The University of the West Indies
Faculty of Engineering
Department of Electrical and Computer Engineering

Writing Manual

ECNG 3020Special Project
2024/2025 Academic Year

University of the West Indies
September 2024

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1 Introduction

A key component of ECNG 3020 Special Project is producing a final project report that communicates your project achievements. This manual provides guidelines for the completion of your ECNG 3020 Project Final Report. The experience gained in the writing of your 3020 report will be useful in writing of journal articles, graduate theses, or technical reports for industry.

If you have not captured your work adequately and accurately it is very likely that you would fail the entire course. Often, too many students relegate their writing to the final days preceding submission. This is reflective of poor time-management. You can jeopardise your entire project, as it may be impossible to complete your report, or you may produce a sloppy document. Begin writing the moment you start your project. The literature review, scope, objectives, and method are usually good starting points.

Writing is never a linear process. You will have to continuously review earlier sections as you produce later ones. **A polished, comprehensive, succinct document is the product of dedicated review and several rewrites.**

2 Style and Quality

2.1 Style

Remember that your final report is a **formal**, **academic** document. Style and tone are key considerations (see Table 1 and Table 2).

2.2 Quality Writing

Your final written report conveys **specific technical information.** Indices of **quality technical information** are itemised in Table 3. Use the checklist in Appendix A to review your report.

Table 1: Tone

Definition	Target	Examples
"Tone" refers to your attitude as reflected your writing. Tone is conveyed largely through your word choices.	3rd person perspective, objective and formal	**Rather than:** *My* (**personal)** method was a *really (***conversational** *good* (**opinionated)** method. **Recast:** Results indicate that there is merit in the method. **(This is objective, as it is supported by evidence-the results you presented either before or after this statement).**

Table 2: Style

Definition	Examples
"Style" refers to **correctness** in the **application** of **appropriate writing conventions or rules.** In the engineering sciences always: • Prefer **short over long.** Choose the quickest way to convey information • Prefer the **simple over the complex**. Choose simple sentence structures, and familiar ways of organising text • Prefer the **familiar over the unfamiliar.** Choose familiar words over words that may be unfamiliar to your audience. Where you use a term that may be new to your audience provide a definition. Prefer familiar ways of organising information—consider document types, like software requirements specifications, are typically presented.	**Rather than:** There *wasn't* enough testing to justify the design. **(Contractions are inappropriate in formal writing)** **Recast:** There *was not* enough testing to justify the design. **Rather than:** *The data acquisition process in the computer aided design (CAD) industry* **(unnecessary word)** *is a rather* **(matter of opinion)** *tedious and time consuming process* **(both convey similar ideas-choose the more familiar or all encompassing one)** *which requires a high degree of skill due to necessary adjustments that need to be made in order to obtain* **(look out for strings of verbs: they result in longwinded unclear language***) a Non-uniform rational B-spline (NURBS) model from the digitised data* **(This is long and the meaning is unclear)** **Recast:** *The data acquisition process in computer aided design (CAD) is tedious. It requires a high degree of skill to obtain a non-uniform rational B-spline (NURBS) model from the digitised data.* **(Your aim is to create precise meaning, using succinct language).**

Table 3: Indices of Quality Information

Easy to use	
Task Orientation	**Succinctly** report the findings of your project.
Accuracy	Ensure data validity and grammatical correctness
Completeness	Include **all** and **only necessary information**
Easy to understand	
Clarity	Ensure that what you mean can be gleaned from the first reading. Always aim for words which are unambiguous in meaning and prefer the familiar word over the unfamiliar.
Concreteness	Include and integrate appropriate examples, data, illustrations, drawings, graphs etc. to aid understanding.
Visual appeal	Support meaning-making through logical layout, easy to discern colouring, easy to read typography, and clear and concisely labelled non-textual items (diagrams, graphs etc.).
Style	Use formal, Standard English, applying appropriate **writing** and **referencing conventions**.
Easy to find	
Organisation	Use a clear hierarchy of information, with headings and sub-headings.
Retrievability	Present information so that readers can quickly and easily find pieces of information. Tables of content, tables of figures, etc., must be well-presented and accurate. All diagrams/tables/ drawings must be captioned.

Adapted from Hargis et al .2004. Developing Quality Technical Information: A Handbook for Writers and Editors 2nd Ed. NJ: Prentice Hall.

3 Academic Rigour

3.1 Referencing

You are to use the citation conventions as set out in **the author-date style** of the Chicago Manual of Style 16th Edition or later. The Alma Jordan Library provides a Chicago Manual of Style quick reference.

3.2 Generative AI Attribution

If you used generative AI, you are to:

- record this in your logbook, whether or not you eventually used that output. See the Student Manual for details.

- declare actual use in the relevant artefact—report; supplemental documentation; and or oral presentation; this narrative account must identify the task for which AI was used, the prompt that was used, and how the output is used.

- provide an in-text citation indicating the generative AI tool and version that was used and the year of use.

- link your narrative to an appendix in which you provide the complete, unedited AI output; provide context for understanding the output, starting with the following headings, and then inserting the complete verbatim output.

  - **Generative AI used (including version):**
  - **Task:**
  - **Date of Use:**
  - **Prompt:**
  - **Verbatim AI output:**

The finer points of using generative AI responsibly and reporting on that use will be covered in the seminar entitled "Generative AI: Responsible Use". Refer to the ECNG 3020 Student Manual for the seminar schedule.

4 Typography and Layout

The formatting of your final report requires careful attention to detail. See Table 4. Aim for a professional finish by:

- Using A4 white paper.

- Leaving a margin of 3 cm at the left-hand side of the page, and 2.5 cm on the right-hand side, top and bottom.

- Using a 12-point Calibri for body text, 16-point bold Calibri for Level 1 headings, and 14-point bold Calibri for Level 2 headings.

- Centre-justifying chapter headings; left-justifying level 2 headings; and justifying body text.

- Using appropriate software, such as Microsoft Visio™, to create diagrams and circuits that can then be imported into your report. **No part of the report should be hand-written, or hand drawn.**

- Generating a PDF version of your report. Review for formatting inconsistencies. When you are satisfied, upload the final electronic copy to the course myelearning site. Instructions for upload appear in the Student Manual.

Table 4: Report Layout and Pagination

	Order of Appearance	Items	Notes
Front Material All pages in the front material, except the title page, are numbered. Use common Roman Numerals, at the top centre.	1	Title page	• Use cover template. See Appendix B.
	2	Statement of Academic Honesty	• See Appendix C.
	3	Abstract	• Place on its own page. • Use single line spacing.
	4	Acknowledgements	• Insert based on your preference
	5	Table of Contents	• Place on its own page/s. • Use of white space, ensuring each item stands out. • List only those items that follow the Table of Contents.
	6	List of Figures	• Place on its own page/s. • Use of white space, ensuring that each item stands out.
	7	List of Tables	• Place on its own page/s. • Use of white space, ensuring that each item stands out.
	8	List of Abbreviations	• Place on its own page/s. • Order items alphabetically. • Use of white space, ensuring that items stand out.
Body All pages from the Introduction onwards, are numbered using Arabic numbers, placed at the bottom right. Numbering is continuous from the front material.	9 - 14	Introduction Literature Review Method Results Discussion Conclusion	• Treat each item as a Chapter with sub-sections where needed. • Number Chapters using Level 1 headings. • Number sub-sections using Levels 2 to 3 headings. Beyond level 3 the information hierarchy becomes difficult to follow. Avoid! • Use double-line spacing for body text. • Place captions for diagrams below the item. • Place captions for tables above the table. You may have chapter variations, either more chapters or differently named chapters: These need to be verified by your supervisor. However you name your chapters, you must have an introduction; chapters that substantially treat with the literature, methods, results, analysis; and a conclusion.
End Material All pages in the end material are numbered using Arabic numbers, placed at the bottom right. Numbering is continuous from the body.	15	References	• Place on its own page/s. • Do not number the reference section like a chapter. Title the page "References" and use the same font as Level 1 Headings • List all references according to the author-date system of Chicago Manual of Style 16th Edition or later • Use single line spacing within each item, but double spacing between different items, so that each reference is distinct • Use a hanging indent for each reference
	16	Appendices	• Sequence appendices in the order that they are referred to in the body. • Place each appendix on its own page/s. • Label each appendix alphabetically – Appendix A etc.

5 Content

5.1 Report Length

The report should be **no more than 80 pages** (i.e., from the title page to the end of your conclusion, discounting references and appendices). Students will be penalised for exceeding this limit. Marks will be deducted from your "Conduct" score. If, for good reason, you expect that the body of your report will exceed this limit, you may apply for a waiver of this requirement. Formal application for a waiver **must be made thirty (30) days ahead of the final report submission.** Written justification is to be provided by the student and approved by the First and Second Examiners of the project (see Appendix D). Applications for waivers should be submitted to the Course Coordinator. A decision on the request for waiver would be communicated to you within one (1) working week of having submitted the application.

5.2 Components of the Report

The guidance provided here is generic and requires adaptation based on your project type and project deliverables. Consult your supervisor on the main content items of your report.

You may have chapter variations, either more chapters or differently named chapters. These need to be verified by your supervisor. How ever you name your chapters, you must have an introduction; chapters that substantially treat with the literature, methods, results, analysis; and a conclusion.

Typically, your report should include the following in the order provided here. Each item (which appears in bold) must start on a new page.

1. **Report Cover**: Use the cover template. See Appendix B. Insert:
   - The project's name or title;
   - Your name and student identification number;
   - Date of the report submission;
   - Your project supervisor's name; and
   - The project type.

2. **Statement of Academic Honesty**: The final report will be incomplete without a signed plagiarism form (see Appendix C) and will count as a non-submission.

3. **Abstract**: The abstract provides a concise, yet comprehensive overview of your work in 250 - 300 words. Here is a guide:
   a. In 1-2 sentences, outline the background of the project.
   b. Give the aim of the project in 1-2 sentences.
   c. Summarise the method in 1-2 sentences.
   d. Report the major results/outcomes of the study in 1-2 sentences.
   e. Conclude with 1 sentence giving the most significant outcome.
   f. Revise the abstract to ensure that it is coherent.

4. **Acknowledgements**: Including this is **a matter of personal choice**. You may thank persons who have been supportive, or you can dedicate your work to someone.

5. **Table of Contents**: The Table of Contents allows for retrieval of information. It should list chapters, sections, and sub-sections in your report (see Figure 1).

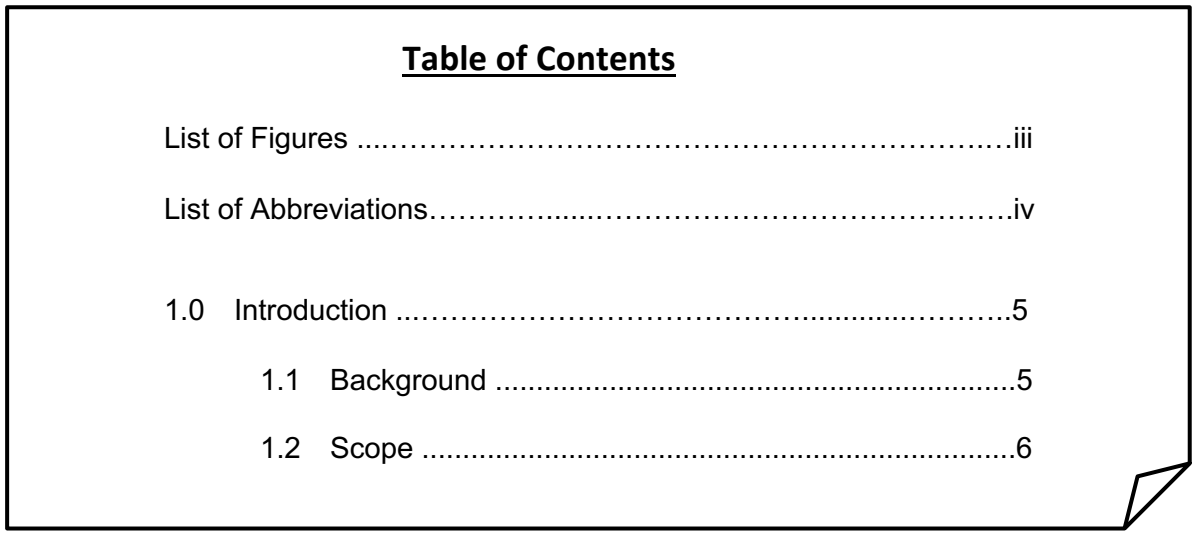

Figure 1: Sample Table of Contents

6. **List of Figures**: All figures should be listed in the order that they appear. It follows therefore, that the numbering of figures within the body of the report should be in ascending order: Figure 1 is followed by Figure 2.

7. **List of Tables**: List all the tables that are in your report. Tables, like figures, should be appropriately captioned and ordered so that Table 1 precedes Table 2, etc.

8. **List of Snippets**: If you have integrated snippets of code into your report, then you are to list the snippets on its own page, within the front material.

9. **List of Abbreviations**: This page provides a list of abbreviations used in your report. Abbreviations are ordered alphabetically. Provide the abbreviation first followed by the complete term (refer to figure 2).

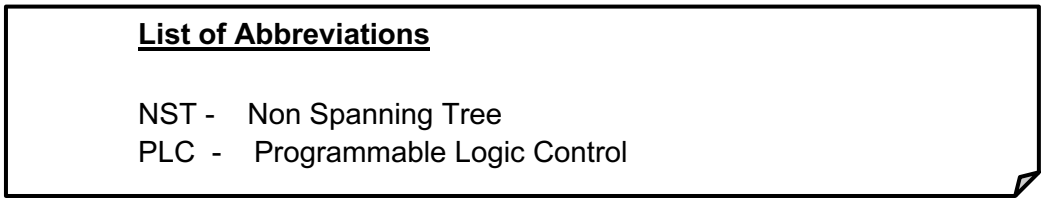

Figure 2: List of Abbreviations

10. **Introduction**: A comprehensive introduction must include:
    - **The background to the study**—what led to this investigation, design, or analysis?
    - **The justification**—why is your work **important, relevant,** or **how is it different?**
    - **The objective/s of the project**—what does your project aim to achieve or what problem does it seek to solve?
    - **The scope**—what is the focus of your study, or the extent of your project?
    - **The organisation of your report.** Give a brief description of each chapter in your report. This is typically one paragraph describing each chapter following the introduction.

11. **Literature Review**: For Type I projects, your Literature Review Chapter should be replaced with a Key Concepts Chapter, where you explore and define the concepts that are central to your project. See 4.3 Project Variations by Project Type.

    For Type II Projects, your Literature Review Chapter may be renamed "Background Theory". See 4.3 Project Variations by Project Type.

    This is a review of established knowledge which is relevant to the topic. It may include a critical account of more recent work, an exposition of theory and the technique/s used for the practical work. The student should bear in mind the overall objectives of the report and **should eliminate any material which is irrelevant.**

    An effective Literature Review summarises and evaluates scholarly literature that is germane to your study. You are to use the literature to demonstrate your understanding of the problem and to inform your approach to the project.

12. **Method**: You should detail the strategies/methods/procedures you used to arrive at your outcomes. Explore and explain the theoretical side of the methods you have used. Depending on the nature of your project, you may need to account for critical methodological aspects such as design, implementation, data acquisition, and analysis.

    As it relates to major components and software used in your solution, you need to justify the selections that you have made. See Appendix E.

    You must include a technical risk analysis. See Appendix F. This can complement your component and software selection.

    In your method chapter, you must complete an Environmental Health Safety Risk Assessment. See Appendix G.

Since each project is unique. You should **consult with your project supervisor on how to organise your method.**

13. **Results**: In this chapter you present the results obtained. Significant elements of your results would be key equations, algorithms, drawings, designs, spreadsheets, graphs, performance specifications and other data sets that have been generated by your work. In the case of projects which have implemented systems, a substantial section on testing is essential.

14. **Discussion**: In this chapter you **analyse** and **evaluate the results** of your project with special reference to relevant theory and or previous research: Does your project confirm or disconfirm previous work? Account for the findings made and any anomalies that may have arisen. Discuss the significance of your project outcomes.

15. **Conclusion**: The conclusion is a **comprehensive** summary of the major findings of your project. Discuss the major outcomes of your project as well as any limitations or shortcomings. You can recommend new directions or areas for future research.

16. **References:** References should be listed in accordance with the Chicago Manual of Style 16th Edition or later. Every source of information—journal article, book, online article, etc.—used in your study must be listed. To do otherwise will invite charges of plagiarism (see Section 5 of this manual).

17. **Appendices:** The appendices must appear in the order in which they are introduced in the text. Each should bear a clear descriptive title and associated letter, for example: "Appendix A: Pattern Recognition Module" and "Appendix B: Pattern Matching Module". Each appendix must start on a new page. **Appendices are used to place information that is related to but not vital to the arguments presented in the body of the report.** For example, if you used a large raw data set, your supervisor may ask you to include this in an appendix. Of course, your carefully selected, analysed data presented in appropriate form (graph; tables; etc.) that support your claims must be presented in the body, where appropriate. Bulky appendices, such as programs, which make your final report too large and unwieldy, **must** be referred to in the body and uploaded to the course myelearning site. A submission link, separate and apart from the report submission link, will be provided for appendices. When you reference an appendix, make sure that the in-text link is explicit, such as "See Appendix B (myelearning upload)". Next, order files in the folder for upload, such as "Appendix A: Pattern Recognition Module"; "Appendix B: Pattern Matching Module". If you are uncertain as to how to treat with large appendices, please consult your supervisor.

5.3 Variations by Project Type

Each project is unique, and it is impossible to prescribe exactly how each report should be organised. Please consult your supervisor: Provide your supervisor with a report mock-up for his or her feedback. **Do not expect that he or she will tell you how to organise your report. This is an unreasonable, insupportable expectation.**

Here are some **recommendations** for organising your report based on project type.

Type I: A Type I project is a substantial literature review toward some stated end—policy recommendations or a conceptual model, for example. Therefore, you are to present your substantial literature review in several chapters, where each chapter focuses on a major theme or issue emerging from the literature. Type I projects test your understanding, analysis, and synthesis of the literature. It is critical that the literature informs the way in which you organise and name parts of your review—the content and sequencing of content must be easy to follow; sensible; and demonstrate sound understanding the material.

In a Type I project, your method may be viewed as consisting of two elements:

1. **How you selected and limited your research**. You should explain how you conducted and limited your research:
    - Which databases did you use and why?
    - What key words did you use for your search?
    - What publication period did you examine? You may limit to new millennium research, for example, with stated justifications for doing so.
    - How did you select the seminal papers you examined? You must justify your selections.
    - Did you limit your research by geography or other parameters? You may limit your research to only investigate power grids in small developing jurisdictions, for example.
    - Did you limit your search by discipline speciality? For example, with explicit justifications, you may have limited your search to journals that are substantively microprocessor systems journals.
    - How is the literature organized?

2. **How you arrived at your stated conclusions**. The second element of your method—how you arrived at your stated end—is critical. It is not sufficient to simply re-state previous findings, rather you are critically reviewing previous studies, using stated measures or ways of evaluating, toward a particular goal—policy formulation, conceptual models, identifying research niches, evaluating systems.

    Here are some possibilities:
    - Assuming you are asked to propose a conceptual model, then your method will be a detailed account of how you arrived at your model. Which pre-

existing models did you examine and how did you evaluate them? Which variables have you included in your model and why?

- Assuming you are asked to evaluate various systems or algorithms towards making recommendations, then your method describes the measures or heuristics you used to evaluate them. How did you compare each system or algorithm with the other? On what basis do you make your recommendations?

Type II: Since Type II projects draw largely on the material taught in the degree programme and do not require extensive reviews of the literature, you may regard your second chapter as treating with background theory. In this case, title the chapter "Background Theory" and account for the theory and engineering practices which inform your project. Type II projects tend to be organised like scholarly engineering research articles. The typical chapter sequence is Introduction, Background Theory, Method, Results, Discussion, and Conclusion.

Type III: Type III projects require substantial literature reviews which lead to a working prototype or the development of a system. Your research may be a project outcome and you may regard it as part of your results. However, it is best treated in the Literature Review chapter. Here the chapter must be appropriately decomposed into subsections so that there is support for the design decisions and approaches that you take, and for your testing and evaluation strategies. Further, your research must be linked to the rest of your report: You can expect to provide, in the relevant chapters, brief summaries of the literature to support of your design to explain your testing and to validate for your results, for example.

Type IV: Type IV reports are similar in organisation to scholarly engineering research articles. The typical chapter sequence is Introduction, Literature Review, Method, Results, Discussion, and Conclusion.

5.4 Non-text items

You should be **very selective of the non-text items** that you present in the body of the report. If you choose to include **an item, it should be vital to the point that you are making or illustrative of the work done.** For example, numerous screen shots of a GUI that you developed are unnecessary and indicative of poor writing. Select and present a few, which best represent the work that you have done.

Graphs, illustrations, figures, and equations that **relate directly** to your discussion should be **well integrated in the main text** where you have referred to them (see Figures 3 - 4). Generally, no more than a page should separate the discussion from the non-text item (that is the graph, illustration, figure, table, equation etc.). If the non-text item is **not directly related** to your discussion but is nonetheless useful you should place it in your appendices.

Once the grid partitioning option was applied at the beginning of training, a uniformly partitioned grid was taken as the initial state (see Figure 5).

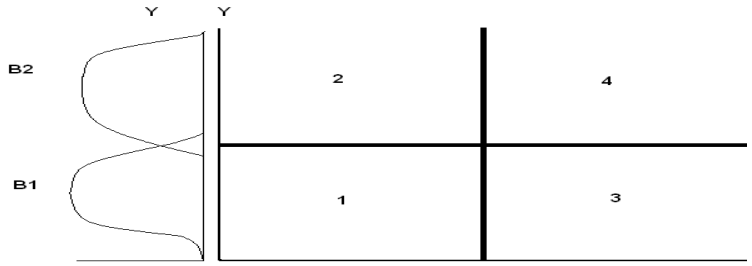

Figure 5: Uniformly Partitioned Grid

Figure 3: Figure Integrated in Text

Equations should be centred and numbered by using numbers placed in square brackets. Mathematical symbols should be set in an italicised font (see Figure 5). This can be done using the Equation tool in Word™.

The output of the 6th layer is the **summation layer** and it is the sum of all the outputs of the 5th layer and it is given by:

$$O_{6,i} = \sum \bar{w}_i f_i = \frac{\sum_i w_i f_i}{\sum_i w_i}, i = 1,2,3,4 \qquad [11]$$

Figure 4: Equation Integrated into Text

Extensive tracts of code are called "Listings". If you need to share these with your examiners, listings should be placed in your appendices. Extracts of code, less than half a page in length, can be included in the body of the report to demonstrate a particular point—that the code is unique in some way, for example. You should caption these extracts as "Snippets" (see Figure 5). All code should be written using an appropriate mono-spaced font, such as "Courier New".

OPEN and CLOSE might be implemented by inline functions or pre-processor macros; they would carry out their functions by memory-mapped IO, special instructions, or via a co-processor interface (See Snippet 1).

```
unsigned strlen ( const char* s )
{
  unsigned i;
  unsigned e1 = OPEN(s, 100, 0);
  for (i = 0; *s != '\0'; i ++, s ++) {}
  CLOSE ( e1 );
  return i;
}
```

Snippet 1: Programmer-directed usage of OPEN and CLOSE

Figure 5: Code Integrated into Text

6 Ethics

ECNG 3020 must not be regarded merely as a means toward the award of a degree. Rather, it must be thought of as **an opportunity for professional and personal development and achievement.** You are to spare no effort in **ensuring the integrity of your work** (please see Appendix C)**.** You are bound by the following academic obligations:

- You must provide both **in-text and bibliographic citation in accordance with the Chicago Manual of Style 16th Edition or later**. Failure to do so will be taken as an attempt to plagiarise. Plagiarism is a grave offence and will attract severe penalties, as outlined in regulations of the University.

- **Authentic research data** are to be presented. Manipulation of results is regarded as a serious offence, whether it involves falsifying results or distorting them to fit expectations and will attract severe penalties as set out in the regulations of the University.

- You must declare your **use of generative AI**. Where you have used generative AI without the permission or both your first and second examiners, you will not be rewarded for that work and charges of academic cheating can be laid against you.

Appendix A: Final Report Checklist

Index of Quality	Description	Items for Action (**attend to each item separately and in turn)**
Easy to use	Task Orientation: Single focus - **succinctly** and **completely** report on your findings.	• Review the **content** requirements of the report – consult manual, supervisor's notes, marking scheme, project proposal • Make a list of **what** you need to report • Determine if you have covered them
	Accuracy: Freedom from error – validity of the data and grammatical correctness	• Ascertain if your results are verifiable • Determine if they need further testing/validation • Report **truthfully** • **Review** for grammatical errors; ask a trusted person to review your work.
Easy to understand	Clarity: Freedom from ambiguity – meaning is clear from the first reading.	• Review for clarity – ask yourself if you have chosen the best word and the best sentence structure to convey meaning. Opt for familiar words and simple sentence structures.
	Concreteness: Inclusion of appropriate examples, illustrations, drawings, graphs etc. to aid understanding	• Show evidence when necessary (illustrations, graphs etc). • Ensure that **all required non-text items** are **well integrated** and **captioned**
	Visual appeal: Attractiveness through easy to discern colouring, easy to read typography and clear and well-labelled non-textual items (diagrams, drawings, graphs etc.).	• Verify that you have used double line spacing for the body of your report • Ensure that you use single line spacing for references, long quotations that are set apart from text and appendices • Choose 12-point TNR or another simple serif font for body text and Sans Serif font for headings • Ensure that all equations, graphs, circuitry are generated by and inserted using appropriate software – no hand-written insertions
	Style: Correct application of appropriate **writing** and **referencing conventions**.	• Verify that you have used standard notation where required • Review your report for tone – it should be formal. Eliminate colloquialisms and contractions. Avoid using the first-person perspective • Review your both in-text and end of text citations. Ensure that they adhere to the CMoS
Easy to find	Organisation: Coherent arrangement of parts that makes the **logical flow of ideas** possible and the **connection amongst ideas clear and apparent**.	• Ensure that your chapters and sections are appropriately ordered and labelled • Review each chapter to ensure that ideas are logically ordered and adequately developed • Use transitions, such as 'first', 'next', 'then', to connect ideas and provide guideposts for the reader
	Retrievability: Presentation of information for quick and easy retrieval. Tables of content, tables of figures etc. must be well-presented and accurate.	• Verify pagination – front material in Roman numerals, everything else in Arabic • Check the accuracy of your table of contents, list of tables, list of figures, list of symbols • Ensure that chapters are appropriately headed, appendices are labelled, non-text items are captioned

Appendix B: Report Front Cover

(Word™ version available on myelearning)

THE UNIVERSITY OF THE WEST INDIES

B.Sc. (Engineering)
Department of Electrical and Computer Engineering
ECNG 3020 – SPECIAL PROJECT

PROJECT TITLE
FINAL REPORT

Stephen Singh
808000001

October 16 2008

Project Supervisor: Dr. Krishna Ram
Project Type: I

ELECTRICAL
& COMPUTER
ENGINEERING
DEPARTMENT

Appendix C: Statement of Academic Honesty

(Word™ version available on myelearning)

THE UNIVERSITY OF THE WEST INDIES
ST. AUGUSTINE, TRINIDAD & TOBAGO, WEST INDIES
FACULTY OF ENGINEERING
Department of Electrical & Computer Engineering
B. Sc. in Electrical & Computer Engineering

CHEATING, PLAGIARISM AND COLLUSION DECLARATION FORM

According to Rules 3.31 and 3.32 of The UWI Faculty of Engineering Undergraduate Regulations and Syllabuses 2018/2019:

3.31 "**Cheating, Plagiarism and Collusion are serious offences under University Regulations**.

(a) Cheating is any attempt to benefit one's self or another by deceit or fraud.

(b) Plagiarism is the unauthorised and/or unacknowledged use of another person's intellectual efforts and creations howsoever recorded, including whether formally published or in manuscript or in typescript or other printed or electronically presented form and includes taking passages, ideas or structures from another work or author without proper and unequivocal attribution of such source(s), using the conventions for attributions or citing used in this University. Plagiarism is a form of cheating.

(c) For the purposes of these Regulations, 'collusion' shall mean the unauthorised or unlawful collaboration or agreement between two or more students in the preparation, writing or production of a course assignment for examination and assessment, to the extent that they have produced the same or substantially the same paper, project report, as the case may be, as if it were their separate and individual efforts, in circumstances where they knew or had reason to know that the assignment or a part thereof was not intended to be a group project, but was rather to be the product of each student's individual efforts.

3.32 Cheating, plagiarism and collusion shall be reported to the Campus Committee on Examinations and the penalties would be in accordance with the University Examination Regulations."

I, ……., have read and understood Rules 3.31 and 3.32 of The UWI Faculty of Engineering Undergraduate Regulations and Syllabuses 2018/2019 on Cheating, Plagiarism and Collusion.

I understand that my submission is subject to the electronic plagiarism checker, Turnitin.

I declare that this assignment is my own work and does not involve cheating, plagiarism or collusion.

Signature:……. Date:……

Appendix D: Application to Waive Page Limit

(Word™ version available on myelearning)

Student Name:	Student ID:
Supervisor:	Second Examiner:
Project Title:	
1. Provide a brief description of your project:	
2. List your project's goals/ objectives:	
3. Define the scope of your project:	
4. Justify the need for increased project length and provide an estimate of the expected length of your report*:*	

..... **.....**

First Examiner **Date**

..... **.....**

Second Examiner **Date**

Appendix E: Components and Software

All projects must include justification for major components and software used; and a bill of materials (See Table 5).

For major components/ software use a table, comparing at least three (3) possible alternatives that could be used to achieve a specific task (temp/flow/humidity/luminance sensors). This comparison table should be supported by a rationale that adequately details why the component/software was chosen. For example, if you had to measure the flow of water from a pump, you should provide a comparison table with alternative flow meters evaluated against several metrics (error, flow rate, price, and type). You should then provide a rationale detailing why one was chosen based on the metrics, your project objectives, and any other design consideration that you have established as being important (such as cost, or durability). Here is an example:

> *Flow meter X may be cheaper and more precise than flow meter Y, but research (customer reviews, etc) show that flow meter Y is far more reliable in terms of lifespan.*

Even in the case where a particular component is specified by the project supervisor, you should examine alternatives so as to comment on the adequacy of the given component.

Here are some examples of inadequate justification:

1. *A light sensor capable of measuring the illuminance (lux) on the plants was required to provide data to be used for analysing plant growth. For this application, the TSL2561 lux sensor was used. The TSL2561 is a light-to-digital converter that transforms light intensity to a digital signal output capable of direct I2C. This was interfaced via the I2C protocol to the Raspberry Pi.*

   When the student indicated that a light sensor was used, he or she did not compare it to any other types of light sensors or sensory techniques. He or she also did not relate it to his or her project objectives to demonstrate that it was the best possible solution.

2. *Flow sensors were required for alarm monitoring purposes. They were used as a binary indicator to determine whether there is flow. These sensors were attached to the outputs of the pumps and the solenoid valves to check for failures. For this application, Hall-effect flow sensors capable of measuring vertical gravity flow were used.*

Here the student does not indicate what specific flow sensors were used and provided no table with comparisons. The use of the sensors was not related to the objectives nor requirements of the project.

Table 5: Bill of Materials Template

(Word™ version available on myelearning)

Student Name:									
Project Supervisor:									
Date:									
Item Name	Item Code	Quantity	Serial Number	Manufacturer	Date Approved	Paid for by DECE	Paid for by Student	On loan from Supervisor	Cost
						(please tick)			

Appendix F: Technical Risk Assessment

(Word™ version available on myelearning)

As part of your ECNG 3020 project, **you are required** to manage technical risk. **Technical risk is** the likelihood that an element or elements of a system or design do not meet its performance requirements, and, if there is a shortfall in performance, how serious the shortfall is likely to be.

Here is a resource that may be useful:

Hong, R. (n.d) Electrical and Computer Design Handbook available at:
https://sites.tufts.edu/eeseniordesignhandbook/2013/risk-management/

Note that though the author labels the content as "Risk Management". In general, the risks that he identifies are very good examples of technical risks as opposed to ESH risks.

Managing technical risk is crucial to project success. It involves three steps: identifying, assessing, and addressing technical risk. You must complete a Technical Risk Assessment and Mitigation Worksheet (see Table6). To assess a risk use Table 7.

Table 6: Technical Risk Assessment and Mitigation Worksheet

Technical Threat	Risk Score	Mitigation Strategy	Details of Mitigation
		Choose one: Eliminate/reduce/accept?	
		Choose one: Eliminate/reduce/accept?	
		Choose one: Eliminate/reduce/accept?	

(Adapted from Hong, R. 2013. "Risk Assessment." Tufts University. Accessed July 2019 at: https://sites.tufts.edu/eeseniordesignhandbook/2013/risk-management/)

Table 7: Technical Risk Assessment Scores

Probability of Occurrence	Significant	**0.3**	**0.7**	**0.9**
	Moderate	**0.2**	**0.5**	**0.7**
	Low	**0.1**	**0.3**	**0.6**
		Low	Moderate	Significant
		Severity of Impact		

(Adapted from Hylton, P. 2006. "Technical Risk Management as the Connectivity in a Capstone Design Course." Journal of Engineering Technology 23 (1):48.)

Appendix G: ECNG 3020 Risk Management Form

(Word™ version available on myelearning)

You are required to manage Environmental, Safety and Health (ESH) risks. This form helps you to identify and address risks that may arise in your project. Since each project is unique, **you will have to adapt this instrument as needed**. You **must** complete this form in conjunction with your supervisor and co-supervisor (where applicable). You are to excise the explanatory material and present **the completed instrument/s only in your final report.**

Risk management involves three stages—identifying, assessing, and mitigating risks. This risk management form is a living document which is likely to change as your project evolves. Working with your supervisor, you are revise this document as needed. **All your risk management forms must be archived in your Log Book**. Each version, **ahead of all practical activity,** needs sign-off from your Supervisor and Co-supervisor (where applicable). You are to account for risk in your method and provide, at minimum, the final risk assessment document in an appendix. Where there were major methodological changes prompted by managing risk, it may be worthwhile to account for these changes: The extent of and the placement of the account are subject to the advice of your supervisor.

Here are the definitions of the risk assessment terms as used in this instrument:

- **A hazard** is any source of **potential** damage, harm or adverse impact on something or someone.
- **ESH Risk** is the chance that a person or resource will be harmed or adversely affected as a result of some particular action. Risk **has two dimensions:** the likelihood of the occurrence of harm; and the severity of that harm.
- **Risk analysis** is the identification of possible risks and their consequences.
- **Risk assessment** is the evaluation of risks in terms of their likelihood and severity.
- **Risk mitigation** has three main strategies—avoidance, reduction, and acceptance. Avoidance is removing the probability of occurrence by eliminating the action or material that carries risk. Reduction is dampening the severity of repercussions. Acceptance is bearing the risk.

Here is a useful resource which provides examples of electrical work tasks and safe work practices:
Tufts University. 2015. Electrical Safety Programme. Tufts University. Available at: https://operations.tufts.edu/facilities/files/Electrical-Safety-Program-and-Fall-Protection-Final-2015.pdf

ECNG 3020 Risk Management Form

PART I: Version Control

Version Number	Date of Revision

PART II: Project Identification

Project Student:

Project Title:

Project Supervisor:

Project Objectives:

Provide an overview of the project's methodology:

Describe the tasks involved in carrying out the practical work (attach additional pages/documentation as needed):

PART III: Projects at a Workplace

This section relates to capstone projects that involve protracted research activity at a workplace external to The Department of Electrical and Computer Engineering (e.g. an industry partner). Such a project involves frequent work, at minimum two times per month, at the industry site.

Name of Project Supervisor:

Name of Co-supervisor (industry based supervisor):

Job Title of Co-supervisor:

Company Name:

Company Address:

Contact details of Co-supervisor:

Provide details of the OHS Workplace Safety Program that is in place at the location where the work will be carried out:

PART IV: Projects involving Field Work

This section is applicable to projects that require field work. Field work is any data collection exercise that is not classroom or laboratory based. Field work may include visits to industries, but such visits are not regarded as regular and ongoing at a fixed placed of work.

Title of field work:

Period of field work

☐ One time	Date:
☐ Multiple, specified	Dates:
☐ Multiple, unspecified	Number: | Date range:

Persons involved in field work

Name	Role (student/UWI Staff accompanying student/Field Trip Facilitator)

PART V: Hazard Identification

This section is **applicable to all projects**. Please complete the hazard identification matrix.

Hazard Identification Matrix (Tick all that apply)		
Will you come into contact with or use: ☐ Industrial plant/equipment/machinery ☐ Ionising radiation sources or equipment ☐ Powered electrical devices/machinery ☐ Lifts/hoists/cranes ☐ Pressure vessels/ boilers ☐ Biological material ☐ Hazardous chemicals ☐ Compressed gas ☐ High Voltage/ High Current Transmission Lines ☐ Falling objects ☐ Any other hazardous material or equipment	Does you project involve: ☐ Using tools/equipment with moving parts ☐ Using tools/equipment that vibrate ☐ Using tools/equipment that ignite ☐ Using heavy equipment ☐ High voltages ☐ Working with human subjects ☐ Working with biological specimens (tissue; body fluids; live or dead animals; bacteria; viruses etc.) ☐ Working at a height ☐ Working with high powered EM radiation ☐ Any other hazardous activity	In the course of carrying out your project work will you encounter: ☐ Loud or continuous noise ☐ Dust/fumes/gases/loose particles or fragmented material? ☐ Extreme temperatures ☐ Slippery surfaces/trip hazards ☐ Exposed electrical wires ☐ Any other HSE threat
List any other hazardous material or equipment:	List any other hazardous activity:	List any other hazardous working condition:

PART VI: Hazard Assessment and Mitigation

This section **applies to all projects**. For each hazard; hazardous activity; or hazardous working condition use the matrices below to assess the risk, then complete the Risk Assessment and Mitigation Worksheet.

	RISK LEVELS	Many events, without proper planning, can have unreasonable levels of risk. However, by applying risk management strategies, risk can be reduced to an acceptable level
E	Extremely high risk	Unacceptable levels of risk. Major disruption. Detailed Risk management strategies MUST be applied in order to reduce or eliminate the extremely high risk level to a satisfactory level. This is high priority. Organisations should consider ways to modify of eliminate unacceptable risks. If risk cannot be reduced, the task should be prohibited.
H	High risk	Potentially serious risks. Some disruption. Proactive risk management strategies are required so that the risk is reduced. No work is to start /continue without the implementation of risk management strategies.
M	Moderate risk	Reduced or degraded capability. Organisations should consider what can be done to manage the risk to prevent any negative outcomes.
L	Low risk	Expected losses have minimal or no impact. Organisations can proceed with these activities as planned. Risk can be managed with simple/routine procedures.

		PROBABILITY / LIKELIHOOD				
	CATEGORY	FREQUENT Either occurs often or is continuously experienced	LIKELY Occurs frequently or several times in life cycle.	OCCASIONAL Occurs sporadically or a few times in life cycle.	SELDOM Some remote possibility in the life cycle.	UNLIKELY Possible but improbable. Probably will not occur in life cycle.
SEVERITY	CATASTROPHIC Death, or permanent total disability, system loss, major property /system damage or financial loss.	E	E	H	H	M
	CRITICAL Permanent partial disability, temporary total disability, significant property /system damage or financial loss.	E	H	H	M	L
	MARGINAL Minor injury, lost work day accident, compensable injury or illness, minor property/system damage or financial loss.	H	M	M	L	L
	NEGLIGIBLE First Aid or minor supportive medical treatment, minor system impairment. No time off work.	M	L	L	L	L

Risk Assessment and Risk Mitigation Worksheet

Risk Priority	The Risk What can happen and How it can happen	Time frame Duration for which the risk exists	Severity Rating	Probability /Likelihood Rating	Risk Level Rating	Risk Treatment/Controls to be implemented	Severity Rating after treatment/controls	Probability /Likelihood rating after treatment/controls	Reduced Risk Level rating after treatment/controls

PART VII: Personnel Sign-Off

By signing below, all personnel agree with the field/workplace conditions outlined and acknowledge receipt of safety instructions.

Student Name (block letters):
Student UWI ID:
Student Signature:
Date:

Supervisor Name (block letters):
Supervisor Signature:
Date:

Co-supervisor Name (block letters):
Co-supervisor Signature:
Date: