Department of Electrical and Computer Engineering,
College of Engineering, Design, Art and Technology,
Makerere University

Student Projects (BSc.)

FOURTH YEAR PROJECT HANDBOOK

October 2023

Introduction

The project is a very important part of your BSc. It is your opportunity to demonstrate your capability as an engineer.

Learning Outcomes:

After successful completion of this unit students will be able to: demonstrate a systematic approach to project work/research and a commitment to attaining the milestones and deliverable that the plan contains, write technical project reports, deliver oral reports, respond confidently to questions arising from their written and oral reports, demonstrate initiative and the willingness to take personal responsibility, demonstrate a critical awareness of the principal problems limiting progress/performance in the technical area of the project, outline the range of technique/solutions currently being brought to bear on these problems, explain the way in which their chosen approach builds on or compliments the current techniques/solutions, make where necessary engineering judgements in the face of incomplete information, demonstrate self-direction in tackling and solving problems.

Skills:

After successful completion of this unit students will be able to: Analyse complex problems breaking them down into a set of simpler problems which are tractable in the context of the knowledge, synthesise solutions to problems from existing knowledge and understanding, identify and acquire knowledge and understanding directly relevant to the solution of a problem integral to the student's project, author and produce written reports to a technical and literary standard consistent with the normal requirements of industry/academia - facilitated and assessed, design and deliver oral reports appropriate to an engineering audience, manage research, design, and/or development projects in an effective and professional way, to operate within the appropriate code of professional conduct, recognising obligations to society, the profession and the environment.

There are four assessments as part of the project and they are described here.

Dates

The project dates for the 2023-2024 academic session are as follows:

Assessment	Details	Submission date	Proportion of mark within unit	Unit/credits
Project Proposal	Mid-term Oral presentation	1 week before Semester I Exams (15th -16th November 2023)	8%	6 credits
	Full Project Proposal Report (Literature review, project specification and plan)	1 week after Semester I Exams (17:00 Friday, 15th December 2023)	12%	
Project	Final Oral presentation	1 week before Semester II exams (17st & 18th April 2024)	32%	
	Final Project Report	2 weeks after Semester II exams (17:00 Friday 24th May 2024)	48%	
	Total		100%	

Assessment Highlights

1. Fourth year Project course unit marks allocation:
   Proposal: 20%
   Project: 80%
2. Assessment of the Proposal and Final Project written reports shall be done by both supervisors
   Final mark allocation:
   40% Oral Presentations, 60% Written Reports

3. Written Reports marks allocation for both the proposal and project:
   60% Main supervisor, 40% Co-supervisor

4. Students shall get clearance for oral presentations from both supervisors.
5. There will not be any supplementary oral presentations. [Not taking part in any of the oral presentations disqualifies one from submitting reports for grading]
6. The Final Project Report at the end of Semester II **must** be prepared on an individual basis by the students. While the Methodology and Results will be the same for team members, the report presentation and/or discussion will be individual.

   For each of the two written reports, you will need to provide a copy, accompanied with a printed and signed approval page to the Department. Additionally, you will be required to submit an electronic version and if requested printed copies to your supervisors.

Sample Mark Sheets

Project Proposal

(Literature Review and Project Plan)

	Criterion	Range	Mark allocated
1	Topic	0 - 3	
2	Project background	0 - 8	
3	Justification of the problem	0 - 8	
4	Clarity of Objectives of the project [Specific Measurable achievable realistic and timely?]	0 - 8	
5	Literature Review / Identification of gaps and critical evaluation of work cited. Synthesis of new work/ideas from existing literature	0 - 20	
6	Clarity of Methodology	0 - 15	
7	Title, objectives and methodology consistency	0 - 15	
8	Individual Participation	0 - 5	
9	Illustrations (Tables, Figures, Graphs, Appendices, References)	0 - 6	
10	Language clarity & conciseness [Clarity and quality of presentation (including use of English)]	0 - 6	
11	Project Schedule & Budgeting [feasibility of plan, usefulness of milestones, appropriateness of deliverables]	0 - 6	
12	**TOTAL**	0 - 100	

Mid-term Oral Presentation

	Criterion	Range	Mark allocated
1	**Introduction/Background** Was sufficient information provided; was it relevant to the problem; does it enlighten a non-expert in the field of study?	0 - 5	
2	**Problem Statement & Objectives** Is the problem statement concise and clear? Is there connection between the Title, the problem statement and the Main objectives? Are the specific objectives adequate to achieve the main objective and are they achievable?	0 - 7	
3	**Methodology** Have the students done adequate Literature review to identify gaps and appropriate methods? Is there a clear methodology for each specific objective? Does the argument for solving the problem follow a logical progression?	0 - 8	
4	**Oral Presentation** Were the spoken words easy to understand; Did the presenters appear to understand the content being presented; Did the presenters speak audibly; Were the presenters appropriately dressed; Was the length of the presentation appropriate; Were the aids/demos/slides understandable; Was there too much or too little information and/or what was the value of the aids; Was the presentation well planned, organized and executed?	0 - 10	
5	**Question and Answer** Did the presenters handle the questions well; Did they demonstrate ownership of the work?	0 - 10	
6	**TOTAL**	0 - 40	

Final Project Report

	Criterion		Range	Mark allocated
1	Originality	Significance / Problem Definition [Initiative, technical complexity of contribution and its originality]	0 - 7	
2		Methodology	0 - 8	
3	Solution to problem / Design	Literature Review / Identification of gaps	0 - 10	
4		Data collection / Investigation	0 - 20	
5		Discussion of Results / Implementation [Attainment of final project objectives including conclusions and recommendations for future work]	0 - 10	
6	Presentation	Preface, Contents, Definitions	0 - 10	
7		General structure / Typing consistency	0 - 10	
8		Illustrations (Tables, Figures, Graphs, Appendices, References)	0 - 10	
9		Language clarity & conciseness [Logical and convincing written presentation: e.g. clarity, lack of ambiguity, good English.]	0 - 10	
10	Participation	Individual Participation in project	0 - 10	
11		**TOTAL**	0 - 100	

***Note: Depending on the project context, not all of these categories will be relevant to every project**

Final Oral Presentation

	Criterion	Range	Mark allocated
1	**Introduction/Background** Was sufficient information provided; was it relevant to the problem; does it enlighten a non-expert in the field of study?	**0 - 5**	
2	**Problem Statement** Was sufficient information provided; Was information presented clearly; Are the project objectives clearly outlined?	**0 - 7**	
3	**Resolution of the Problem** Did the facts obtained, through review, simulation, design, etc., support the solution; Did the argument for solving the problem follow a logical progression; Did the results / conclusions meet the project objectives	**0 - 8**	
4	**Oral Presentation** Were the spoken words easy to understand; Did the presenters appear to understand the content being presented; Did the presenters speak audibly; Were the presenters appropriately dressed; Was the length of the presentation appropriate; Were the aids/demos/slides understandable; Was there too much or too little information and/or what was the value of the aids; Was the presentation well planned, organized and executed?	**0 - 10**	
5	**Question and Answer** Did the presenters handle the questions well; Did they demonstrate ownership of the work?	**0 - 10**	
6	**TOTAL**	**0 - 40**	

Project Work

Synopsis (Abbreviated project proposal)

Guidelines for Abbreviated Project proposal

Project ideas should be submitted by two students. Submissions of a project idea by one or by more than two students must be justified and will only be considered if accompanied by recommendation from the proposed supervisor of the project idea.

It is important to note that proposals should preferably be from students within the same discipline, that is, for each proposal both students should be either Telecommunications Engineering or Electrical Engineering or Computer Engineering students.

Project idea/synopsis submissions should be no more than 3-5 pages and include the following:

a) Project title
b) Student names, registration number and course
c) Problem to be addressed and justification - What is the problem and why is it important? What value does the project provide beneficiaries, users, clients or customers? How relevant is the problem in the Ugandan context? What statistics are available on people/systems that are affected directly or indirectly? What are the consequences or what will happen if this problem is not addressed? How is the problem related to national and global priorities, e.g. Uganda's Vision 2040, the Sustainable Development Goals, etc?
d) Project background - What work has already been done by others in your problem area?
e) Project objectives - What are the objectives against which the project's successes or failures can be assessed? A good (general) summary on overall objective (or goal/aim) versus specific objectives can be accessed here https://learn.solent.ac.uk/mod/book/view.php?id=116233&chapterid=15294#:~:text=Aims%20are%20statements%20of%20intent,to%20achieve%20the%20desired%20outcome.
f) Methodology - How will each of the objectives be achieved?
g) Expected results - What are the expected results on completion of the project?
h) Timeline - What is the expected duration of the project activities?
i) Any references you have consulted in preparation of the proposal
j) Names of any lecturers you may have contacted in preparation of the proposal (it is not required that you contact a lecturer before submitting a proposal except for project ideas chosen from the list submitted by lecturers). Other than lecturers, kindly note any other resource persons/institutions or experts you may have consulted with about the problem to be addressed by your project.

For further guidance, some examples of abbreviated proposal formats include

https://www.sun.ac.za/english/faculty/eng/mechanicalmechatronic/Documents/Undergraduate/Current%20UG/MM%20Procedures%20for%20Final%20Year%20Projects/2013cguidelines%20for%20project%20proposals2014.pdf;

and

http://www.uh.edu/~lsong5/documents/A%20sample%20proposal%20with%20comment.pdf

Please note that students are not required to identify their own supervisors but you are welcome to indicate your choice for supervisor, if you wish. However, please do not indicate any proposed supervisor, unless you have consulted with the lecturer concerned and they have agreed to be considered as your supervisor. To repeat though, it is not necessary for students to identify their own supervisor.

As you think of possible projects, I would like to bring to your attention the IEEE Online Database that we currently have through the University intranet. The database has a wide variety of conference papers, journals, etc., from which you could do research for potential projects, or research to gather more information on an area you have already identified for your projects. Other online academic research databases include:

i. Scopus
ii. Web of Science
iii. IEEE Xplore
iv. ScienceDirect
v. Directory of Open Access Journals (DOAJ)
vi. JSTOR

FULL PROJECT PROPOSAL REPORT GUIDELINES

Guidelines for Students. Students should consult with their respective supervisors on preferred format.

Introduction

Introductions to research and projects tend to be relatively short compared to the other sections of the text but quite complex in terms of their functional elements. Some of the more common elements include:

- establishing the context, background and/or importance of the topic
- giving a brief review of the relevant academic literature
- identifying a problem, controversy or a knowledge gap in the field of study
- stating the aim(s) of the research and the research questions or hypotheses
- providing a synopsis of the research design and method(s)
- explaining the significance or value of the study
- defining certain key terms
- providing an overview of the report structure

The Literature Review

1. A good literature review comprises:
   - a comprehensive survey of existing relevant work
   - a detailed review of the best (most important) contributions
   - a critical comparison of these contributions

- a synthesis of new knowledge from existing work

2. The literature review might typically be 4 – 6 pages long and is likely to contain between 6 and 20 references, at least half these being 'traditional' (i.e. journal papers and conference papers). Non-traditional references may include textbooks, reports and websites.

3. Your report should survey the field, i.e. it should:
   - identify as much relevant published work as possible
   - be up-to-date (with most emphasis on work less than 5 years old, less emphasis on work between 5 and 15 years old and only classic material older than 15 years)
   - contain some references from this year!

4. Your report should review the work, i.e. it should comment, for example, on its:
   - relevance
   - strengths and weakness
   - reliability
   - accuracy

5. Your report should compare and contrast work, i.e. it should:
   - comment on what you judge to be the most important work and what you feel is of less importance and explain why
   - make value judgements where necessary

6. Ideally a report will add to knowledge, i.e. it will:
   - compare results from different sources in tables
   - explain differences in results from different sources
   - identify trends
   - construct aggregated databases
   - calculate new statistics from published data
   - compare old models with more recent data
   - compare old data with more recent models

7. Note: it is possible to take only existing published work and say something new of value – the best critical literature reviews are often publishable as research papers in their own right. This should be your aim – although a literature review that doesn't achieve this ideal is not necessarily a failure.

8. Your report should be clearly and simply formatted, e.g.:
   - use decimal section numbering (e.g. 3, 3.1, 3.2, 3.2.1, 3.2.2, 3.2, 4, 4.1)
   - bold section headings
   - 12 point Times New Roman font

The Project Plan

1. The project plan will generally contain:
   - a requirements specification (methodology)
   - a technical specification (methodology)
   - a set of explicit objectives
   - Expected outcomes and results/significance of the project
   - Scope and limitations
   - a Gantt chart/work plan
   - milestones (defined and indicated on the Gantt chart)

- deliverables (defined and indicated on the Gantt chart)
- Budget

2. A requirements specification might typically be half a page to one page in length and gives:
   - a definition of what the hardware/software will do (i.e. it says what the project outcome(s) should be)
   - a top-level definition of the final deliverables

3. A technical specification might typically be one page to three pages in length and include top-level flowcharts (for software) and system block diagrams (for hardware). It is:
   - a description of how the hardware/software will realise the requirements outlined in the requirements specification (i.e. it says how the project outcome is to be achieved)
   - a more detailed definition of deliverables

4. The objectives are often best presented as a list of bullet points. Some projects (e.g. those of an investigatory nature) may not lend themselves to a conventional requirements and/or technical specification and in this case the need for explicit project objectives becomes even more important. Conversely, the objectives for a 'design and build' project may be self-evident from the requirement and/or technical specifications. The relative importance of these three items is therefore a matter of judgement and students should obtain the advice and consent of their supervisors before coming to a conclusion about which to include in their own project plan and what the balance between them should be.

5. A Gantt chart is a set of time-lines showing the start and end dates of the individual tasks into which the project has been divided. The individual task should be described in a table associated with the Gantt chart. Some of the task time-lines will probably overlap implying that more than one task is being progressed in parallel for at least some of the time. You are advised to keep the Gantt chart reasonably simple and on a single page if at all possible.

6. Milestones are those points on the Gantt chart where progress/achievement can be objectively measured (e.g. completed and tested subroutine X, built and tested circuit Y).

7. Deliverables define the software/hardware/data-analysis/results/reports etc. that form the output of the project and for which the customer is paying. Some milestones may be deliverables. All deliverables are milestones.

8. Please include anticipated budgets and source of funds as part of your proposals, as applicable

Much of the advice given on style and presentation etc. for the Final Report is also applicable to the project proposal so you are encouraged to read to the end of the handbook appendices. A good resource for technical and academic writing are the **Academic Phrase banks** at:
1. http://www.phrasebank.manchester.ac.uk/
2. https://www.ref-n-write.com/trial/academic-phrasebank/
3.http://en.fel.zcu.cz/AE%20III%20Guidelines%20for%20Academic%20Writing/How%20to%20write%20a%20paper/Useful%20phrases.pdf

Sample Project related templates can be found at:

http://www.obriain.com/training/thesis/ and in the appendix section of this document.

With the guidance of your supervisors you are free to choose other templates as long as all aspects in the assessment criteria are covered.

Project Presentation Guidelines

Your oral presentation should last no more than 10 minutes. 5 minutes will be allowed for the audience (examiners and other students) to ask questions.

This hand-out has been prepared to give basic guidelines on the oral presentations for Fourth Year Project students. It is expected that the students are working closely with their supervisors – and hence these guidelines are to be considered supplementary to guidelines from supervisors. Do consult with your supervisors to establish the content and style of your own particular presentation.

1. Presentation Format

Presentations are expected to be clear and short. Students will have 10 minutes of presentation and 5 minutes of questions to present their projects. The following will be required of each presentation:

- You must have a visual aid. The visual aid will typically be power-point slides.
- All members of the project group must participate in presenting and responding to questions.
- All project group members should have, and display, a good understanding of the project/proposal.

It is recommended that students time and practice their talks so that they are able to complete the presentations on time. For example, a rough guide is to expect to spend a minimum of about 30 – 60 seconds per power-point slide; and this should enable you determine the appropriate number of slides for a 10-minute power-point presentation.

Using headings of your choice, your presentations would be expected to include the following:

a) Project title, Student names and registration numbers, Course, Supervisors' names
b) Brief Background of the Project
c) Problem Statement
d) Significance/Justification of the Project
e) Objectives (General and Specific)
f) Project Scope
g) Methodology (including stepwise account of process/methods/flow diagram used to accomplish your specific objectives)
h) Results
i) Conclusions and Recommendations
j) Future work
k) Estimated Budget for the project
l) Other than ECE lecturers and staff, mention any other resource persons, institutions and/or experts you may have consulted or worked with on the problem addressed by your project

2. Tips on preparing your presentation

Some questions that might help you reflect and guide you in developing your presentations include:

- Does the presentation tell a coherent story? The story should flow.
- How does the visual aid assist in the explanation? Your visual aid should assist you in telling your story.
- Is there a clear rationale for the decisions? You might have mentioned (what would seem) an arbitrary decision (say about the software you used, equipment used, design, etc). Did you 'flip

a coin' or is there any reason behind the decision? Explain the supporting reasons as best and succinctly as possible.

- How is the problem addressed by the project a 'computer/electrical/telecommunications engineering' problem? What makes this problem interesting from an engineering point of view?

3. Tips on delivering your presentation

What makes for a good presentation – delivery is an important element of this. Some pointers to note include:

- First establish a rapport with the audience - at the very least greet the audience.
- Introduce yourself and your supervisors – but only briefly as you are already known. (For purposes of your presentations, panels will have details of who is presenting what topics. However, it is still useful to have an introductory slide which has your names on it.)
- Use appropriate words, terminology and jargon. If you think you have used a technical word without explaining it, then pause to explain it.
- Make sure everyone can hear you - speak to the person on the back row, speak clearly and reasonably slowly
- Use intonation in your voice to add colour and interest. Be expressive.
- Use the presentation aids (projector, pointer, etc.) well!
- Try to use at least 24-point font text size, or greater, in your presentation slides.
- Establish eye contact with the audience - but don't threaten them.
- PREPARE your talk.

What not to do when delivering your presentations – what makes a bad speaker?
Pointers that indicate a bad speaker or presenter include:

- Talks too slowly.
- The talk is at the wrong level (either too simplistic or too difficult).
- Stands still and just talks.
- Too much text on the slides.
- The text font size is too small.
- Reads verbatim everything written in the slides, with minimal or no additional explanations.
- There are no visual aids - or even worse there are poor visual aids.
- Has a monotonous voice.
- Not responsive to the audience.
- Flippancy!
- Stares at the projector and/or slides, avoiding eye contact with the audience.
- Poor timekeeping.
- Casual/untidy dressing.

More on the issue of flippancy: Sometimes students try to hide their inability to give a good presentation through the use of casual and repeated flippancy. Their attitude is one of - well you all know me, and I know you, and after all this is just a game, so what is the 'big deal', now where's that slide, oh I can't find it, never mind it wasn't important, here's the next one, well it speaks for itself, most of you know this, so I'll take it off before you can read it, is the time up yet? No, oh I'll go on then, etc., etc., etc.
Remember that this activity is to help you present your project work and findings, and also build your presentation and communication skills plus it is graded, so approach it seriously and responsibly - don't be flippant.

Finally, never answer a question with "I was told to do this by X, Y and Z" (usually where X is your supervisor!). This is your project, your work and your presentation - accept the responsibility that goes

with the position. You may well have been "told" to do something but in answering a question you should give the reasons that underlay that "telling". Don't pass the buck! Answer the question!
Practice your presentation in advance and try to ensure that you are not just reading from the slides. The purpose of any slides is to emphasise what you are saying, not duplicate it. Ensure that the quantity of material you are trying to present is appropriate to the amount of time available. If your presentation is too long, we may have to stop you before the end.

4. **Concluding remarks**

These guidelines are not a definitive set of do's and don’ts but just some pointers that might help improve the quality of your presentation. Choose the points that you think are relevant or appropriate.

Adapted from:

- Presentation Guidelines, David McDonald - http://projects.ischool.washington.edu/mcdonald/courses/info490_wi06/page2/page2.html

- Project Presentation Guidelines –

  http://webservices.cs.nott.ac.uk/intranet/index.php/guides-and-handbooks-mainmenu-82/ug-handbookmainmenu-87/studying-at-nottingham/third-year-project/82

- ECE Final Year Project Presentation Guidelines, 2013

FINAL PROJECT REPORT GUIDELINES

Guidelines for Students. Students should consult with their respective supervisors on preferred format.

This section gives a brief overview of the various components that make up a typical final year Project report. Your report may follow this overall structure, though individual sections will obviously vary considerably from report to report. A sample template for the project report structure and layout is given in the Appendix.

Final Report/Structure

Title page

This may seem unimportant but you need to ensure that your title gives a reader a good idea of what is inside your report.

Declaration

i. A signed and dated declaration by the candidate (you) indicating that the project report is your own work.
ii. Approval by Supervisors.

Dedication (Optional)

This mentions name(s) of persons to which the research is dedicated.

Acknowledgements

In this section you should acknowledge those who have helped you, or offered advice, during your project. This entails recognition of mentors, colleagues, individuals, Sponsors and institutions which supported the research/project.

Abstract

The abstract consists of a brief summary (between about 150 and 500 words), which accurately outlines the complete content of your report. Abstract should be no more than a one page synopsis of the project report that previews the main points of the report in non-technical language. It should preferably not exceed 500 words. It contains enough information to generally familiarise a reader with the report, but it should NOT simply be an outline of the report. This information includes a brief on the project objectives, methodology, results, recommendations and conclusion.

Contents page (Table of Contents)

This is made up of all the titles of the sections and subsections in the report. It should be laid out so that the structure of the report is easy to see. You must give the page number at which each section starts. Make sure the page numbers are correct! The table of contents should list all material following it as well as any material which precedes it. The title page will not find a place among the items listed in the Table of Contents. Items preceding the Table of Contents should have their page numbers in **lower case Roman letters**. No more than one and a half spacing should be adopted for typing the matter in this part of the report.

The table and figures shall be introduced in the appropriate places. The Final project report should range between **40 – 60 pages in length**, excluding the preambles (items 1 - 9) and the appendices.

List of Tables
The list should use exactly the same captions as they appear above the tables in the text. One and a half spacing should be adopted for typing the matter under this head.

List of Figures
The list should use exactly the same captions as they appear below the figures in the text. One and a half spacing should be adopted for typing the matter under this head. The List of Figures and List of Tables may appear on the same page if both lists do not include many items.

List of abbreviations
Whilst all abbreviations should be defined in the text when they first occur, e.g. '…the third generation of cellular systems is represented by UMTS (Universal Mobile Telecommunications System) which uses code division for multiple accessing …', the list of abbreviations provides a convenient reference for the reader who is dipping into the report rather than reading it from beginning to end.

List of principal symbols
Whilst all symbols should be introduced in the text when they first occur, e.g. 'where GT is the transmit antenna gain in decibels' the list of principal symbols provides a convenient reference for the reader who is dipping into the project report rather than reading it from beginning to end. Alphabetical order should be used in presenting symbols, abbreviations, acronyms, etc.

Main body

This is the main part of your report. It will contain a description of the problem you are solving, some background on the problem (including a summary of any work on which you are building), your analysis of the problem, your design of your proposed solution, how you implemented your solution, testing your problem solution, and finally an evaluation of what you have achieved.

It is difficult to be specific about the number of pages that make up a good project report. Length is not an indication of quality and sometimes it is the opposite. However, as a general guideline, a project report whose main body is less than 40 pages is unlikely to do justice to the topic, while one that is longer than 80 pages is probably capable of being improved by being shortened. Project reports longer than this are strongly discouraged and are liable to be penalized.

The main body will be made up of a series of main sections. It is recommended that this include one introductory section, one background section, one section on theory (sometimes the background and theory sections are combined), at least one section describing the solution of the problem (which might be divided, for example, into Implementation and Results), one section containing a discussion of the results, and one section containing conclusions. There will also be a list of references and possibly a bibliography and some appendices. The purpose of these sections is outlined below.

1. Introduction

- In most project reports the title of this chapter is exactly that, 'Introduction', but it might not be. For example, it could be something relating to the broad area of your project, e.g. 'Digital Video'.
- The purpose of this section is to explain the motivation for your work. You should briefly state the specific problem, and try to place it in a wider context. Explain why this is a useful, interesting, important, even exciting project. If you are tempted to dive into great detail, avoid the temptation; almost certainly there is a better place for this detail later in the project report. An external examiner has recommended that students should include a clear description of their

project objectives in their project reports. This is the place to put those objectives; probably in a short sub-section called 'Aims', 'Objectives' or 'Aims and objectives'. (The difference between an aim and objective is the subject of perennial debate in educational circles but the consensus appears to be that Aims relate to an overall or overarching 'objective' whereas Objectives relate to more detailed and specific 'sub-aims'.)

- This is Chapter 1 and provides and presents the background to the study, statement of the problem, purpose/aim, objectives, significance/importance and justification/rationale.
- *Suggested length 5-10 pages.*

2. Background/Literature review

- In this section you will also demonstrate that you have read the literature relevant to your problem, and have found the most important previous work on the subject. Since you have already completed a literature review (in Semester 1) you will almost certainly want to cite (reference) your Semester 1 report and/or include the Semester 1 report in an appendix.
- This section gives the opportunity of reassessing the literature, however, in the light of your increased knowledge of the subject – gained over the recess period. You may also want to supplement your original review here with references published after it was submitted or with important references you missed the first time around!
- This appears as Chapter 2. Same as in the Proposal but in greater details. (Any relevant Literature may be cited in any of the chapters. In some cases there may not be a need for a separate Chapter on Literature Review and/or Theoretical Analysis)
- Here you should also dig into the real specifics that underpin your particular approach to the problem.
- *Suggested length 5-15 pages*

3. Implementation

- Here you describe what you have done and how you have done it. Another generic title for this section might be methodology although, where possible, the title should be specific to your work, e.g. 'An embedded quantizer'.
- Poor project reports fall apart at this point, when it becomes obvious that student has really done very little and is relying on a lot of background and theory to cover up. Be very specific about what you have done as opposed to what may have been done by others. **If you are lucky enough to have found the entire solution to your problem on the Internet, and are stupid enough to try and conceal it, be warned that supervisors will almost always pick this up.** (The correct thing to do if you stumble on a solution that is already complete is to draw it to the attention of your supervisors and discuss with them the best way forward. In many cases this will be to extend the scope of your project so that you can make a contribution over and above that which you have already found.) Above all be honest.
- *Suggested length 10-15 pages.*

4. Results

- This is where you report your results. Use tables, graphs etc. where the project is investigative in nature. Use block diagrams, circuit diagrams, figures showing input/output signals, performance curves, photographs etc. where the project involves the design of hardware. Use flow diagrams, pseudo code, screen shots, etc. where the project involves the design of software. (Some projects may, of course, include all these types of output.)
- *Suggested length 5-15 pages.*

5. Discussion

- Many students do well up to the implementation part, then they do something barely adequate in the way of getting results, and are at a loss for words when it comes to evaluating their

results. If you are really interested in the problem, by this stage you should have lots to say about how good your solution was, how well it compared to previous work, and what more you would like to do. Do not say 'I did not have time to do so-and-so for such and such an excuse.' Be positive.

- *Suggested length 5-10 pages*

6. Conclusions

- Make this a really concise and readable summary of the good things that have come out of the project. Be frank about the shortcomings, but try to be positive. You are a sentient being, right? So you must be capable of deduction, right? So what conclusions do you draw from this project.

- Conclusions in the form of a list of concrete statements (effectively bullet points) are a good idea. Keep them short, focussed and technical. Don't include vague '**educationa**l' conclusions such as ***'I learned a lot from doing this project'***.
- (Sometimes the discussion and conclusions can be legitimately combined in one section. This is a matter for your judgement.)
- *Suggested length 1-2 pages.*

7. Further work

- This is where you say what you would do next if you had more time and/or resources.
- Suggested length 1–2 pages.

The main text will be divided into several chapters and each chapter may be further divided into several sections and sub-sections. • Each chapter should be given an appropriate title. • Chapters, sections and sub-sections should include appropriate numbering to enhance flow and "read-ability" of the report. • Tables and figures in a chapter should be placed in the immediate vicinity of the reference where they are cited. Sources for all tables and figures should be included in the caption (but not highlighted in the List of Tables or Figures) • Footnotes should be used sparingly. They should be typed single space and placed directly underneath in the very same page, which refers to the material they annotate. • Subsections

References

You will certainly be using books, journal papers, articles, conference papers, URLs and so forth, to provide you with information to do your project. In addition, the background and literature review sections of your report will discuss other people's work in the field.

You must acknowledge all your information sources. This is done by providing a list of references at the back of your project report, and referring to (i.e. citing) the individual items in this list at the appropriate points in your project report.

Also if your reference list is trivial/nonexistent, it is an indication that you have not really delved into the literature and so would almost certainly affect your grade.

The number system of referencing

There are various ways of listing the references. If you look in the back of research papers and some textbooks, you will see examples. Here is an example.

[1] ARMSTRONG, J. M., and MITCHELL, R. J.: Uses and Abuses of Inheritance, Software Engineering Journal, 1994, 9, (1), pp. 19-26

[2] Communications of the ACM, Special Issue on Cognition and Software Development. June 1995, Vol. 38, No. 6.

[3] Cargill, T. A.: Does C++ really need multiple inheritance? Proceedings of UK Unix User Group Conference, 1990, pp. 53-59

[4] GOGUEN, J. A., and MESEGUER, J.: Order-sorted algebra I: equational deduction for multiple inheritance, overloading, exceptions and partial operations. Technical Monograph PRG-80, December 1989, Oxford University Computing Laboratory, Programming Research Group.

The reference list is in the order the references are first cited. Note that each individual reference needs to be this detailed to enable a reader of your report to find it. You must, therefore, give the author(s), the title, when it was published, where it was published (if a journal article, then state the particular volume and issue number, if a book, state the name of the publisher), and (also if a journal article), which page numbers the article covers. Note that if you copy a table or figure from a journal or conference reference, it is not sufficient just to put a reference number after the title. The correct form is to say "Taken from [n]". Also, be careful of infringing copyright in taking such material – if it is a direct copy, you should seek the copyright holder's (usually the publisher's) permission to replicate the material.

Items in a numbered reference list, such as the one shown above, are cited in the main body of your project report with the appropriate number. Here are some sample citations, using this style:

A recent survey on software development in the Communications of the ACM [2] reports that the choice of programming language apparently does not have any appreciable affect on levels of software reuse.

Maybe one of the greatest dangers that exists is that object-oriented languages (such as C++) are now so popular, they are being used to develop software for safety critical applications before we have any formal basis for inheritance between classes in these languages [3].

Several attempts have been made to formalize types of inheritance, particularly multiple inheritance [4, 5], though none has been widely accepted as correct.

Remember that every item in your list of references must be cited (referred to) at least once somewhere in the text. If you wish to list any literature that gives general background or is helpful in some other way but is not cited in the report then this list goes into a separate section called the **Bibliography**.

The Appendices

There may be information that is important to your project report for completeness and/or reference, but which does not fit naturally into the main body of the report and is not essential for proper understanding. For example, if you are using special hardware or software tools (e.g. a channel sounder or OPNET) you might wish to provide the reader with a brief description of these tools. This description is probably best placed in an appendix, and the reader directed to the appendix at the appropriate point in the main text of your project report.

Another appendix could usefully contain all the detailed tabulated results from testing your system. If your system is designed to be used and/or maintained by others then you should include the user and maintenance guides in an appendix.

It may also be useful to put code into an appendix as an 'archive of last resort' to which people can turn when the electronic copies are lost, destroyed, amended beyond recognition etc. If your project is software focussed it is also possible that you wish to impress your examiner(s) with the professional nature of your coding style and clarity of your comments.

These are only suggestions – what goes into the appendices is very dependent on the specific project you are undertaking. You need to exercise your own judgement.

Be aware that project report assessors are not obliged to read any part of any appendix. Appendices are there for the reader to use if they feel they need them. Material that forms an essential part of your project and that you feel it is essential that an assessor reads should not be relegated to an appendix.

Supplementary Advice on Report Writing

- Take care with English - use short, simple, meaningful sentences
- Use references to
  - add authority
  - avoid unnecessary background, derivations and proofs, etc.
  - refer to work
- Cite reference properly - recommend IEEE Transactions style (but whatever style you choose, be consistent)
- List references properly - recommend IEEE Transactions style (but be consistent)
- Acknowledge all sources including figures at point of use

On completion use the following process:

- Spell/grammar check
- Proof read and amend as necessary
- Spell/grammar check again
- Proof read again!

This (tedious) process can easily take a full day!

Report structure

- Title page – use a standard template if given
- Declaration
- Acknowledgments
- Abstract
- Table of Contents – include page numbers
- List of abbreviations
- List of principal symbols
- Introduction
- Body of report – use decimal heading numbers
- Discussion – sometimes part of conclusions

- Conclusions
- References – all references must be cited in text
- Bibliography – useful material not cited in text
- Appendices – background and/or supporting material

Report format

- Use templates where given
- Use Word or LaTex
- Paginate at bottom centre of page
- Paginate preliminary pages using Roman numerals (i, ii, ii, iv, etc.)
- Paginate main text using Arabic numerals (1, 2, 3, 4, etc.)
- Use decimal section numbering
  - e.g. 3, 3.1, 3.2, 3.2.1, 3.2.2, 3.2, 4, 4.1
  - Don't use 1.0, 2.0 etc.
- Start each main section (1, 2, 3 etc) on a new page
- Try not to have 'empty' sections (e.g. section 2 followed immediately by 2.1)
- Use 12 point Times New Roman font
- Use bold section headings
- Indicate new paragraph with a line space – don't indent
- Justify left and right margins

Figures and tables

- Number and caption (in italics) all figures and tables (Figure 4 Title of figure) placing captions immediately below figure/table)
- Refer to (i.e. cite in text) all figures and tables
- Use equation editor for equations/formulas
  - Number all equations/formulas
  - Use (3.4) right justified where 3 is main section heading (1, 2, 3, etc.) and 4 indicates the 4th equation in that section
- Centre equations or align vertically at equals sign whichever is more appropriate
- Cite references in order as far as possible
  - E.g. [1], [2], [3, 4], [5], [2], [6], [7], [4], [8, 9], [15-20, 30, 65] etc.
- Use third person, past tense, passive voice
  - E.g. use: the experiment was undertaken and the results noted
  - Rather than: I undertook the experiment and David Smith noted the results
- Use proper symbols (especially Greek letters where appropriate, e.g. µs not us)
- Use proper symbols for units (e.g. s for seconds, not S or sec and V for volts, not v, Hz for hertz, not HZ, hz or hZ)

- Use S.I. units unless there is an overwhelming reason to do otherwise
- Get prefixes correct (especially k for kilo, not K and K for kelvin not k)
- Units written out in full are not capitalised even if named after a person (e.g. ampere, not Ampere, hertz, not Hertz)
- Avoid use of intensifying adverbs (e.g. very, extremely) and the opposite (e.g. quite, fairly)
- Be precise and concrete, avoid vague statements.
- Avoid the word obviously (if it is obvious it doesn't need saying)
- Avoid slang, colloquial English and over-use of jargon.

Define all abbreviations at first point of use (and consider a glossary or list of abbreviations if necessary).

General instructions:
Students are expected to prepare their reports paying attention to the correct English grammar as well as to the appropriate technical language in presenting their work. Common mistakes to avoid include:

- Avoid use of 1-sentence paragraphs
- Bullets should be used after careful consideration as to whether this is the best way to present the material as opposed to presenting the material in paragraph format
- Subsections should not start off with a list of bullets. An introductory sentence or two would guide a reader as to the context of the bullet points being presented.
- All tables and figures, particularly in results presentation, should be clearly explained in the text preceding or following the table or figure.
- All material that is not due to the student's own analysis or opinion should be referenced. References should be placed at the end of the sentence before the full stop.

Whereas projects are generally carried out in pairs, the project report is expected to reflect the individual style of a student including:

- Style and format of presenting the report within the guidelines for project reports
- Choice of language and sentence construction
- Introduction of the project and its significance
- Analysis and conclusions drawn from the project results

Students that present reports that are deemed to be identical will have committed plagiarism/ collusion. It is however understood that the project results shall be common to both reports since e.g., one simulation/assessment was done by both students.

APPENDIX : TEMPLATES

Templates for your **Project proposal** and **Final Project Report** are provided on the following pages. The sequence in which the project report material should be arranged and bound should be as follows:

1. **Cover Page & Title Page**
2. **Declaration**
3. **Dedication (Optional)**
4. **Acknowledgement (Optional)**
5. **Abstract**
6. **Table of Contents**
7. **List of Tables**
8. **List of Figures**
9. **List of Symbols, Abbreviations or Nomenclature (As applicable)**
10. **Contents (Proposal Report)**
11. **Contents (for Final Project Report)**
12. **References**
13. **Appendices**

Title of Project Here in 16-Point Centred and Overflowing onto Next Line if Necessary

Full name here
Registration Number

A Project Proposal/Final Project Report *(delete as applicable)* submitted to Makerere University in partial fulfilment of the requirements for the award of BSc in
Name of course

Department of Electrical & Computer Engineering
College of Engineering, Design Art and Technology

Month Year

Declaration

No portion of the work in this document has been submitted in support of an application for any other degree or qualification of this or any other university or institution of learning. Except where specifically acknowledged, it is the work of the author.

I have abided by the Makerere University academic integrity policy on this assignment.

Signed .....

Date .....

Abstract

Start abstract here. It should be a concise summary of what the report contains, or tell the reader what the report contains in sufficient detail for him/her to decide whether to read it in detail. Typically length would be between 150 and 500 words. Do not include references in the abstract. Use 12 point Times New Roman font and line spacing of 1.5.

Key-words: make, the key-words, specific, separated by commas.

Contents *(for Project Proposal)*

Contents *(for Project Report)*

*Note: Depending on the project context, not all of these categories will be relevant to every project

Acknowledgements

You may acknowledge here anyone who you feel has helped significantly in the execution of the work or the production of the report.

List of Abbreviations

GMSK	Gaussian Minimum Shift Keying
GPS	Global Positioning System
UMTS	Universal Mobile Telecommunications System

List of Principal Symbols

G	Antenna gain (dBi)
P_T	Transmitted power (W)
m	modulation index
θ	Antenna 3 dB beamwidth (deg.)

College of Engineering, Design, Art, and Technology (CEDAT)
Department of Electrical and Computer Engineering
Year Four Projects for Academic Year 2023/2024 – Supervision Record

Date	*Student(s) at meeting*	*Supervisor*	*Comments*	*Signature*

MAKERERE UNIVERSITY
COLLEGE OF ENGINEERING, DESIGN, ART AND TECHNOLOGY
SCHOOL OF ENGINEERING
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

2023/2024 FINAL YEAR PROJECT PRESENTATION CLEARANCE FORM

NAME & REG. No. OF CANDIDATE (S):

DEGREE PROGRAM / AREA OF STUDY:

MAIN SUPERVISOR:

CO-SUPERVISOR:

PROJECT TITLE:

PROJECT ABSTRACT:
[Provide a brief summary of the report not to exceed 300 words. The abstract should include what the study was about, the methodology used as well as key results, conclusions and recommendations.]

PROJECT CLEARANCE:
The project titled with abstract as above and conducted by the named candidates is **ready/not ready** *(indicate by tick or crossing out status of project as applicable)* for the 2023/2024 *Midterm/ Final* Project Presentations scheduled for *(...insert date…)*.

Signed:

MAIN SUPERVISOR: ……..... DATE: ….….....…

CO-SUPERVISOR: ……..... DATE: ….….....…

[Kindly return completed form to the fourth year project Coordinators at Room xxxx, CEDAT. ***Submission deadline is (Weekday date month year)*** *before 5:00 pm.]*