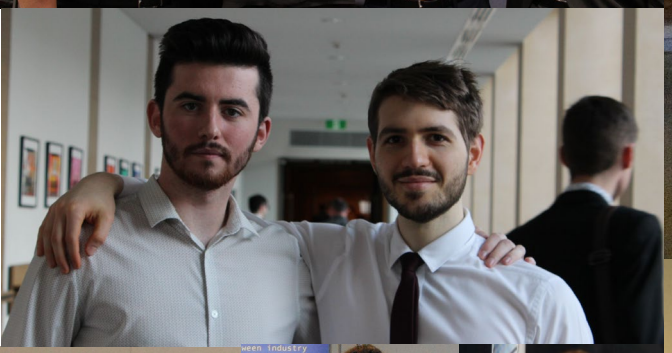
CEED

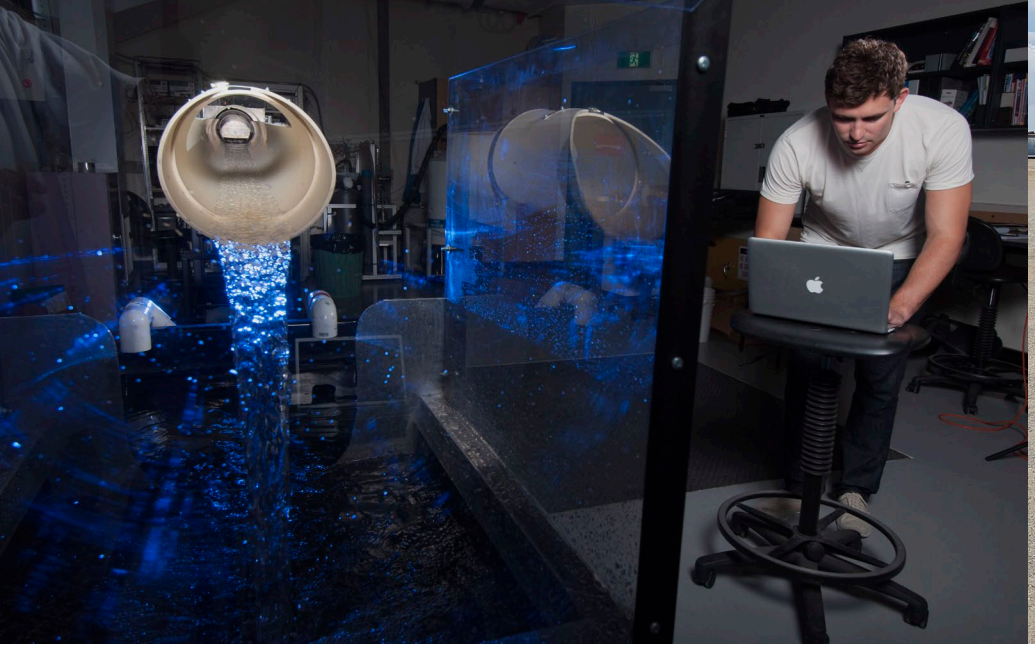
CEED Induction 2023 - 2024

Jeremy Leggoe
CEED Director

Kimberlie Hancock
CEED Program Coordinator

Welcome to the CEED Family





CEED = Research projects dealing with real industry issues

Features of CEED Projects

- CEED projects have a defined commercial objective
  - CEED projects have defined deliverables, which are intended to create benefits for the Client enterprise
- CEED projects provide students with experience in operating in a professional environment
  - To make effective progress on the project you will need to develop a network in the client enterprise.
  - To gather and deliver information, you will need to become skilled in professional communication.
  - CEED project findings must be grounded in commercial reality
- CEED projects are supported by the client, the CEED Office and UWA
  - CEED clients support the projects with resources and expertise.
  - Academic supervisors contribute their expertise.
  - CEED Office staff provide an additional source of expertise.

CEED Project Development

- The CEED office is in constant contact with industry to identify and develop opportunities.
  - Delivering presentations on-site
  - Developing relationships with HR organisations
  - Developing relationships with contacts
  - Maintaining relationships with our alumni
  - Maintaining a web and media presence
- Opportunities are referred to the CEED office by the Faculty, Office of Industry and Innovation Engagement, Development and Alumni Relations, and the Office of Research Enterprise.
- Academic staff develop projects with their own contacts, and we then facilitate the projects.
- Students develop relationships with industry, and engage us to facilitate the project.

CEEDWA

Industry Sponsored Research Projects

Information Pack 2019/2020

CEED student Matthew Avent studying the transport of sand in multiphase pipeline flows

Cooperative Education for Enterprise Development (CEED) is a formal program designed to link the abilities and training of undergraduate and postgraduate students with the research and development needs of progressive organisations in the wider community.

What are CEED Projects?

CEED projects are student research projects undertaken for academic credit. Honours, Masters by Coursework and Engineering Final year Projects are most common, but Higher Degree by Research (PhD, Masters) projects may be arranged.

The project topics are defined by the client enterprise – meaning that CEED projects address real issues in the client's operations, delivering outcomes which enhance performance.

In "Full" CEED projects, the CEED Scholar spends 8 weeks on site with the client during the summer vacation, immersing themselves in the operations and culture of the client while working on their research project.

Each CEED Scholar has both an academic supervisor and a mentor from the client enterprise. This ensures that the Scholar remains connected to the client throughout the project, and engages academic staff from our leading universities with the client and the project.

Benefits of CEED projects to client enterprises include:

- Cost effective research projects (eligible for R&D tax incentives) targeting issues specific to your business
- Engagement of leading university experts with your staff and issues
- Extended engagement with potential graduate recruits (including the potential to maintain relationships with vacation employees)
- Specialist training of potential graduate recruits in technology, policy areas, issues and operations unique to your business
- The opportunity to use the client mentor role in development programs for early career staff
- Access to university research facilities, and engagement with leading academic teaching and research staff

CEED projects may currently be undertaken in any discipline at UWA and Curtin that offers a suitable research project unit.

There are two CEED intakes each year: The main intake in September-November, and a mid-year intake predominantly for engineering disciplines in April-June.

Past Projects

Each year, CEED Scholars present their work publicly at the CEED seminar. The seminar proceedings illustrate the nature and range of the projects undertaken by our Scholars and clients.

Past CEED seminar proceedings are available at: www.ceed.wa.edu.au/about/seminar-proceedings/

Personal Capital in CEED Projects

- Staff members at the CEED Client have championed the project within their enterprise, which is expecting success.
- Your Academic Supervisors will be looking for opportunities for future interaction with the Client.
- The University's reputation as a world-class research institution rides on every external interaction.
- The ability of the CEED Program to secure future projects is dependent on the success of current projects.
- YOUR reputation in industry is dependent on your approach to the project – a CEED project is a chance to make a good name for yourself in the Client enterprise, which can pay dividends in unexpected ways in the future.

Effective Communication

- **Rhetoric**
  - **The art of speaking or writing effectively**
- In Aristotle's classical view, rhetoric consists of three elements
  - Ethos – establishing the character or credibility of the speaker (ie – Does the speaker have the experience or background to make the argument?)
  - Logos – The logic of the discussion (ie – Does the Discussion make sense? Are the statements accurate?)
  - Pathos – The appeal to the emotions or sympathies of the audience (ie – Why would the audience get on board with a proposal? Why do they care?)

Exercise - Communication

- You have 60 seconds to describe your project to an audience made up of staff members from your client.
- The 60 seconds will be timed – you will be cut-off at exactly 60 seconds.
- You have 5 minutes to work individually to prepare your address.
- You will not be allowed to use notes during your address
- The group will provide feedback on how successfully you have addressed the elements of ethos, logos and pathos.

Session 2

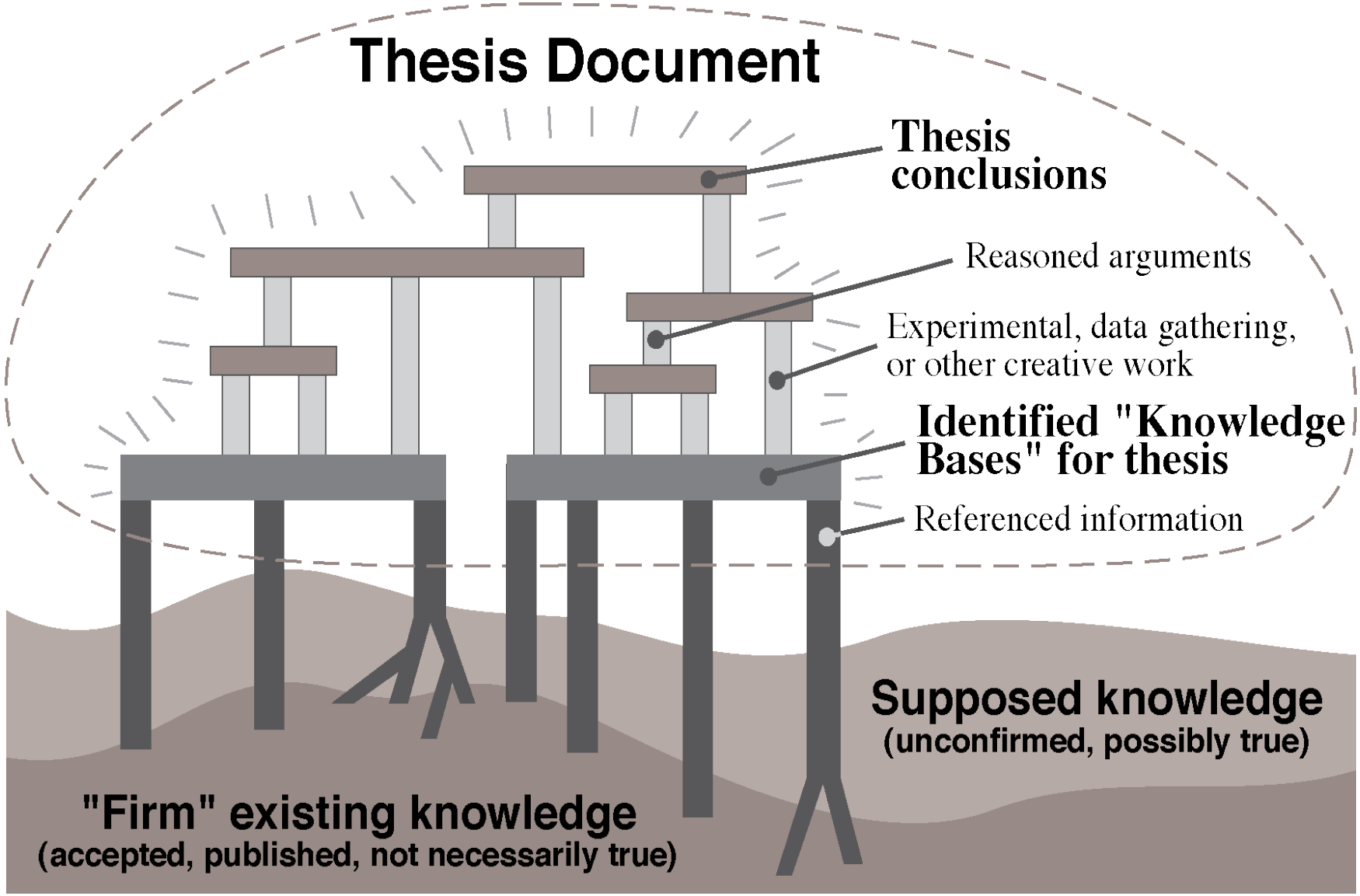
Project Initiation


Goal
You are Here

Getting Started on the Project

- Meet with your academic supervisor to discuss their ideas and expectations for the project.
- Start work on your literature review.
- Meet with your Client Mentor to discuss their ideas and expectations for the project
- Start compiling the Project Brief, and complete the first draft of the project brief within 8-10 weeks of starting work on the project

Building a Foundation for the Project



Every statement and conclusion in a professional report <u>must</u> be supported by <u>accepted</u> literature or your results and deductions

What is a Literature Review?

- The literature review is the first step in any successful research effort, and will continue throughout the project
- The purpose of the literature review is to establish the state of the art in the area that you are working in.
  - For investigative research, this will mean reviewing the academic literature.
  - For design projects, this will mean identifying current approaches to solving the problem of interest (or similar problems).
  - For industrial projects, this will entail reviewing standards and current operating practices.
  - In CEED projects, this will also require reviewing internal documents to determine the history of the issue within the client enterprise.

Basic Tools

- Internet search engines have greatly simplified the process of identifying information sources.
- Google, Wikipedia and Media sites can and should be used to provide a quick overview of a field.
  - Use to identify relevant publications and experts.
  - Can help with basic definitions or even formulae.
- However, it must be remembered that it is generally **UNACCEPTABLE** to reference these sources in a thesis
  - The reviewing and control of posted data ranges from inconsistent to non-existent.
  - It can be difficult to assess the expertise (or motives) of the poster.

Expert Materials

- A research report should rely on peer reviewed and/or edited materials such as
  - Scientific Journal Articles
  - Books
  - Scientific Conference Proceedings

- The UWA library is an excellent research library

  - In addition to the materials in the stacks, there is a wide range of journals available electronically

  - Onesearch is a very efficient tool, which can link you directly to books and papers

  - If a particular paper or book is not available, the library can generally locate a copy via inter-library loan relatively quickly. This service (**GETIT**) is free to students enrolled in final year, honours, and postgraduate projects

Expert Search Tools

- Compendex, also formerly known as “Engineering Index” provides a list of papers matching your specified search terms.
  - To access
    - Type “Compendex” into the OneSearch text entry space
    - Click on the “view online” link that appears under the first search result in the list.
  - Compendex finds both journal papers and conference proceedings (Web of Knowledge focuses on journal papers)
- The “Web of Knowledge” provides a similar capability but can be more powerful because it also provides a Citation Index.
  - The number of citations tells you how influential a paper is.
  - You can follow a “citation trail” from an important paper to research the current state of knowledge in a field.
  - To access : Type “Web of Knowledge” into OneSearch, and the proceed as for Compendex.

Web of Knowledge

https://onesearch.library.uwa.edu.au/

Approach

- Remember that the word “review” is important – it is not a literature “survey”
- It is essential to read the material you find carefully and critically.
  - Does the material apply directly to your work?
  - What are the limitations of the published material?
- A good paper or book will usually be well referenced – the reference lists can help you find older, more fundamental work in a field
  - A good literature review will evolve and expand from each paper you review.
  - Fundamental papers can often make it easier to understand the topic you are researching

Approach

- IMPORTANTLY - do not limit your consideration of literature to recent works.
  - Fundamental papers and texts can often make it easier to understand a particular technique or approach.
  - In seminal papers, the jargon of the field has usually not yet developed – so the text is often more comprehensible
  - The basis and limits of a particular approach can also often be more clearly identified in the original papers.

***So don't ignore the dusty old journals! In many fields, the basis of current thinking was laid out a long time ago*.**

“If I have seen farther than others, it is because I have stood on the shoulders of giants.”

Sir Isaac Newton

Exercise – Literature Review

- Identify bodies of literature relevant to your project.
- Identify search keywords relevant to those bodies of literature.
- Work in pairs (or a trio). Discuss your keywords, and bounce ideas off each other
- After 10 minutes discussion, we will go through a sample search for a few projects with the group.

Project Brief

CEEDWA

<Project Title>

Project Number 20XXX

CEED Client Name

Project Summary

The project summary provides a clear, concise summary of the project. It should briefly identify the reasons for undertaking the project (with emphasis on relating those reasons to the needs of the client enterprise), the objectives of the project, and the business value realized by the client enterprise in achieving those objectives. It should then proceed to identify the methods by which the objectives will be achieved, and the total costs that may be expected (excluding the original project fee). The key deliverables must also be identified.

The length of the summary must be limited to ensure that the summary, the headings above, and the names below appear together on the cover page.

<CEED Student>
<School>, University of Western Australia

<CEED Client Mentor(s)>
<Facility>, <CEED Client Organisation>

<Academic Supervisor(s)>
<School>, University of Western Australia

<Date>

1

Co-operative Education for Enterprise Development (CEEDWA)

The University of Western Australia
35 Stirling Highway
Crawley WA 6009

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ceed@uwa.edu.au
www.ceed.wa.edu.au

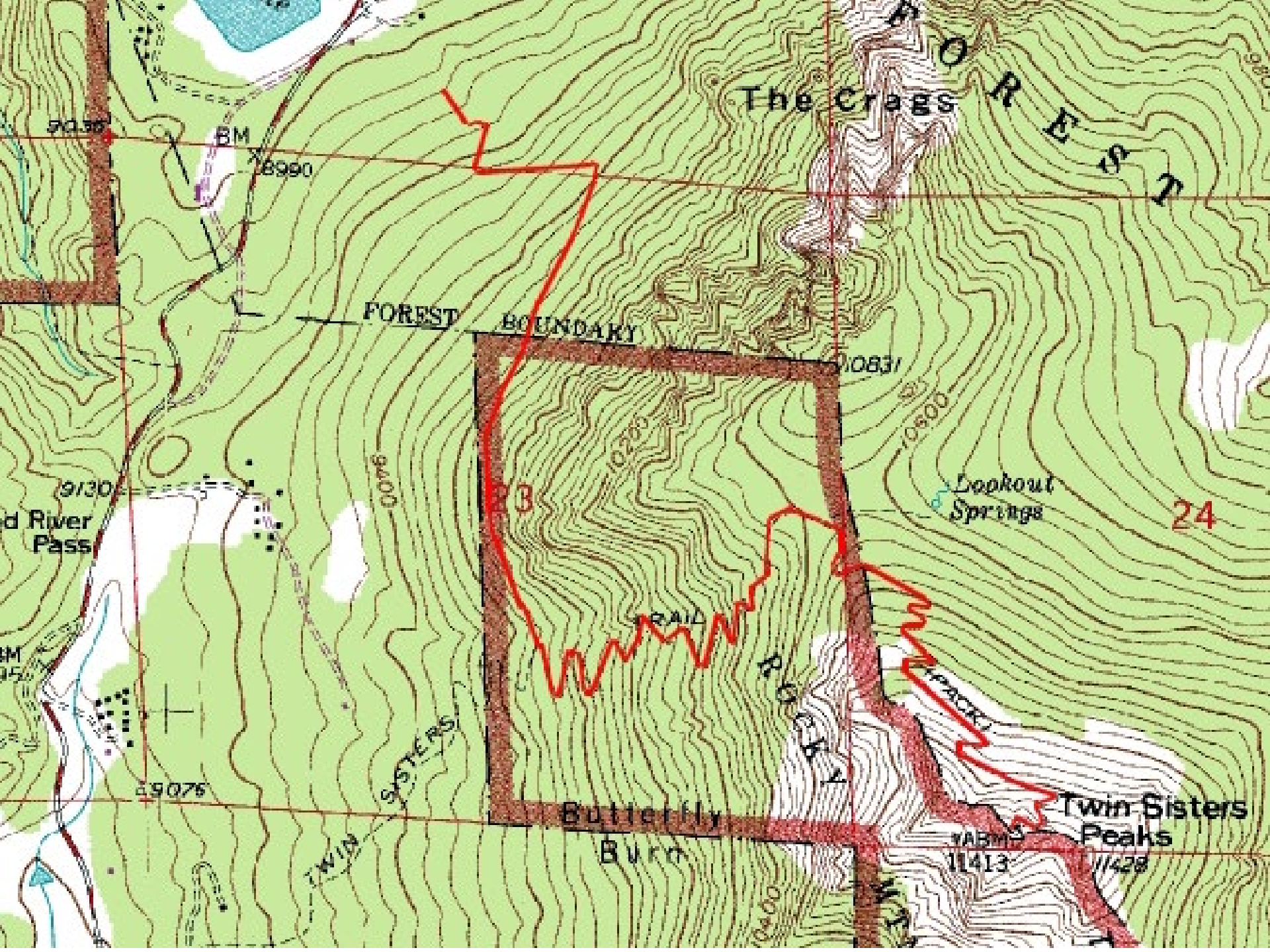
Callum Webb *Conveyor Belt Wear Life Modelling*

Endorsement

Student	Callum Webb	
Print Name	Callum Webb	
Date	29/04/2013	
Client Mentor(s)		
Print Name(s)	Stephen Muller	Nick C. Wilson
Date	10 May 2013	14th May 2013
Academic Supervisor(s)		Melinda Hodkiewicz
Print Name(s)	R.Nazim Khan	M. Hodkiewicz
Date	3 May 2013	6 May 2013
CEED Director		
Print Name	Jeremy Leggoe	
Date	16/5/13	

17


Objective?
?
?
?
Path?


The Crags
FOREST
BOUNDARY
BM
8990
9130
d River
Pass
9076
TWIN SISTERS
Lookout
Springs
24
TRAIL
ROCK
Butterfly
Burn
Twin Sisters
Peaks
11413
11428
10831
10600
10250
9900
9400

Project Brief Template

[Project Materials for Scholars – CEEDWA]

CEEDWA

<Project Title>

Project Number < YY/XXX >

< CEED Client >

Project Summary

The project summary must provide a clear, concise summary of the project. It must briefly identify the what, why, how and intended outcomes of the project:

- What are the subject and objectives of the project?
- Why is the project important to the client?
- How are the objectives to be achieved (and what resources are required)?
- Intended Outcomes – what are the deliverables of the project?

The summary is a "shop window" for your project. Care must be taken in its preparation, as it is the first (and maybe only) part of the brief that will be read. As such, it provides an important first impression of the quality of your work. It should be a maximum of 250 words (this sample is 155 words), and must also be limited to ensure that the summary, the headings above, and the list of project participants below all appear in this cover page (without manipulating the fonts or formatting).

<CEED Student>
<School>, <University>

< Academic Supervisor(s)>
<School(s)>, <University>

< CEED Client Mentor(s)>
<Department/Facility>, <CEED Client>

<Date>

Cover Page and Summary

- Project Summary
  - In some respects, the summary is the most important element of any proposal or report
  - For busy readers, the summary may be the only thing they read – it will ALWAYS be the first thing they read
- The summary must provide a clear, concise description of
  - The reasons for undertaking the project
  - The project objectives
  - The business value realised by achieving the objectives
  - The methods by which the objectives will be achieved and expected costs
  - The key deliverables

Project Background

- 1st Element – Problem Statement
  - The specific issue addressed by the project
  - Implications of the issue for the client
- 2nd Element – Background Information
  - Current Situation
  - History of the issue in the client enterprise
  - State of the art (from early literature review)
- 3rd Element – Current and Future Environment
  - How does the environment affect the motivations and execution of the project
  - Changes that may affect the project – Will new equipment or information become available? Is legislation changing?

Objectives & Benefits

- 1st Element – Objectives
  - What are the specific objectives to be achieved by the project?
- 2nd Element – Benefits Analysis
  - Describe the business value realised by the client through the implementation of the deliverables
    - Financial consequences
    - EH&S improvements
    - Improvements in KPIs
    - Policy formulation

Execution - Methodology

- The methodology sets out the process by which the objectives will be accomplished
- Break down the project into specific tasks, and describe the approach that will be taken to accomplishing each.
  - Experimental/Field tasks: describe equipment and techniques
  - Modelling tasks: identify software and computing resources
  - Theoretical tasks: identify approaches under consideration
  - Design tasks: identify tools or approaches
  - Financial tasks: describe tools and analytical techniques
  - Survey Tasks: describe approach and target populations
- Identify any constraints imposed on the methodology
- **This is often the weakest element in poor briefs**
  - **You should provide specific detail – vague ideas are not enough. Careful planning is critical**

Execution - Timeline

- Scheduling the project elements is an essential part of research plan development
- The timeline should be described in two distinct ways:
  - A Gantt chart is required
  - The key milestones should be listed and discussed
- Consider the following key questions;
  - How long will each task take?
  - How variable is the predicted time for each task?
  - Which tasks can be done concurrently?
  - Which tasks have prerequisites?
  - Which tasks lie on the critical path?
- Discuss any key constraints on the proposed timeline

Execution – Gantt Chart

Microsoft Project - Sample Project.mpp

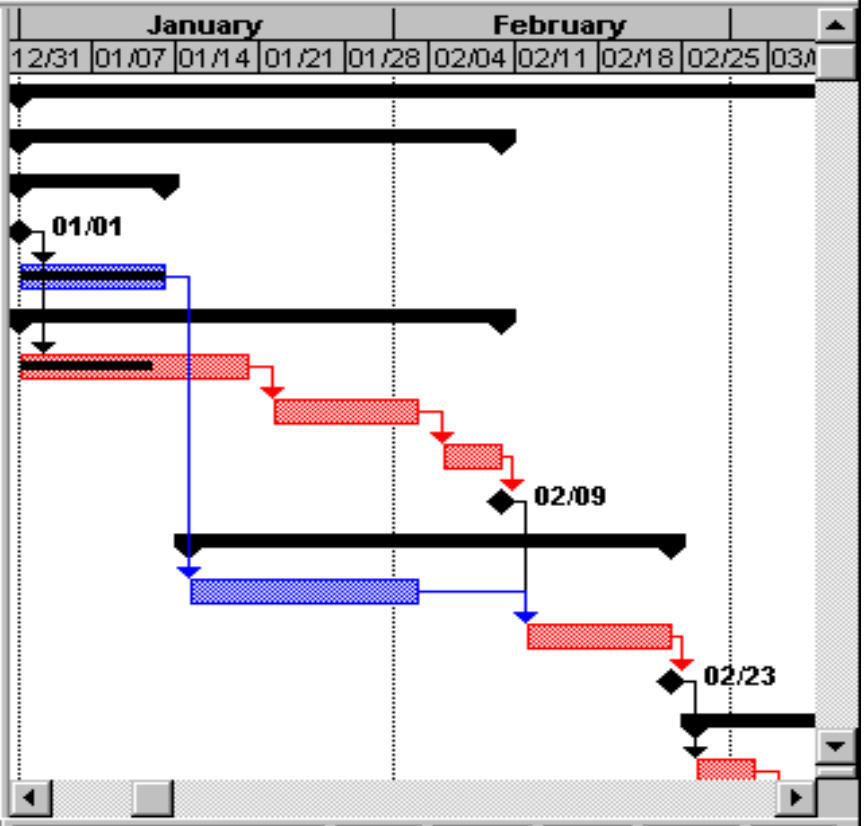
File Edit View Insert Format Tools Project Window Help

No Group | Show | Arial | 8 | All Tasks

Project Summary

Gantt Chart

	WBS	Task Name	Cost
1	1	Project Summary	$38,000.00
2	1.1	Design Phase	$18,400.00
3	1.1.1	First Design Phase	$4,000.00
4	1.1.1.1	Start Milestone	$0.00
5	1.1.1.2	Design Task 1	$4,000.00
6	1.1.2	Second Design Phase	$14,400.00
7	1.1.2.1	Design Task 2	$6,000.00
8	1.1.2.2	Design Task 3	$4,000.00
9	1.1.2.3	Design Task 4	$4,400.00
10	1.1.2.4	End Design Milestone	$0.00
11	1.2	Programming Phase	$10,000.00
12	1.2.1	Program Task 1	$6,000.00
13	1.2.2	Program Task 2	$4,000.00
14	1.2.3	End Program Milestone	$0.00
15	1.3	Testing Phase	$9,600.00
16	1.3.1	Test Task 1	$2,400.00



Ready | EXT | CAPS | NUM | SCRL | OVR

Exercise – Gantt Chart

- Prepare a Gantt chart for your project
  - Working individually, break down the project into tasks with identifiable outcomes and lengths.
  - Draw up your Gantt Chart on the whiteboards or in your notebook
- The group will review and discuss the proposed timelines

Execution - Resources

- You **MUST** identify any resources needed to undertake the proposed methodology
  - Who will provide each resource (UWA or the client)?
  - Check with your supervisor and mentor to ensure that resources are available
  - Are the resources in place? If not, how long will it take to secure them?
- Provide a detailed break down of any anticipated costs.
  - The client **must** agree in advance to any expenditure
  - Note any constraints imposed on expenditures (ie limit on total budget)

Risk Management

- It's essential that project managers understand potential problems, or "risks", that may affect the project. They may then identify "risk management" strategies to eliminate or mitigate these risks.
- Risks are classified into four broad types:
  - Safety
  - Environmental
  - Financial
  - Project Outcomes
- Examples of each type of risk may be encountered in final year projects
- In your brief, you are required to provide a section addressing the various types of risk

Risk Management (cont.)

- Note – It is imperative that your risk management section only include significant **real** risks
- If there is no significant risk of a particular type, it is perfectly acceptable to clearly and simply state that there is no significant risk
- **Do not invent risks just to pad out the risk management section.**
- Each project will encounter different risks – but it is expected that all projects will be subject to risks to project outcomes.

Confidentiality & Publication Approval

- Is any of the information that you will be handling confidential (for IP, commercial, or publicity reasons)?
- What are the procedures for clearing papers, presentations and theses for publication/submission?
  - How many weeks in advance must they be submitted for approval? **Note – for most companies, the process will take 3-4 weeks. Mentors are often unfamiliar with this – so take our word for it!**
- Will this thesis need to be held confidential? If so, why, and for how long?

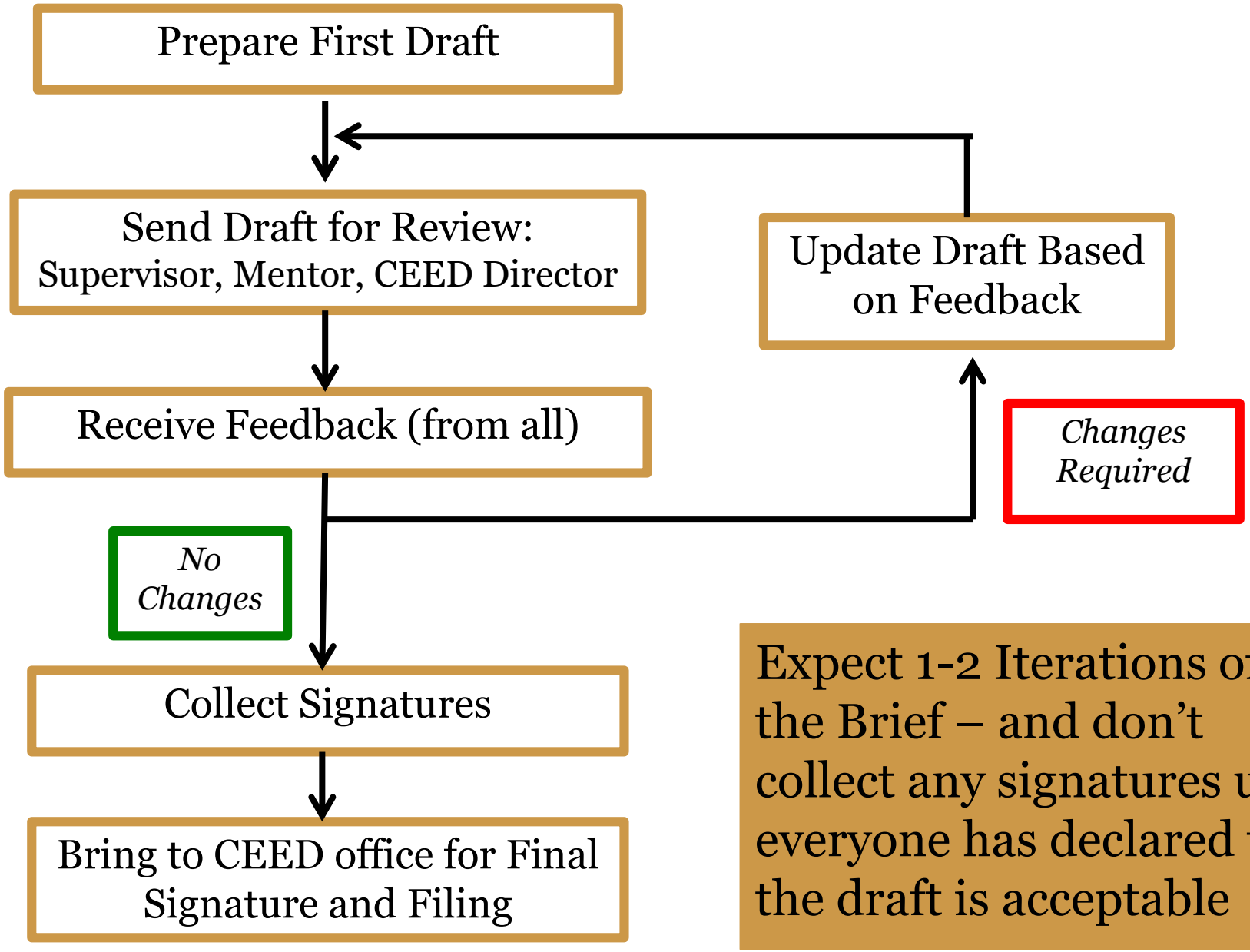
It is essential that confidentiality requirements and clearance procedures be set out clearly in the project brief

Deliverables

- List all deliverables, specifying the format they are to be delivered in.
- Deliverables may include
  - Project Report
  - Software
  - Experimental Rigs
  - Manuals for Software and Experimental Rigs
  - Implementation plans
  - etc

Session 3
CEED Project Coordination

Project Brief Preparation Process



Expect 1-2 Iterations of the Brief – and don't collect any signatures until everyone has declared that the draft is acceptable

Project Brief Submission

- The first (and subsequent) drafts of the project brief must be submitted to the client, supervisor and CEED office for review
  - All parties must sign off on the final document, and so must be involved in all stages of the revisions.
- You can expect the brief to go through at least one set of revisions.
  - Ideally one should be enough – but it will depend on how well you follow the instructions for revisions.
- Pay particular attention to
  - Benefit Analysis
  - Methodology
  - Risk Management
  - Confidentiality
- **The project brief must be completed within 10-12 weeks of the start of work on the project**

Monthly Report

CEEDWA

Expenses This Month	
Urgent Issues	

CEED Project Monthly Report	Insert Month
Project No & Title:	
Client	Insert Text
Student	Insert name

Project progress this month
Enter Text

Issues affecting progress
Enter Text

Expected progress next month
Enter Text

Issues that may affect progress next month
Enter Text

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for Enterprise Development
(CEEDWA)

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Expenses incurred this month
$

Total expenses incurred during the project to date
$

Itemised list of expenses incurred this month
In this box, provide an itemized list of all project expenses incurred during the month, stating the amount of each item and the reason for the expense. Please also indicate whether it was an expense paid for by the client, or incurred by UWA. If expenses have occurred: • attach copies of all receipts • attach a copy of the written authorisation from the client covering the expenditure. If no expenses have been incurred this month, simply enter "No expenses incurred this month" in this box.

Project Expense Table

Date	Expense Detail	UWA Amount	Client Amount	Approval and receipts attached Y/N

Signed	**Date**

Recipient List

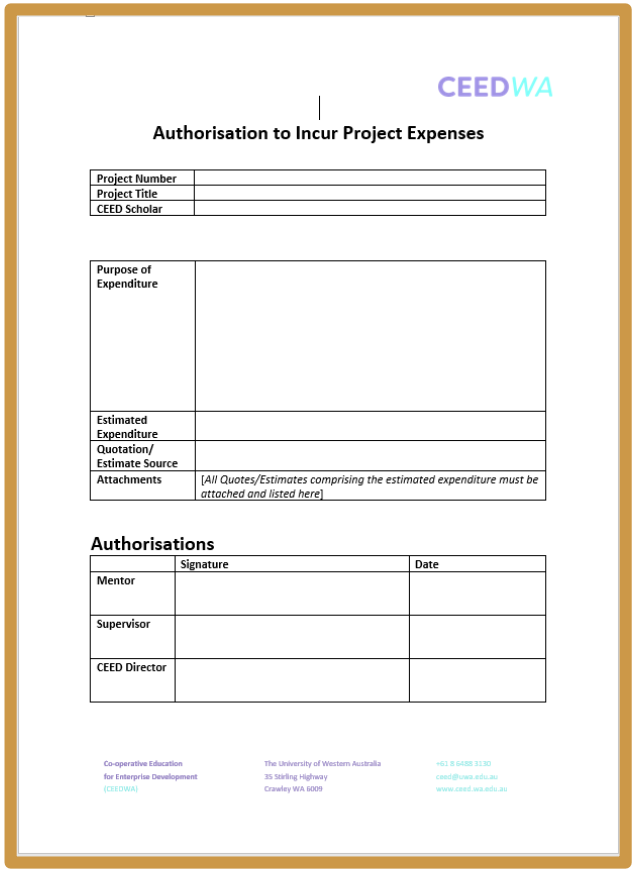
- Academic Supervisor
- Client Mentor
- CEED Office (ceed@uwa.edu.au)
- Self

Monthly Report

- You are required to submit a monthly report by 5:00 pm on the first day of each month
- The template for the monthly report is available at the CEED website.
- The monthly report **must** be an accurate summary of the status of the project.
  - Your supervisor and mentor <u>must</u> have an accurate picture of project status, expenditures and resource needs in order to advise you properly and schedule resources
  - The submission of the report should serve as a reminder to update your project timelines
- The monthly report will be circulated to the client mentor, supervisor and CEED office.
  - It must be professionally prepared and presented

Project Expenses

- The CEED Client entirely funds the project.
- You <u>must</u> comply with the accounting needs and procedures of the Client and the University.
- **Written approval must be secured <u>before</u> incurring any expenditure; the client will be under no obligation to pay if you do not.**
- You are responsible for the financial management of the project (under the oversight of your Supervisor and Mentor). **Expenses must be reported monthly.**
- Estimated Project budget requirements should be set out in the project brief, and discussed with the client during the formulation of the project brief.



CEEDWA

Authorisation to Incur Project Expenses

Project Number	
Project Title	
CEED Scholar	

Purpose of Expenditure	
Estimated Expenditure	
Quotation/ Estimate Source	
Attachments	[*All Quotes/Estimates comprising the estimated expenditure must be attached and listed here*]

Authorisations

	Signature	Date
Mentor		
Supervisor		
CEED Director		

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Project Expenditures

- **The client is responsible for all project expenses.**
- The client may incur expenditure directly (this is common for travel and accommodation), or we may incur expenditures on the client's behalf (this is common for workshop expenses, experimental consumables, test rig construction)
- **We can only incur expenditures on the client's behalf with the prior written authorisation of the client** – **you must complete the expenditure authorisation form and have it signed by your mentor, supervisor, and the CEED Director before incurring expenditure**
- In general, expenditures must be billed to your supervisors' operating accounts – **you should not incur expenditures yourself**
- The CEED office will bill the client and reimburse your supervisor at the end of the project – this will require you to provide:
  - Records of all internal expenditures (eg workshop hours)
  - Tax invoices for all purchases

Minor Expense Allowance

- $200 is included in the CEED project fee to cover printing expenses
- This amount is intended to cover the costs associated with preparing reports and deliverables for the client, supervisors and CEED Office
- Allowable expenses include:
  - Printing and binding of reports
  - Media for transporting digital files (thumb drives, external hard drives, etc)
  - Textbooks and photocopying
  - Other approved minor project expenses
- The allowed amount may only be exceeded with prior written authorisation by the client – they will be billed for the excess
- You may incur these expenses yourself – to be reimbursed, **you must provide all receipts – itemised tax invoices are the minimum requirement.**

Studentship

- For full final-year/honours/masters projects the studentship is paid in **four** equal installments
  - 1st Installment: Upon receipt of a project brief signed by all parties
  - 2nd Installment: At the start of the second semester of your project (if you are up to date with reporting requirements and making satisfactory progress
  - 3rd Installment: Upon satisfactory completion of your seminar committee, paper and presentation obligations
  - 4th Installment: When Client confirms that all deliverables have been received and accepted.
- For Three Quarter final-year/honours/masters projects the studentship is paid in **three** equal installments
  - Equivalent to the 1st, 3rd and 4th installments for Full projects
- **All payments are contingent on being up to date with monthly reports**

Exercise – Monthly Report

- Prepare a sample monthly report for the first month of your project.
- You have 10 minutes to compile the report – later in the day you will get feedback on the reports.

Session 3

Managing Your Research Project

It’s your project!

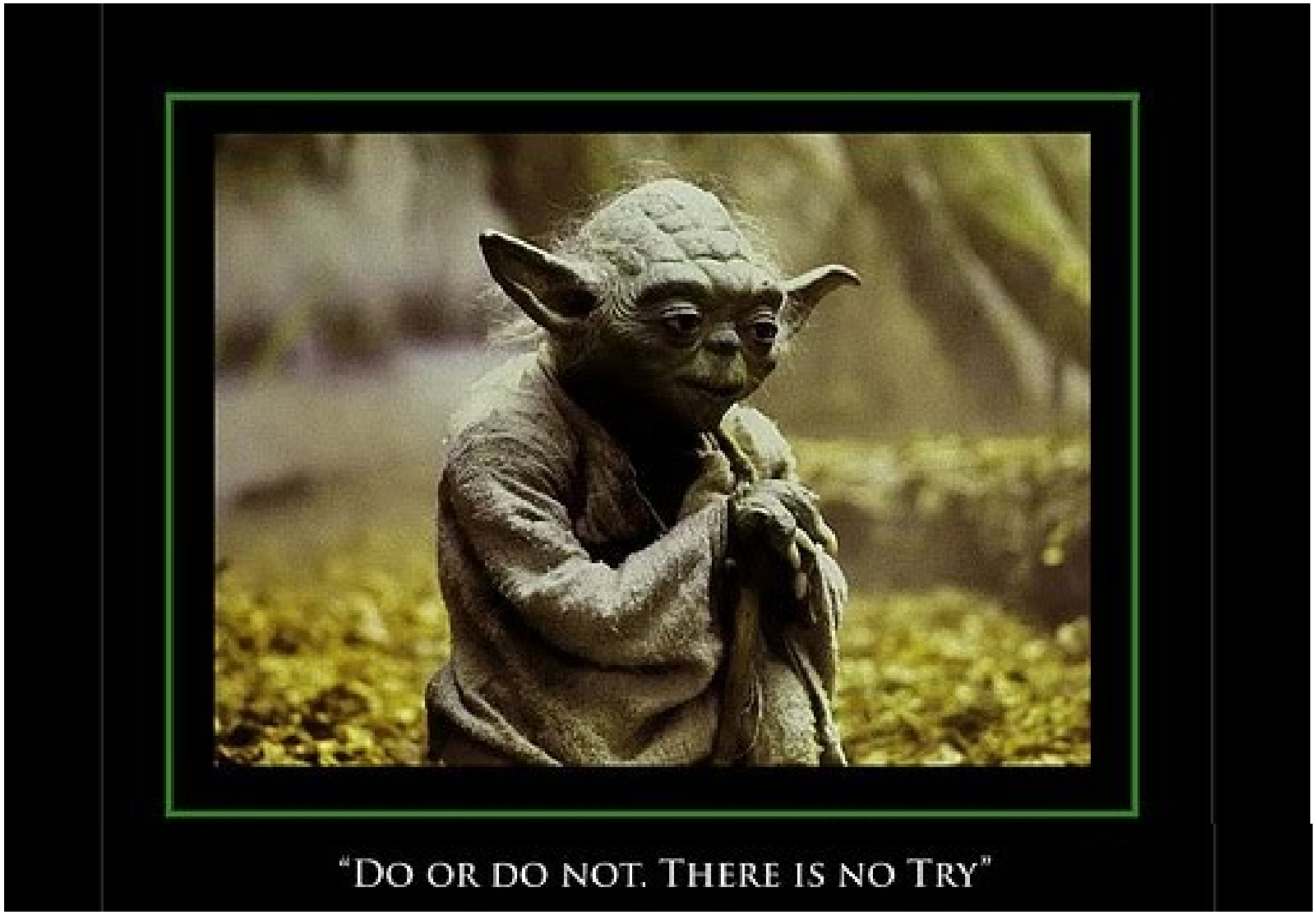
It’s your project!

- **You** must take “ownership” of the project for it to be successful.
  - You will receive support from your supervisor, the client, the CEED office, school staff, and your fellow students,

    BUT

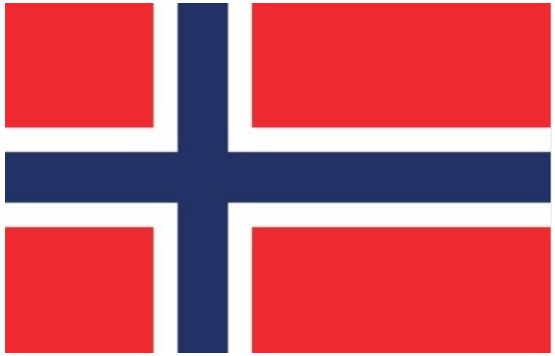
    You’re the person primarily responsible for the success or failure of the project.
- **You** must take the initiative to keep the project moving in the absence of immediate deadlines or external pressure.
- If you get moving on your project earlier, you will have more opportunity explore your project. The more you explore, the better your project will turn out.

Commitment – Language is Important!



Project Execution

The lessons of Amundsen and Scott



Amundsen Expedition

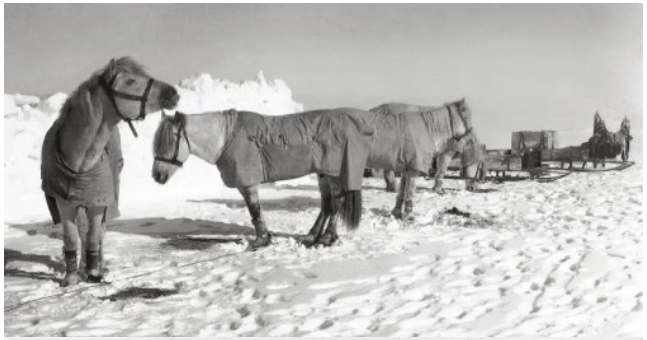
- Departed Bay of Whales - 19 October 1911
- Reached South Pole – 14 December 1911
- Returned to base – 25 January 1912

Scott Expedition

- Departed Ross Island – 1 November 1911
- Reached South Pole – 17 January 1912
- Never returned to base – All members of pole party lost (last diary entries 29 March 1912)

Preparation

Explore and Test your options



Amundsen

Scott

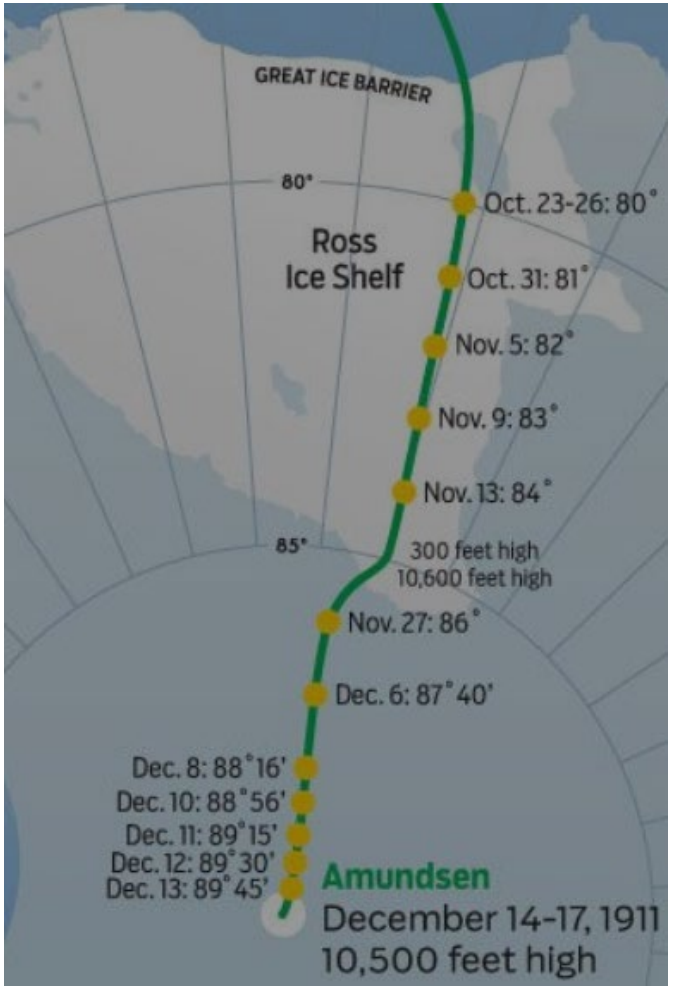
Innovation
Explore innovative/overlooked options

Amundsen Expedition

- Amundsen lived with the Inuit people for extended periods
  - Absorbed lessons on living and working in polar conditions – gained experience with sled dogs
- Launched expedition from Bay of Whales, which was avoided by others as it was thought to be unstable
  - Started 60 miles closer to the pole than Scott….
- When setting depots, placed 20 black pennants in increments either side of depot, to give a wider target to "hit" in case they were off course in a storm
  - Black – easily seen against snow
- On outward journey, left markers (used packing cases) every ¼ mile, with pennants on poles every 8 miles
  - Helped speed return journey

What are you not considering?

Maintain Consistent Progress
The Disciplined "20 Mile March" Approach



Amundsen Expedition

- Targeted travelling 15-20 miles per day regardless of the conditions
  - Limited travel in good conditions – avoided exhausting the team
  - Forged on in poor conditions (as long as not too dangerous) – travelled on 8/15 gale force wind days
- Reached South Pole having averaged 15.5 miles per day

Scott Expedition

- Pushed to exhaustion in good conditions travelling extreme distances
- Didn't travel at all in poor conditions
- Took an extra 25 days to reach pole……

Consistent progress is critical in long term projects….

Project Timeline

- Make sure you set out definite deadlines for individual tasks.
  - Identify regular milestones that will help mark your progress, especially in longer or more complex tasks
- **Stick to your deadlines**!
  - Don’t let weekly pressures (or the absence of imminent project submissions) reset your priorities.
  - Make time for your project every week – it’s the most important unit you’re undertaking over the next year.
- Keep your Gantt chart updated as the project evolves
  - Take particular care to identify tasks on the critical path, and keep them on schedule.

Project Activities

- Project activities NEVER go smoothly
  - Anything that you leave to the last minute WILL get delayed when you can least afford it.
  - Sometimes things that are beyond your control will go wrong (this is why we do risk management).
- Get your research going as early as possible;
  - This will give you the chance to overcome difficulties
  - You may identify ways to enhance your project (remember– you are effectively in competition for resources).
- Use the holiday breaks– don't let your project stall during teaching breaks.
  - Workshops, libraries and labs are quieter over the break – it can be easier to get things done.
  - More importantly, you don't have other classes in the break.

Teams always have competing priorities

- Industry teams must address multiple stakeholders - contractors, joint venture partners, in-house teams, government, the community) – even Uni team members will be taking different combinations of units
  - Each party in the project will have their own priorities
  - Aligning priorities will be an important part of setting the project plan
- **You must start as early as possible to allow flexibility to accommodate priorities (it will be difficult to control timing of activities)**

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- Industry teams must address multiple stakeholders - contractors, joint venture partners, in-house teams, government, the community) – even Uni team members will be taking different combinations of units
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Site Testing & Sample Collection

- Projects involving site testing or sample collection face particular challenges.
  - You will have to fit your testing in with operational and maintenance schedules
  - Several parties may be involved in setting up and executing the program – and they will each have their own priorities
  - The program may involve multiple organisations (client, contractor, community); and all of their schedules will need to align to enable the program to proceed
- **So – you must start as early as possible to plan and organise the test/sampling programs**
- **Be aware that the timing will be difficult to control – so plan accordingly in your project timeline**

Be Pro-active!

- Resolve issues as soon as they arise.
  - Procrastination is fatal in team (and individual) projects
  - Problems will not become easier to fix next week (in fact – there will be less time available to address any issues).
- Don’t assume that your team will be available on your timetable – get material to them early.
  - Everyone is busy; this project is one of many of each team member’s radar, and they will have other obligations to attend to.
  - You have to give your team time to review and respond thoughtfully to material.
- Fellow team members will respond to your enthusiasm.
  - If you’re interested and getting things done, it will help energise the rest of the team.

Meetings

- Set and maintain a regular meeting schedules with your supervisor and mentor
  - The frequency will depend on availabilities – but must be consistent and regular
  - Milestones should be considered in setting meeting frequency.
  - Use online meetings (MS Teams) to maximize team availability
- Set goals to be achieved between meetings
  - At each meeting, discuss the work done since the last meeting
  - Set down what will be done by the next meeting.
- Set an agenda for each meeting and have a purpose
  - Every meeting needs a purpose – **but every meeting should advance the project in some way**.
  - Document the key points and share with all after the meeting.

Manage Yourself

It's critical to manage your own state of mind Use the Gantt chart – it's important to see the progress that you are making

- Keep a growth mindset – expect there to be setbacks. Each setback is a lesson, and can be overcome or adjusted for.
- Be careful about overcommitting yourself (this applies to Uni too – Uni is demanding!)
- Don't give yourself excuses – use language that commits you to action, and act accordingly
- **Expect disruption!!!**

Remember – nothing ever goes perfectly. Dealing with issues in a project is absolutely normal (even inevitable), and they'll be resolved by action rather than inaction

Adopt a Deliver Mindset – not a "Marks" mindset
80% is NOT Good Enough!

- The biggest difference between a classroom project and a professional project is that in the professional world you are judged by delivery rather than marks.
- In the classroom, 80% gets you a High Distinction; in professional projects, something that is 80% right will 100% not work – and it will be handed straight back to you to fix (in the best case – in the worst case the project will be taken off you)
- In practice, turning in work with obvious errors (proposals that can't work, or completed projects that don't work) makes you look careless and lowers others' confidence in you and your team.

Marks are only relevant in educational environments. You will only be deemed successful in professional practice if you deliver something that works!

Session 4

Communication

Professionalism

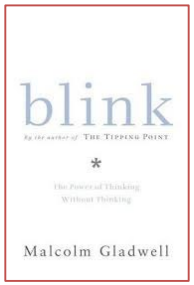
- CEED students undertake projects in a professional environment, and must respond accordingly
- **Every** form of communication or interaction associated with the project **must** reflect your professionalism
  - Presence
  - Presentation
  - Punctuality
  - Phone conversations
  - E-mails
  - Meetings & Technical Presentations
  - Written reports
- **It's critical to know the appropriate ways to interact in a professional environment – a good or bad interaction (or even an inappropriate lack of contact) can affect a relationship for an extended period…**

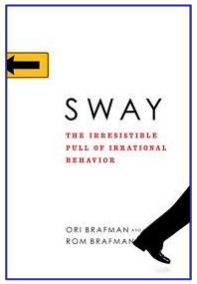
Presence and Note Taking

- It is critical to be fully “present” at all meetings
- Professional meetings are not recorded – you must take “live” notes during the meeting
- The note book is your ally – take it to all meetings, and keep it with you during any calls or research sessions
- Your phone is the enemy of presence – don’t become a phone zombie!!!!

Presentation

- First impressions are more influential than you suspect – and presentation is an important element of a recipient or counterpart's first impression
  - Be aware of the consequences of "Diagnosis Bias" and "Value Attribution"!
- If you or your work are presented poorly, colleagues will (subconsciously) assume that your work is equally poor
  - Dress and act professionally
  - Take care in checking spelling and grammar
  - Take care in the arrangement and presentation of figures





References

- *Gladwell, M, 2007, Blink – The Power of Thinking Without Thinking, Little Brown & Co, New York*
- *Brafman, O, Brafman, R, 2008, Sway: The Irresistible Pull of Irrational Behavior, Broadway Business, New York*

Punctuality & Responsiveness

- Showing up late for an appointment of any type is disrespectful to the other participants
  - It leaves the impression that you think your time is more important than that of the other participants.
  - Your time is **never** more important than that of the CEED client, the academic supervisor, or CEED staff.
  - Take any necessary steps to ensure you arrive on time.
- Punctuality in the submission of reports and timely response to e-mails is equally important
  - Failing to meet deadlines demonstrates your unreliability
  - You must RSVP promptly to appointment requests, whether they come from the client, supervisor or CEED office
  - You should never let issues drift – deal with them as they arise.

RSVP

Attitude

- CEED students are expected to adopt a professional attitude in the execution of their projects
  - This means doing things until they are done properly, rather than doing “just enough”.
  - Every interaction during a CEED project can affect your professional reputation – Perth is an outrageously small town (professionally).
  - You will have the opportunity to present your work to not only your client, but representatives of a wide range of companies at the CEED seminar
- **Remember – in a professional project, you are not being judged by marks. You are being judged by results.**

Exercise – Communication

- List the key points of the discussion presented in the last 4 slides
- List the actions that you will take in your project based on this discussion
- You have 5 minutes to compile the list – at the end of the 5 minutes we will compare the lists.

Managing Communication

- Keep meeting minutes
  - Always book the next "meeting" from the current “meeting”
  - Minute only decisions and actions
- Put all agreements in writing (usually, e-mail or an e-mailed memo will do)
- Keep notes
- Keep all parties well informed - no-one should feel “out of the loop”
- Maintain regular contact with all parties
  - “Out of sight, out of mind” is not entirely true – people notice when they’re not hearing from people they expect to hear from. And often they don’t like the silence.

Effective Communication

- Improving the effectiveness of your communication will;
  - Reduce frustration on all sides
  - Improve chances of mutual understanding
- Know which form of communication to use
  - Students are prone to relying on e-mail when they should call or meet face-to-face

Always remember – in phone and e-mail exchanges, your counterpart can't see you. You MUST take extra care to leave a good impression.

Phone Communication

- Consider the situation of others
  - Be prepared for your contact to be busy
- Control the progression of communication
  - If a contact is busy, set a time for a follow up or return call
- Leave useful voicemail messages
  - Always leave your contact number
- Do not nag via voicemail
  - Leave ONE message
- Your own voicemail greeting must be informative and professional

E-mail

- Professional e-mails should be written as if they are letters
  - Grammar and spelling must be correct
  - Do not be overly familiar
  - Do not lapse into colloquialisms or “txtspk”
- Always be mindful that e-mails can be circulated to unintended recipients
- **Take extra care when wording e-mails**
  - It is **very** easy to leave the wrong impression via a poorly worded e-mail
  - Students are often guilty of poorly worded e-mails to supervisors, staff or mentors
  - Always check – what sort of attitude does your e-mail convey? It’s easy to come across as arrogant or rude

Presentations, Talks and Seminars

CEED Seminar (September)

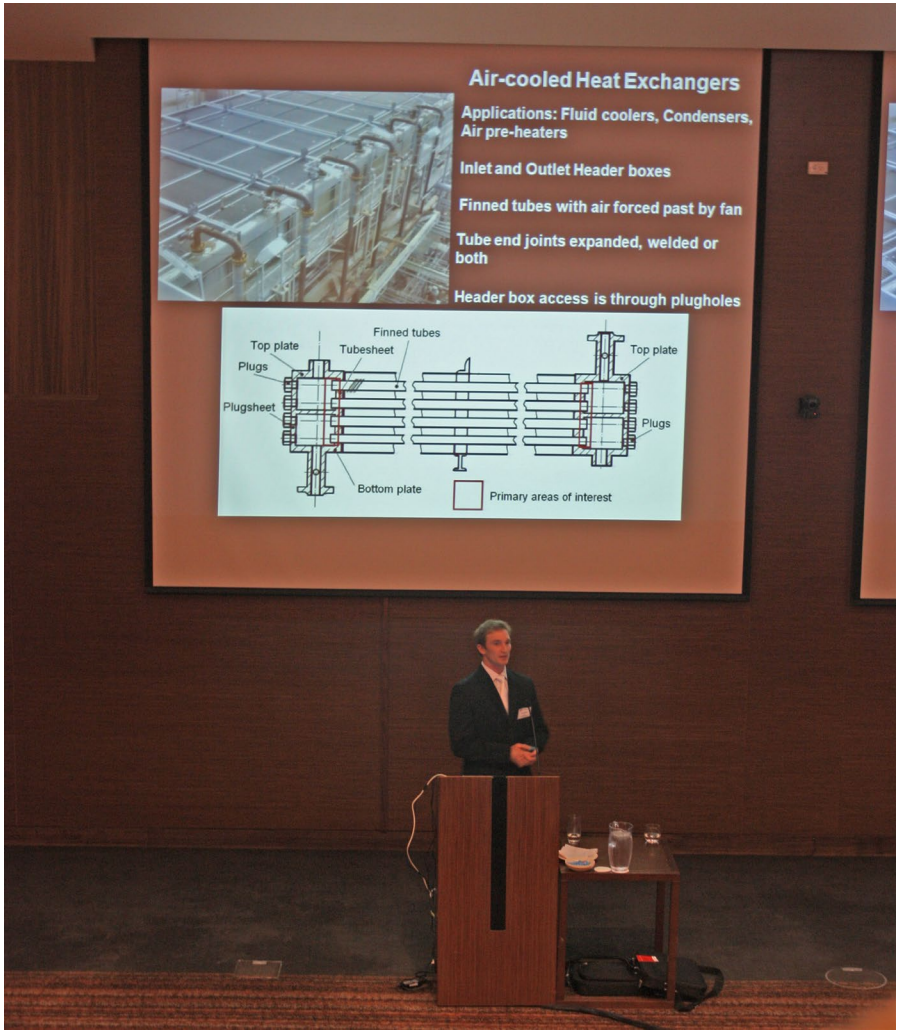
- You will prepare a short (six page) paper
- You will deliver a 20 minute presentation (15 minute talk, 5 minutes for questions)
  - Students starting at mid-year will be invited to return to deliver a presentation.
- You will also participate in event planning and operations.

Most students are also invited to give presentations at their Client's premises

Preparation is the key to good presentations.

Delivery and Personal Presence

- Speaking Volume
- Speaking Rate
- Mannerisms
- Eye Contact
- Activity and Engagement



Professionalism

- Avoiding Redundancy
- Professional Expression
- Professional Dress
- Meeting Time Limits

Delivery and Personal Presence

Speaking Volume

Speaking Rate

Delivery and Personal Presence

Mannerisms

Delivery and Personal Presence

Eye Contact

Activity

Professionalism

Avoiding Redundancy…..

Professionalism – Expression and Dress

Professionalism – Meet Time Limits!!!!

Confidence!

Confidence derives from preparation.

Slide Content

Initial Slides

- The first 3 slides must establish;
  - **What** the project is about, and what your objectives are
  - **Why** the project is important
  - **How** you are going to achieve your objectives (in a general sense)
- **If the audience doesn't know what the talk is about after the first 3 slides, then you have lost them**
- Slides that list the order of the sections of your presentation are **worthless!!!**.
- It is essential to use high impact graphics in your initial explanatory slides – help the audience visualise the issue and its importance.

Slide Presentation

- Spelling and (gross) grammatical errors are unforgiveable.
- All graphs and images must be appropriately labelled
  - Axis titles, legends, units
- You must use appropriate (professional) language on your slides, as well as in your verbal expression
- Your slide content should reflect the expected level of shared knowledge with the audience
  - You MUST tailor your presentations to the audience.

Technical Content

- It is essential that all technical content presented be accurate; any obvious errors will lower the audience's opinion of your work, and diminish its potential impact.

Question Time

- Prepare in advance – think about the questions you would ask, and prepare answers for those
  - What were the limits of your model or experiment? Why did you settle on particular assumptions? Which choices were arbitrary? Which aspects of your hypothesis are open to challenge?
- Listen to questions carefully.
- Don’t rush – take a moment to think about your answer.
- Don’t take questions personally
- Don’t be defensive
- Accept that the questioner may be raising a valid point.
- You don’t always have to have an answer – but you should have an idea of how to get the answer.

Font Size

- All text and image labels must be visible from the back of the room.
- Rule of thumb – never use less than 16 point font, and try to stay at 20 point and above for important text.
  - This is 20 point (Calibri)
  - This is 16 point
  - This is 12 point
- Note that these limits can vary for different types of font
- Be sure to use crisp, clear fonts;
  - Georgia (this presentation), Times, Arial, Helvetica, Geneva

Background and Colours

- Be careful when selecting backgrounds and slide formats
  - “Busy” slide templates can restrict space and obscure information
  - Don’t let background colours overwhelm the key information
- Ensure that Background and font colours are compatible
  - Dark on light or light on dark are the rule – “sort of dark on sort of light” or vice versa is a silly mistake

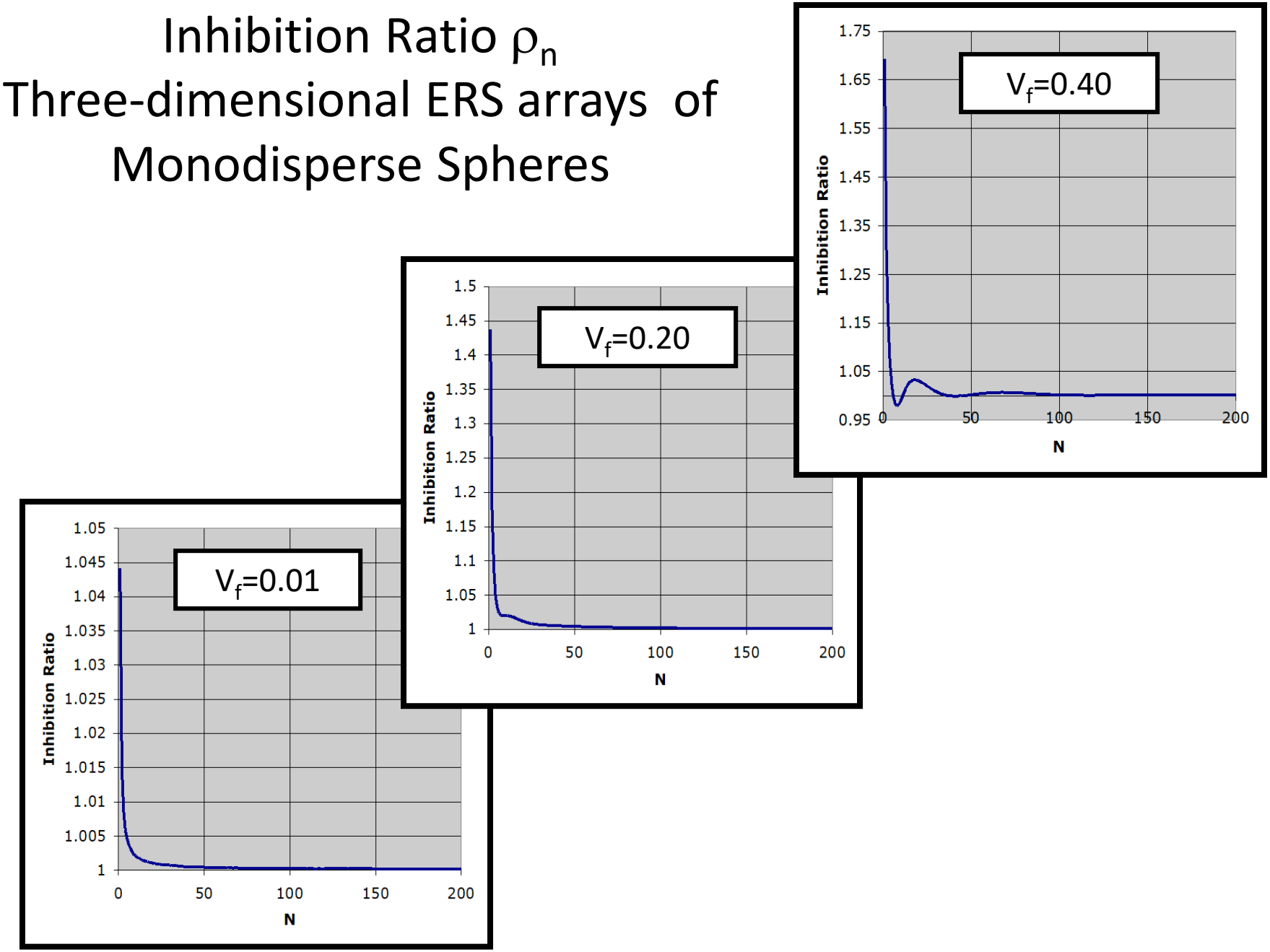
Good	Good	No Good	Stupid

  - Make sure that the background colours are compatible with graphs and images too.

Image Size

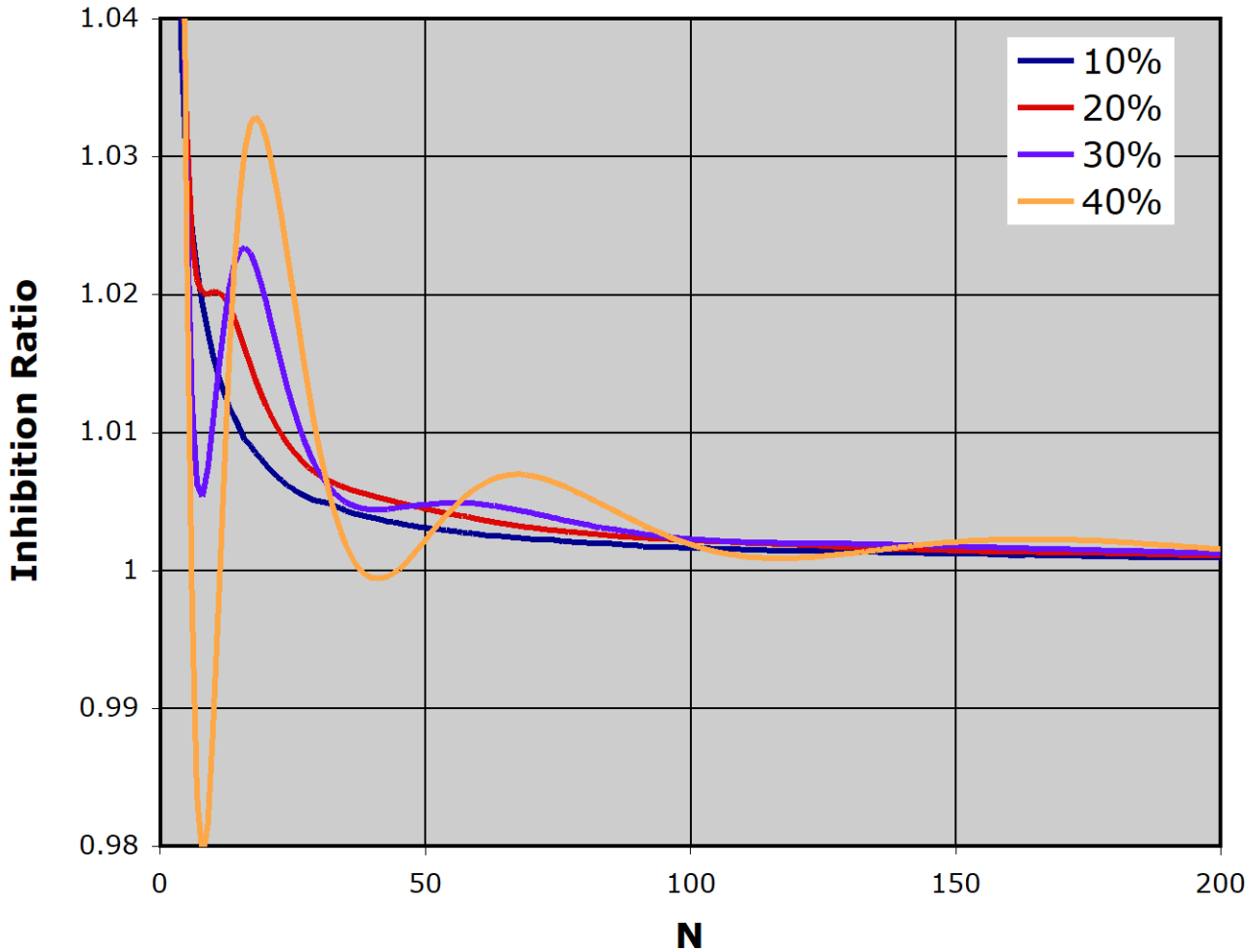
- Make sure that all image features, symbols and labels are visible at the back of the room
  - Lines and text are often “thinned” by the projector – so lines that look good on your screen may not show up well when projected.
  - Color definition can also be lost in projection – it can be hard to tell Blacks from Dark Blues, etc
- Use judgement in deciding whether to squeeze multiple images or graphs onto a single slide
  - Is the point you are trying to make still clear with the smaller images?
  - Do you really need to compare the images – or is the point still clearly made with larger images on separate graphs?

Inhibition Ratio ρ_n
Three-dimensional ERS arrays of Monodisperse Spheres



Effect of short range order on Inhibition Ratio;

Three-dimensional ERS monodisperse particle arrays



Report Preparation

Why Prepare a Report?

- **To communicate your project's motivations, objectives, methods and findings to others**
- Obviously, your report will be marked, but you will find that if you focus on *effective* communication, the mark will take care of itself
- When making decisions on whether your report is effective, place yourself in the reader's shoes;
  - Would someone reading this text understand what you are thinking?
  - Does this figure or graph convey the information that you wish to convey to the reader effectively?
- **The reader is NOT a mind-reader; all they have to work with is what you provide in the report**

Report Audience

- When preparing any report, you must take into account the expertise and motivations of the target audience
- For your report, the audience will include
  - Staff at your client enterprise; these staff may have extensive experience, but may not be familiar with specialized techniques
  - Management staff at client enterprises; these individuals may or may not have specific expertise
  - Recruiting officers at potential employers; these individuals may or may not have specific expertise
  - Academic Staff in your school; experienced researchers and teachers
  - Future students; experience similar to your own

Audience Motivations

- Implementing your recommendations, or evaluating your recommendations for implementation.
- Deciding whether to support continuing research on the subject
- Following up or extending your research
- Determining whether to hire you
- Determining where you should be assigned in an organisation
- Comparing your research with research done elsewhere

And……..

- Marking

Project Summary

- In some respects, the most important element of any report
- For busy readers, the summary may be the only thing they read – it will ALWAYS be the first thing they read
- The summary must capture the reader's attention – so take care in preparing it.
- The summary must provide a clear, concise description of
  - The reasons for undertaking the project
  - The project objectives
  - The methods by which the objectives will be achieved
  - Key conclusions and recommendations (highlighting costs of implementation and benefits, advances in the state of the art, novel capabilities or features of a new design, as appropriate)
- The summary should usually be limited to 250 words (always less than one page)

Introduction and Project Objectives

- The introduction sets out:
  - The nature of the issue being addressed
  - The importance of the issue
  - The past history in the area and the current state of the art
  - The objectives, and the reasons for pursuing those objectives.
- Context is important: why is the project important to the field, client or community? How does the project advance the state of the art?
- What benefits accrue from the achievement of the objectives?
- A brief description of the structure and contents of the report may be included, but is not essential (most reports follow reasonably conventional structures, and contents are provided).

Literature Review

- The literature review may be blended into the introduction or presented as a separate chapter.
- The purpose of the literature review is to establish the state of the art in the area that you are working in.
  - For investigative research, this will mean reviewing the academic literature.
  - For design projects, this will mean identifying current approaches to solving the problem of interest (or similar problems)
  - For industrial projects, this will entail reviewing standards and current operating practices.
- **Remember – it's important to REVIEW the literature critically. It's not a literature "survey".**

Process

- *The guiding principle for this section is that it should provide any information that would be necessary for someone to repeat your work*.
- The nature of this section will depend on the project
  - Experimental Method
  - Model Formulation
  - Design Approach
  - Data Collection
- Providing detailed information is critical
  - Your findings are meaningless if the reader cannot tell how you obtained them.
  - Figures are essential.
  - Design criteria MUST be defined for design projects

Results & Discussion

- *The guiding principle for this section is that it should describe what has been done, and demonstrate how well the findings are understood.*
- Focus on presenting “analysed” results
  - Raw data may be provided in appendices
  - Use graphs and tables as appropriate
- For design studies, the final design, and its performance of the design will represent “results”.
- Take care to evaluate how well your presentation communicates the results to the reader
  - Graphic comparisons are particularly powerful
  - When comparing results, select a form that keeps the items being compared on a single page

Results & Discussion (cont.)

- The purpose of the discussion is to place your results in context.
  - Compare the findings with any original expectations.
  - Compare the findings with the pre-existing state of the art.
  - Compare the proposed approach with alternatives.
  - Discuss the limitations of the current project.
- It is important to assess the limitations of a technique, in order to properly apply results.
- Arbitrary choices should be identified, and alternative approaches should be considered in the discussion.
- *Remember – all statements and arguments in your report must be supported, either by your results, or information available in the literature.*

Every statement and conclusion in a professional report <u>must</u> be supported by <u>accepted</u> literature or your results and deductions

Conclusions and Future Work

- Conclusions should state concisely the most important findings of the project.
  - Assess whether or not the objective of the project have been achieved.
  - Identify any future work arising from the project (unresolved issues, or steps for implementation).
- While the conclusions will generally brief, care should be taken in writing this section.
  - Remember, it will be the last thing that the audience reads, so it will be the last thing on their mind before they make a decision on the future of your project (in professional practice), or on your grade (right now)!
- **Last impressions are important too**!

Your reports must stand on their own as documents!

- Remember that your reports may have a life within the client organisation that extends far beyond your participation in the project
  - The report must make sense even when you're not around to explain it.
  - The methodology and recommendations in particular must be clear to people who were not original participants.
  - You never know who may end up seeing your report – they are often circulated widely, including to senior personnel within the client enterprise.
- Any additional deliverables (such as manuals) must be prepared with the intended audience in mind

Be Concise!

- Your unit may specify a word limit; and while there is no limit on CEED final reports, no-one wants to read something that is unnecessarily long!
  - Review your text critically – eliminate anything that adds nothing for the reader
  - Review your style – eliminate unnecessary wording.
  - Review your results presentation
    - Don’t include a graph and a table if both show the same thing.
    - Rather than repeated graphs, could the results be compared on a single graph?

Reports are judged on their content and the impact of their content, not their weight!

Project Administration

CEED Administration Office

Office Days/Hours

- 9am to 2pm Monday, Tuesday, Thursday and Friday;
- Closed – Wednesday;
- Important to email or make an appointment (2020 will involve a lot of leave absences).

Location

- Monadelphous Integrated Learning Centre, 1st Floor, through red door 1100A, room 157.

Contact Details

- Phone: 6488 3130 or 0432 408 788
- Email: ceed@uwa.edu.au
- Website: http://ceed.wa.edu.au/

- The CEED Administration office should be your first contact for questions regarding the CEED Program.
- cc ceed@uwa.edu.au when emailing Jeremy Leggoe.

Project Administration

Document Naming Format

Correspondence sent to CEED

- dd.mm.yy Project No. Name Short description:

  06.12.19 20-001 Amanda Bolt December Monthly Report;

  06.12.19 20-001 Amanda Bolt V1 Draft Project Brief.

Project Expenses

Authorisation to Incur Project Expenses

- Form must be fully executed by Mentor, Supervisor and the CEED Office before expenses are incurred;
- Fully executed form must be sent to ceed@uwa.edu.au at time expenses are incurred – not at the end of the project;

Project Administration

Project Expenses cont.

- <u>UWA Workshop/Lab Use</u>
  - Take into consideration when budgeting for Workshop/Lab the cost of disposing of unused materials, testing specimens etc at the end of the project;
  - Keep a record of Workshop/Lab usage, check this against statements;
  - Obtain regular statements from Workshop/Lab. If amount exceeds agreed estimated amount in Project Brief a new Authorisation to Incur Expenses must be completed.

- <u>Monthly Reports</u>
  - Ensure Project Expenses incurred by UWA are included on Monthly reports, and receipts provided where necessary.

Project Administration

Final Year Unit Academic Assessments

- You must meet all the deadlines for your final year project unit;
- Do not submit Academic Assessments to LMS, due to the confidentiality of CEED projects please only email to ceedfyp-ecm@uwa.edu.au and cc ceed@uwa.edu.au

Monthly Reports

- Due on 1st of the Month. If for some reason your can't meet that deadline please let Administration know;
- Include as much detail as possible as Administration review these;

Appointments

- CEED Administration look after Jeremy's calendar, therefore they are the first point of contact for appointments with Jeremy;
- Confirm your attendance to meetings/events set by CEED as soon as possible;

Project Administration

Deliverables

- Ensure all documents are named with the least amount of characters as possible;
- Make an appointment with CEED Administration when you are ready to submit to the CEED office. Please do not drop in as staff may not be in.

Please feel free to contact Administration at anytime during your project.

The Mission of the CEED Program

- To provide students with the opportunity to undertake research projects dealing with real industry issues.
- To provide students with experience in a professional environment, preparing them for the transition to graduate roles.
- To develop the professional skills of our students, and prepare them for working under the constraints and conditions experienced in professional environments.
- To engage industry with universities, demonstrating the benefits of applied research, laying the foundation for deeper engagement – while delivering value through the project
- To engage academic staff with industry, sharing their expertise and exposing them to current industry priorities.

32 Years of CEED

- The concept originated at RMIT, and with federal government support CEED was founded at UWA (and several other universities) in 1989.
- With the withdrawal of government funding, CEED at UWA became self sufficient.
- The program was founded in Mechanical Engineering, expanding over time to accommodate any discipline.
- By the end of 2022 we will have completed nearly 650 CEED projects at UWA.
- At present we typically complete 15-25 projects each year, representing (industry funded) research expenditures of ≈ $300,000 - $500,000 per annum
- In several companies, CEED is aligned with vacation and graduate hiring programs

Risk Management (cont.)

- Safety Risks;
  - include those events that could potentially cause injury or death (both to participants and to bystanders)
  - Safety (and Environmental) risks should be documented in the project safety induction form, which MUST be included with the proposal
- Environmental Risks;
  - include those events that could cause damage to the environment (such as spills, waste, gas releases)
- Financial Risks;
  - Include blow-outs in the cost of activities or equipment, which may prevent project progress or hamper other operations
- Project Outcome Risks;
  - Include events that may adversely affect the successful completion of the project

Risk Management (cont.)

- Risk management approaches could include;
  - Developing alternate approaches to cover equipment loss
  - Identifying strategies in the event that partner opts out
  - Identifying alternate techniques.
  - Developing strategies to ensure security of data.
- The brief **must** include a section on risk management. For each risk, you must provide;
  - A brief description of the risk
  - An assessment of the likelihood of the risk eventuating
  - The consequences of the risk
  - The management strategies to be adopted

Initial Meeting With the Client

- The first meeting is an opportunity to set the tone for the partnership
  - Be prepared (technically)
  - Dress professionally (or appropriately, for site visits)
  - Coordinate with your supervisor before meeting the client (if possible)
  - Be prepared to network with client staff
  - Relax – remember, every one at the meeting wants the project (and therefore you) to succeed.

Initial Meeting with the Client – Overview Questions

- What objectives is the Client seeking to achieve?
- What is the history of the issue/project within the Client enterprise?
- What benefits does the Client seek from achieving those benefits?
- What would the Client like as primary and secondary objectives?
  - Ensure Mentor understands the academic requirements of the project
- What deliverables is the Mentor expecting?
  - Report only, software, working prototype ?
- What is the preliminary timetable for project?
  - Do not agree to commercial deadlines

Initial Meeting with the Client - Resources

- What constraints will be imposed on the approach to solving the problem
  - How will you need to fit in with other Client activities, products or policies?
- What resources does the Mentor think are needed? Does the Client already have them?
- What resources (e.g. labs and equipment) does the Mentor hope UWA will provide?
- Will any special test rigs be needed? Where will they be built or sourced?
- Will items be ordered specially?
  - Do you need to provide information? By when? Who will order the items?

Initial Meeting with the Client – Client Factors

- Is any information needed urgently for budgeting?
- What mechanisms will be followed to approve expenditure?
- Which Client personnel have interest in the project and its benefits?
- Which Client personnel have relevant expertise?
- Agree on communication channels:
  - frequency of reports/meetings?
  - good days/times (or bad) to contact Mentor?
- Who will act as “deputy” Mentor when the Mentor is unavailable?

Initial Meeting with the Client – Site Work

- When can you visit the site to familiarise yourself with the environment?
  - Are there any special requirements for site work (sites, medicals, safety training, special clothing)?
- Agree on the duration and timing of site work.
- Will there be any HR Department people involved?
- How best can you make contact with such people?