Discipline of Electrical and Electronic Engineering
BE Projects 2018/2019

Format of Project Theses and Other Reports

Revision 1.0 19th September 2018

1. Introduction

This document includes guidelines to be used in generating theses for final year projects in Electrical & Electronic Engineering. While the document mainly applies to the production of the (very substantial) Final Project Thesis, all technical reports follow more or less the same overall layout and structure, and contain the same elements, so the guidelines here also apply to greater or lesser degrees to the other reports required (Progress Report and Preliminary Report). You should consult your supervisor for any further guidance on the report.

2. Copyright and Plagiarism

It is a University requirement that the thesis submitted should be wholly the original work of the author. It is expected that elements of your degree assignments and projects involve making use of the published and unpublished work of others. This is an everyday part of academic and commercial work. However, it imposes on you a responsibility to ensure that, in using the work of others, you neither steal their intellectual property, nor mislead others as to the identity of its owner or originator. All source material must be referenced in the normal way.

The University defines plagiarism (the representation of another person's work as one's own), and related misconduct very clearly in the various College Statutes and regulations. All project work, written or otherwise, submitted by a student to their supervisor, is expected to be the result of their own thought, research or self-expression. If your project involves the use of existing ideas, algorithms, source code or other related material, you must clearly acknowledge its use and properly identify the origin of this material. In cases where students feel unsure about a question of plagiarism in any element of the submitted project work, they are obliged to consult the project supervisor on the matter before submission. If there is evidence of plagiarism in any element of the submitted project work, the student or project group involved will face disciplinary action. **Possible penalties for plagiarism within projects range from a failure of the project (the minimum penalty) to expulsion from the University.**

As described in the project assessment information, the assessment of written work of which reference to work by other authors forms an integral part, requires the unambiguous identification of the true author of each argument, item of evidence, deduction and opinion. Therefore, the following declaration shall be included and shall be signed and dated by the author:

I declare that this thesis is my original work except where stated

Date Signature

.....

This declaration constitutes an assertion that full and accurate references and citations have been included for all material, directly included and indirectly contributing to, the thesis.

The following aspects of the assessment relate specifically to the discouragement and detection of plagiarism:

- Students will record their day-to-day work in a permanent log book and submit this, along with the thesis, for scrutiny by the examiners.
- Students will be examined in the course of the viva-voce examination to determine their understanding of the material in the thesis.
- Students will include a signed **Declaration of Originality** at the beginning of the thesis, of the form shown in the Requirements for Undergraduate Theses.

Much of the intellectual property which you will make use of in your studies will be covered by copyright law. Guidance on this is available from the Copyright Licensing Agency. Where you present material and ideas based on the work of others, you must provide adequate referencing (see below), to ensure that you do not mislead others as to the extent of your own contribution. Failure to provide adequate referencing will result in you being guilty of plagiarism. If you quote directly from the work of another, i.e. copy material verbatim, the quotation must be clearly set in quotation marks, "", and the origin of the quotation referenced in the usual way. Where the quotation is extensive, e.g. more than ten words, it should be set as a separate paragraph, still in quotation marks, and given a wider than normal left hand and right hand margin. Note carefully, however, that even if you modify the original material, e.g. by changing some of the words, re-drafting a diagram, or re-formatting a table, you will be guilty of plagiarism if you do not give clear and accurate reference to the original material, directly adjacent to your version.
IF IN DOUBT CONSULT YOUR SUPERVISOR.

3. Project Thesis Length

Quality of content takes precedence over quantity. The information given here should be taken as a reasonable guideline to the expected size of the submitted document. The number of words specified is based on the number of pages given, assuming typical thesis content, layout and font. The conversion guide is that a page contains three hundred words, each word being five characters plus a space or other punctuation. Those pages preceding the main text of a project thesis are not counted in the numbers given below. Those pages following the main text of a project thesis are counted.

- For B.E. projects, the thesis should comprise in the region of 60 pages (18000 words as calculated above) of text, with a maximum of 100 pages including diagrams, graphs and tables. At least 15 equivalent pages of diagrams will be expected.

- The proportion of space taken up by the figures will be no more than twenty percent. The criteria for their selection will be that they :
    - carry key data/information in a concise manner

- amplify or clarify a written description
- bring coherence to several threads of written argument/description
- do not use animations such as clip art, these are a waste space!
- All figures and tables must be labeled using some standard format that is consistently applied through the report.
- If a figure or table is included that **it MUST be referred to in the text of the thesis**. If it is not referred to then the diagram/table should not be present!

4. Thesis Style

Concise, grammatical prose composition. Consult e.g. IET publications for examples of acceptable style (http://digital-library.theiet.org/). Make sure that all content has value – "padding" in the interests of making a thesis appear more substantial than it actually is, should be avoided (it will be detected – and punished).

5. Thesis Structure

Theses should be assembled and bound in the following order :

- Front cover
- Title page
- Abstract (not more than 200 words); a short section clearly outlining the project area, the project goals, reasons, and the overall result/findings of the report. Do not discuss selection of project topic here.
- Declaration of originality
- Acknowledgements
- Table of contents (chapters, sections, sub-sections, page numbers)
- List of symbols.
- Glossary.
- Main text, addressing the subject of the title (formatted in single-column style)
- References
- Appendices
- Back cover

Tables, diagrams, graphs and photographs (if any) are to be inserted in the body of the text, if necessary on separate sheets, as close as possible to the passage to which they refer *and facing the same way as the rest of the text.* Where colour or continuous shade images are used, all copies must be clearly reproduced to the same standard. Where any such material is not wholly your original work, the legend must include a reference to the origin.

6. Format

Theses to be typed or printed to meet the following specification:

- A4 paper typed on one side only.

- At least a one inch left-hand margin, one and a half or double-line spacing, with extra spacing to accommodate mathematical equations, etc.
- **Chapters, sections, sub-sections of chapters** to be numbered decimally
- **Page numbers** located at the top right-hand corner of pages to run serially 1, 2, ... from the beginning of the main text, earlier pages being numbered i, ii,...
- Diagrams and graphs (upright wherever possible) to be drawn to a high standard in a dense black ink.
- **Key equations, tables, diagrams and graphs** to be numbered serially, chapter by chapter (e.g. in chapter 3 the first equation is (3.1), the next (3.2) etc.);
- Equation numbers to be placed on the right-hand side of the page, tables, diagrams and graphs to have their number and a clear, explanatory legend, placed directly below them.
- **SI units** to be employed throughout.
- **Standard symbols** to be used wherever possible. The IET standard for the setting of mathematical text is that it should be in *Times italic* font with units in Times roman.
- **Mathematical symbols** to be typed or (where necessary) inked in consistently and carefully in dense, black ink.
- **Appendices** to be numbered A.1, A.2, ... ; **equations** in Appendix 1 to be numbered (A.1.1), (A.1.2), etc.

7. Title Page

Name, reference legend, approved title and date to appear in standard form on the front cover accurately positioned to appear in the window. e.g.

Sean P Ryan

B.*E. Electronic Engineering (or Electronic & Computer Engineering etc.) Project Report*
EE*** (ie., course code)

April 2017

The approved title will normally be that given on the specification, subject to any approved variation agreed with the supervisor.

8. Main Text

The following is a suggested structure breakdown. Sections may include one or more chapters.

Introduction and literature review: put the work in its academic context. Set the scene; some background on the project area, its application, its relation with respect to current technology trends etc, i.e., detail which will quickly help the reader to get a grasp of the project. If the literature review is substantial, it may be a separate chapter. Clearly (and briefly) specify the problem and all assumptions. Include clear system block diagram(s) for clarity illustrating:

- Project application/behaviour and interfaces
- Main project components

Use your own words; copied text is generally quite obvious and overcomplicated. Include the formal project plan/schedule. Include enough detail to set the project in context without introducing the elemental detail. Finish the introductory chapter with a brief outline of each following chapter, i.e., indicate the structure of the thesis. Begin each subsequent with a paragraph introduction detailing the chapter focus. Similarly end each chapter with a one paragraph summary that "leads in" to the next chapter.

- Structured, chapter by chapter description of the work carried out, including (where appropriate)
    - Detailed background theory. Avoid including too much detail on 'standard issue' components, e.g., 80C31, latch, SRAM, DAC, ROM etc - briefly outline the functionality of each device used (and why) but don't give a detailed pin-by-pin description (unless this really helps the explanation). Assume that the reader has a reasonable understanding of basic electronics and software - spend most effort on the most interesting aspects of the project.
    - Alternative solutions considered, reasons for selecting the final solution.
    - Structured design and implementation : program and circuit design detail using (as appropriate),
        - ⇒ truth tables, logic minimisation, timing diagrams
        - ⇒ flow charts
        - ⇒ pseudo code
        - ⇒ assembly process, equipment/materials used
        - ⇒ software implementation language(s) and versions

      A clear description of all results and achievements should be included. Include complete program/parts list in Appendix but highlight and fully explain the most interesting implementation details.
    - Trouble-shooting and testing. Modifications carried out. Briefly highlight areas where difficulty occurred - justifiable problems can and do arise. Outline the
        - ⇒ test strategy used, tests performed
        - ⇒ functions operational, functions failing etc
        - ⇒ improvements made

  Note : the report could include several distinct design/implementation and testing sections, (as outlined above), each dealing with separate project areas, e.g.,
  1. Core hardware design/implementation and test
  2. Peripheral hardware design implementation and test
  3. Software design, implementation and test

  Take time to figure out the best structure to suit your project report. Discuss and agree with the Project Supervisor.
- Discussion : Clearly discuss the effectiveness of
    - the results of each project phase; briefly refer again to the individual results achieved if this helps improve clarity.

- the strategies used
- what worked, what didn't and why, difficulties which arose and which were/were not solved, unforeseen problems.
- Ways of achieving a better solution.
- Success of the methodologies used (design, test, assembly etc)
- Don't include an 'excuses...' section.
- Highlight areas of difficulty and potential solutions, e.g., noise, assembly problems, component problems etc.
- Critique your formal project plan and suggest ways in which it may have been more effective.

- Conclusion: the conclusion should briefly recap the aim of the project and outline what elements have been achieved, how well and how close the project came to achieving the initial project goals (be specific and honest). Also, include recommendations for future work. Don't be afraid about repetition - you're hammering home the important aspects of the project.
  Putting your results in context. Include a few short concrete points on the benefits obtained from performing the project work. Highlight any major pitfalls which a future student should recognise.

- Appendices : include the following :
  - full parts list/supplier part numbers/supplier details
  - copy of unusual (or difficult-to-get) device specifications (Do NOT include copies of data sheers relating to any "standard" electronic components that you have used e.g. micro-processors, logic devices, op-amps or other common devices!)
  - any useful background material used in developing the project which might clutter the main body of the report if included

As concerns software that has been developed as part of your project, full software listing should NOT be included in the submitted thesis itself. These should be submitted in the format of a CD/DVD included along with the submitted printed report and as a zip file included with the submitted PDF thesis document.

Proof read the thesis !

Avoid copying long descriptive background information. Instead, summarise concisely and refer the reader to more detailed sources of information (indicated in references or appendices).

9. References

References in the body of the text to be indicated by numerals, either placed in square brackets, or superscripted, assigned serially in order of first appearance. The citation of references is an important aspect of the presentation of any written technical work and is an essential part of any defense from an accusation of plagiarism.

Listed references to be given in standard form : in numerical order and in full, in accordance with IET rules, e.g.:

1. BATES, D.R.: 'Atomic and molecular processes', (Academic Press, 1968), p. 79
2. SNELSON, R.A. and LUCAS, J.: 'Longitudinal diffusion coefficient for electron swarms at low E/p', IEE Conf. Publ., 90, 1972, pp. 23-30
3. LOWKE, J.J.: 'The drift velocity of electrons in hydrogen and nitrogen', *Aust. J.Phys.*, 1962, 316 pp. 15-35

Scrutinise the referencing given in recent IEE publications and note in particular the type styles and punctuation.

One function of a cited reference is to enable a reader to consult the original source, for confirmation of matters relating to your use of the reference and for additional details. Many WWW pages have an ephemeral existence, more so than equivalent printed sources. If the equivalent information is available from a printed source, cite that.

Another function of a citation is to invoke the authority of the cited source as support for your assertions and arguments. Bear in mind that sources of information are not all to be given the same credence. This applies equally to spoken, printed and electronically delivered information. Be critical of the quality and veracity of all information, however it is published. WWW pages are produced for a wide variety of reasons, advertising and other forms of commercial promotion are common reasons. As a consequence, such information may be presented in a way which is accidentally or deliberately misleading. Many WWW sites are not what they may appear to be; do not rely on an apparently obvious word or phrase in a URL to identify the source of the information. You should establish the real identity of the author of any information cited, and the owner of the site whence the WWW page is made available.

Similar comments apply to the different quality of information to be expected from refereed journals and the proceedings of highly regarded conferences, books, the proceedings of minor conferences and colloquia, and newspaper and magazine articles. Consult your supervisor for guidance regarding the credibility of your cited sources of information.

Should you decide to use a WWW page as a reference, you should include the following details:

- The complete URL for the original WWW page being cited (Do not cite a URL which merely gives an indirect link to the original source.).
- The verified author of the information.
- The author's affiliation(s) appropriate to the material cited.
- The verified owner of the WWW site.
- The date of composition (or most recent update) of the WWW page.