation day is an opportunity for students to demonstrate their oral presentation skills. The primary objective of the presentation day is to prepare students for the real-world, where presentations are an integral component of business. This will be a all day event which is usually scheduled on the last day of exams. There will be one or two Dean's sessions - to which industry will be invited, students will be selected for these sessions based on their presentations at the start of Trimester 2, and their submitted report. This is a serious opportunity for your work to be seen on a larger stage, and perhaps lead to some new oportunities.

6.1 Overview

The presentations will each be 15 minutes long in total. This should break down into around 10 minutes of speaking, 3 minutes for questions and 2 minutes for change over. Strict time-keeping will be followed, and presentations that run over the time limit will be cut short. This is highly undesirable and does not auger well for a good presentation grade.

You should expect to get through at most seven slides. Any more, and you will be speaking far too quickly to give an effective presentation. Make sure that you practice your talk several times to get the timing right.

The talk should cover all aspects of your project, including the motivation, problem statement, discussion approach, technical aspects of approach and experimental results. The following suggestion is one possible outline, though naturally you should vary the structure to suit the specifics of your project.

Slide	Title
Slide 1	Title, Name and Supervisor Name(s)
Slide 2	Introduction + Motivation
Slide 3	Problem Statement and Discussion of Possible Approaches
Slide 4	Overview + Justification of Chosen Approach
Slide 5	Technical Discussion of your Solution
Slide 6	Experimental Results and/or Findings
Slide 7	Conclusion

NOTE: The format for presentations should be either in PDF or powerpoint. Presentations will need to be submitted the day before, so we can make sure they're all loaded on the presentation machines. We will *not* check that your files work correctly, so you should do that yourself.

6.2 Demonstration

Most students will be able to provide a sufficient illustration of their project during the presentation. However, in some cases, a demonstration of the working artifact may be preferred. Think carefully about this; a demonstration may seem like a good idea, but they can easily break the flow of a talk and detract from the message being delivered. It is very easy to have the audience looking curiously at your project rather than listening to you speak! Videos of your project can be more effective for this reason - and are strongly recommended as live demonstrations are inherently high risk and it is not unusual for them to go wrong.

NOTE: The course coordinator and appropriate technical staff must be notified well before the presentation day if a student wishes to use a demonstration.

6.3 Assessment

The examiners will consider the presentations according to the following criteria:

- Motivation (i.e. was the project properly motivated?)
- Problem Statement (i.e. was the problem being addressed clearly identified?)
- Design Constraints (i.e. were necessary constraints on the design clearly identified?)
- Design Decisions (i.e. were alternatives considered and sensible reasons given for the approach taken?)
- Implementation (i.e. was a sensible discussion of what has been done provided?)
- Evaluation Approach (i.e. was the approach being taken clearly identified?)
- Justification of Evaluation (i.e. was the evaluation approach justified?)
- Results (i.e. are results presented in a clear manner?)
- Professionalism (i.e. was the presentation of a professional nature?)
- Structure (i.e. was the presentation structured appropriately?)

NOTE: There is limited time within the presentation and, hence, we do not expect you will cover all of the above in detail.