GENERAL SECTIONS OF THE PROJECT REPORT

Chapter 1: Introduction

Chapter 2: Literature Review

Chapter 3: Methodology and Materials / Design and Implementation

.

Chapter 4: Tests, Results, and Discussion

.

Chapter 5: Conclusion and Recommendations

Figures

Diagrams or figures are often used in the text to complement an explanation to enhance understanding of the presentation. Each diagram or illustration should bear a meaningful caption that is numbered sequentially in accordance with the chapter number and not the section or subsection number in which they appear. The figure caption should be located at the bottom of the figure as close as possible to where it is cited in the text. All figures should be referenced in the text and this should be done prior to the appearance of such figures. Students should avoid referring to a figure as “the above figure” or “the below figure”; rather, the actual figure number or name should be mentioned in the text. Figure 1 illustrates how a figure and its caption are presented in a thesis.

Tables

As with figures, students should ensure that all tables shown in the thesis, including those in the Appendices, are referred to in the text. Tables should be numbered with Arabic numerals throughout the thesis. A table should be on the page following the first reference to it or, on the following page if the available space cannot accommodate it. When a large table is placed in landscape orientation, the top of the table should be at the binding edge. The table number, title and caption should be single-line spaced and placed above the table.

Table 1.1: Power components of the load

Real Power (W)	Apparent Power (VA)	Reactive Power (VAR)
109	200	50
220	300	40
330	400	30
440	500	20
550	600	10

Each table should have a meaningful caption and must be numbered according to the chapter number in which it appears. For example, Table 1.1, Table 1.2 and Table 1.3 to indicate they belong to Chapter 1; Table 2.1, Table 2.2 and Table 2.3 to Chapter 2, and so on. Please note that the use of Table 2.1.2, because the table appears in sub-section 2.1, is not acceptable. It is encouraged to use 10 point font size for the contents of your tables, and all vertical lines must be removed from your tables as illustrated in Table 1.

Equations

All equations, whether mathematical or chemical, are considered as text and should be typed using Equation Editor or MathType in Microsoft Word. These equations should be numbered sequentially according to the name of the chapter in which they appear for ease of reference. Equation numbers should be enclosed in parentheses and made to align towards the right hand margin of the text. If detailed derivation is needed, it is to be placed in an appendix.

$$(1+x)^n = 1 + \frac{nx}{1!} + \frac{n(n-1)x^2}{2!} + \cdots \quad (1)$$

Each equation should appear on its own line and should be indented from the left margin of the text. The use of leaders (dotted lines in-between the equation and its number) is no longer fashionable. Find eqn (1) as an illustration in a thesis.

In-text Citations and References

In-text citation is a brief mention of the source at the point where the information is presented in the text while the References or Bibliography section contains the list of works cited in the thesis. In-text citations are usually placed at the end of sentences.

While there are several referencing formats in use, this Department shall adopt the IEEE (Institute of Electrical and Electronic Engineers) style of citation and listing. For citation in the body of the text, all reference materials are numbered and are referred to by this number. The number is enclosed in square brackets. Typical examples of sentences that contain reference citation look like these:

In this direction, close to US$ 4.0 billion has been invested in ethanol biorefineries [1]. The biodiesel projects include the Biodiesel Nigeria Limited's biodiesel initiative in Lagos State, Aura Bio-Corporation's Tolao Biodiesel project in Cross River State and the Shashwat Jatrophal Biodiesel Limited's biodiesel project in Kebbi State [2, 3].

The first reference citation [1] shows that the first information in the example was obtained from a journal article referred to as [1], while the second information was sourced from a textbook and a conference paper, which you refer to as 2 and 3 respectively. Once you number a reference, use the same number in all subsequent citations. Note that for the number to mean referencing, it must be enclosed in square brackets, and to cite more than one source at a time, e.g. [1], [3], [7]; [1, 3, 7] is preferred. Likewise, [1-5] is preferred to [1]- [5].

The listing of the above references takes the following format**:**

[1] E. I. Ohimain, "Emerging bio-ethanol projects in Nigeria: their opportunities and challenges," *Energy Policy*, vol. 38, pp. 7161-7168, 2010.

[2] V. Ajjarapu, *Computational Techniques for Voltage Stability Assessment and Control*. New York: Springer, 2006.

[3] M. F. Akorede, H. Hizam, I. Aris, and M. Z. A. Kadir, "Contingency evaluation for voltage security assessment of power systems," in *IEEE Student Conference on Research and Development (SCOReD)*, Serdang, Malaysia, 2009, pp. 345-348.

The use of software such as RefWorks or EndNote for publishing and managing bibliographies, citations and references is also encouraged. Students should note that references not cited in the text should not be listed here, and vice versa.

Appendices are located immediately after the References section. They usually contain information or data that is too detailed for the main body of the thesis. Examples include the Bill of Engineering Measurements and Evaluation (BEME), manufacturers‟ data for components, very lengthy quotations, programming codes, etc. Appendices are normally to be cited and paginated consecutively with the main text. Each appendix should normally start on a new page.

CHAPTER ONE

1.1 INTRODUCTION

This chapter gives a description of the subject matter and problem(s) being studied, and indicates its importance and validity. This can be supported by citing relevant literature on the subject. Other information expected in this chapter include aim, objectives, problem statement the scope of the study and sometimes the methodology intended to be employed to solve the problem. For this project report, the department is adopting the sub sections below for chapter 1.

1.2 AIM

The aim of this research is to investigate the effect of capacitive, inductive and resistive loads separately and combined on the cost of power consumed as well as the quality of the power delivered to households.

1.3 OBJECTIVES

The objectives of this research are: (Usually some of the things that will be attained and achieved that are not part of the major reason the project or research was embarked on)

- To identify and distinguish among the different types of residential loads.
- To know if loads actually consume the power rating written on their name plates.
- To identify if different types of loads (capacitive, inductive or resistive) of the same rating actually consume the same power
- To identify a cost-effective combination of loads when trade-offs can be made.

1.4 PROBLEM STATEMENT

The problem statement is usually a statement that justifies the rationale behind carrying out the project or research. This can be a single simple sentence, compound sentence or a combination of not more than two sentences. An example is the fierce arguments between consumers and electric power supply company workers on bills can be curbed if consumers understand their loads better. Consumers can easily monitor which combinations of their load will minimize cost and still maintain quality of power.

1.5 SCOPE OF THE WORK

- The research covers residential loads alone.
- The research uses various loads of the approximately the same rating.
- The research employs single phase loads alone.
- Energy analyzer will be used for the data capturing.
- Mobile oscilloscope will also be deployed for signal quality.

CHAPTER TWO

2.0 LITRERATURE REVIEW

This chapter should be devoted to a critical review of the academic and technical literature on previous works on the project. The significance of literature review is to evaluate the current work with respect to the existing works. In addition to this, literature review is highly important because it provides the author with insights to really understand the problems and limitations of the previous researchers on what is being studied or worked on.

Students are to note that literature review is not simply a summary of works of different authors; rather it should give an insight into each book or pertinent findings of a journal article and explain how it relates to the topic and why it is inadequate to answer the research questions. Greater part of references is usually found in the literature review. The more the references, the better, for this shows how far the student has searched and how much his/her knowledge in this topic has expanded. While there are several referencing formats in use, this Department shall adopt the IEEE (Institute of Electrical and Electronic Engineers) style of citation and listing. For citation in the body of the text, all reference materials are numbered and are referred to by this number. The number is enclosed in square brackets. Typical examples of sentences that contain reference citation look like these:

In this direction, close to US$ 4.0 billion has been invested in ethanol biorefineries [1]. The biodiesel projects include the Biodiesel Nigeria Limited's biodiesel initiative in Lagos State, Aura Bio-Corporation's Tolao Biodiesel project in Cross River State and the Shashwat Jatrophal Biodiesel Limited's biodiesel project in Kebbi State [2, 3].

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CHAPTER THREE

3.0 METHODOLOGY AND MATERIALS / DESIGN AND IMPLEMENTATION

This chapter should concentrate mostly on the student's own work on the project. This may involve system design and calculations, modelling and simulation of a system, data collection and analysis, software development and implementation, description of construction works, etc. The aforementioned items are broken down and developed into relevant meaningful sub-chapters. The problems encountered in the course of the study may also be stated here.

Under the design calculations, students should show how all values of various components used in the study are obtained. All the assumptions made should be clearly stated and any material selected based on any standard should be referenced adequately in the text. The circuit diagram of each module should be carefully drawn and explained, selection of components must be justified, etc. The chapter should be broken into headings and subheadings. The number of headings will depend on the particular work. However, these subheadings must flow according to the order of the modules of the work, culminating to the assembly of all the modules to form the complete work

CHAPTER FOUR

4.1 RESULTS, PRESENTATION AND DISCUSSION

This chapter should contain steps taken to test the developed device. Test and measurement methods must be properly documented. The results obtained should either be tabulated or plotted depending on the type of work. Signals could be photographed and the photographic plates pasted on the work. Thorough testing is very helpful in bringing out the quality of the work.

The results obtained in the study must be discussed extensively. The meaning should be explained and their relevance to the aim of the project should be highlighted. A good discussion of results will look at various aspects of the results. Similarly, the student should try to compare, contrast and integrate his/her results with the findings of other studies. Finally, the shortcomings/limitations of the work must be explained and possible remedy.

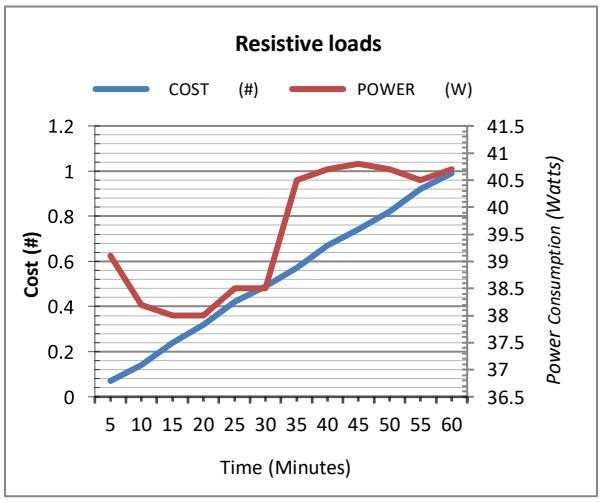

Figure 4.1a: Real Power against time plot

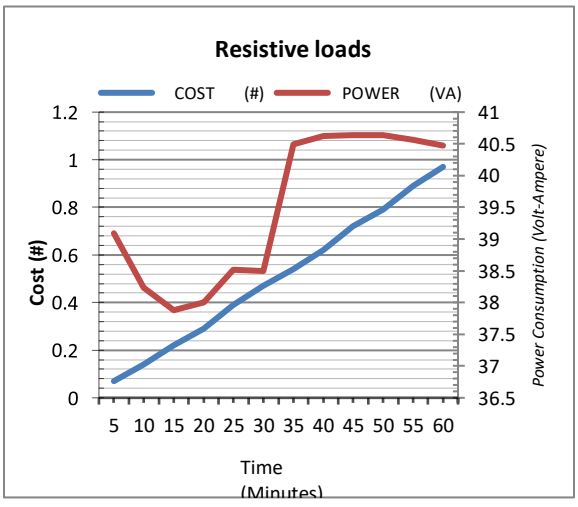

Figure 4.1b:Apparent Power against time plot.

The first figure in chapter 4 should be labelled figure 4.1, then 4.2 then 4.3 and so on, while that in chapter 1 should be labelled figure 1.1, 1.2 1nd then 1.3 in that order. When presenting results and comparisons are to be made, figures are better placed side by side on the same page or not far from each other to enable an appropriate comparison.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATION

5.1 CONCLUSION

Concluding statements should state if the aim and objectives of the project or research has been realized. The headings of conclusion can be 5.1 while that of recommendation will be 5.2, BEME 5.3 and references 5.4. The recommendation depicts areas of further research on the topic as well as some of the objectives which may not have been realized.

5.2 RECOMMENDATIONS

The conclusion should summarise the highlights of the previous chapters and should briefly mention the findings of the project. It should clearly state the contributions of the work. On the other hand, recommendations section as discussed should state the constraints of the project work or study and hopes for other possible future work.

5.3 REFERENCES

IEEE REFERENCING FORMAT EXAMPLES

This section presents basic formats and examples of different types of sources that could be cited, using the IEEE referencing style. Particular attention should be paid to the format of each type. Meanwhile, students are advised to note the following rules:

Style for Titles

- Set the titles of books (including handbooks and manuals), periodicals, conference proceedings, and standards in italics with headline-style capitalisation (i.e. capitalise the first and last words, and all important words in between; except lowercase articles, prepositions, and conjunctions).
- Set the titles of articles, book chapters, reports, theses and dissertations, conference papers and presentations, and patents in quotation marks with sentence-style capitalisation (capitalise first word of title and subtitle, as well as proper names and most initialisms).

Punctuation

Place punctuation inside quotation marks. An example with a question mark is provided below under "Print Journals."

Abbreviations

- Either spell out the entire name of each periodical you reference, or use accepted abbreviations. Either way, students must be consistent.
- Use the following abbreviations: vol., no., p. (one page only), pp. (range of pages), Jan., Feb., Mar. (optional), Apr. (optional), Jun. (optional), Jul. (optional), Aug., Sept., Oct., Nov., Dec.

Books

Basic Format:

[1] J. K. Author, *Book Title*, ed (if applicable). City of Publisher: Publishing company, year.

Examples:

[1] J. A. Momoh, *Electric Power System Applications of Optimization*. New York: Marcel Dekker Inc, 2001.

[2] C. D. Roger, F. M. Mark, S. Surya, and H. W. Beaty, *Electrical Power Systems Quality*, 2nd ed. New York: McGraw-Hill Professional, 2002.

Book Chapters

Basic Format:

[1] J. K. Author, "Chapter title" in *Book Title*, edition, volume. Editor"s name, ed. City of Publisher: Publishing company, year, pp. xxx-xxx.

Example:

[1] L. Stein, "Random patterns," in *Computers and You*, J. S. Brake, ed. New York: Wiley, 1994, pp. 55-70.

[2] R. L. Myer, "Parametric oscillators and nonlinear materials," in *Nonlinear Optics*, vol. 4, P. G. Harper and B. S. Wherret, ed. San Francisco, CA: Academic, 1977, pp. 47-160.

Article in a Print Journal

Basic Format:

[1] J. K. Author, "Article title". *Journal title*, vol., pp. xxx-xxx, date.

Example:

[1] F. Milano, L. Vanfretti, and J. C. Morataya, "An Open source power system virtual laboratory: The PSAT case and experience," *IEEE Transactions on Education*, vol. 51, pp. 17-23, 2008.

Electronic Books

Basic Format:

[1] J. K. Author. (Year, Month day). *Book title*. (edition). [Type of medium]. Vol. (issue). Available: site/path/file [date accessed].
Example:
[1] S. Calmer. (1999, June 1). *Engineering and Art*. (2nd edition). [On-line]. 27(3). Available: www.enggart.com/examples/students.html [May 21, 2003].

Electronic Journal

Basic Format:
[1] J. K. Author. (year, month). "Article title." *Journal title*. [Type of medium]. Vol. (issue), pages. Available: site/path/file [date accessed].
Example:
[1] A. Paul. (1987, Oct.). "Electrical properties of flying machines." *Flying Machines*. [On-line]. 38(1), pp. 778-998. Available: ww.flyingmachjourn/properties/fly.edu [Dec. 1, 2003].

Articles from Conference Proceedings (published)

Basic Format:
[1] J. K. Author, "Title of paper," in Unabbreviated Name of Conf., City of Conf., Abbrev. State (if given), year, pp. xxx-xxx.
Example:
[1] M. F. Akorede, H. Hizam, I. Aris, and M. Z. A. Kadir, "Contingency evaluation for voltage security assessment of power systems," in *IEEE Student Conference on Research and Development (SCOReD)*, Serdang, Malaysia, 2009, pp. 345-348.

Unpublished paper presented at a conference

Basic Format:
[1] J. K. Author, "Title of paper," presented at the Unabbrev. Name of Conf., City of Conf., Abbrev. State, year.
Example:
[1] G. Celli and F. Pilo, "Penetration level assessment of distributed generation by means of genetic algorithms," presented at *Power System Conference, Clemson, SC*, 2002.

Handbooks/Manuals

Basic format:
[1] *Name of Manual/Handbook*, xth ed., Abbrev. Name of Co., City of Co., Abbrev. State, year, pp. xx-xx
Example:
[1] *Transmission Systems for Communications*, 3rd ed., Western Electric Co., Winston-Salem, NC, 1985, pp. 44–60.
[2] *Motorola Semiconductor Data Manual*, Motorola Semiconductor Products, Inc., Phoenix, AZ, 2007.

Reports

Basic Format:
[1] J. K. Author, "Title of report," Abbrev. Name of Co., City of Co., Abbrev. State, Rep. xxx, year.
Examples:
[1] J. H. Davis and J. R. Cogdell, "Calibration program for the 16-foot antenna," Elect. Eng. Res. Lab., Univ. Texas, Austin, Tech. Memo. NGL-006-69-3, Nov. 15, 1987.
[2] R. E. Haskell and C. T. Case, "Transient signal propagation in lossless isotropic plasmas," USAF Cambridge Res. Labs., Cambridge, MA, Rep. ARCRL-66-234 (II), 1994.

Standards

Basic Format:
[1] Title of Standard, Standard number, date.
Example:

[1] IEEE Criteria for Class IE Electric Systems, IEEE Standard 308, 1969.

Patents

Basic Format:

[1] J. K. Author, "Title of patent," U.S. Patent x xxx xxx, month, day, year.

Example:

[1] J. P. Wilkinson, "Nonlinear resonant circuit devices," U.S. Patent 3 624 125, July 16, 1990.

Theses (M.Sc.) and Dissertations (Ph.D.)

Basic Format:

[1] J. K. Author, "Title of thesis," M.Sc. thesis, Abbrev. Dept., Abbrev. Univ., City of Univ., Abbrev. State, year.

[2] J. K. Author, "Title of dissertation," Ph.D. dissertation, Abbrev. Dept., Abbrev. Univ., City of Univ., Abbrev. State, year.

Examples:

[1] J. O. Williams, "Narrow-band analyzer," Ph.D. dissertation, Dept. Elect. Eng., Harvard Univ., Cambridge, MA, 1993.

[2] N. Kawasaki, "Parametric study of thermal and chemical non-equilibrium nozzle flow," M.Sc. thesis, Dept. Electron. Eng., Osaka Univ., Osaka, Japan, 1993.

Newspaper

Basic Format:

[1] J. K. Author*, "Article title." *Newspaper* (month, day, year), section, pages.

Examples:

[1] B. Bart. "Going Faster." *Globe and Mail* (Oct. 14, 2002), sec. A p.1.

[2] "Telehealth in Alberta." *Toronto Star* (Nov. 12, 2003), sec. G pp. 1-3.

Lecture Notes

Basic Format:

[1] Lecturer(s). Occasion, Topic: "Lecture title." Location, date.

Example:

[1] M. F. Akorede, "Powerline communication," Lecture notes for ELE575, Department of Electrical and Electronics Engineering, University of Ilorin, Ilorin, Oct. 28, 2013.

Unpublished Materials

These are the two most common types of unpublished references.

Basic Format:

[1] J. K. Author, private communication, Abbrev. Month, year.

[2] J. K. Author, "Title of paper," unpublished.

Examples:

[1] A. Harrison, private communication, May 1995.

[2] B. Smith, "An approach to graphs of linear forms," unpublished.

[3] A. Brahms, "Representation error for real numbers in binary computer arithmetic," IEEE Computer Group Repository, Paper R-67-85.

World Wide Web

Basic Format:

[1] Author(s)*. "Title." Internet: complete URL, date updated* [date accessed].

Example:

[1] M. Duncan. "Engineering Concepts on Ice. Internet: www.iceengg.edu/staff.html, Oct. 25, 2000 [Nov. 29, 2003].

5.4 BILL OF ENGINEERING MEASUREMENT AND EVALUATION SHEET

S/N	DESCRIPTION OF ITEMS	QUANTITY	UNIT PRICE (N)	TOTAL (N)
	RENEWABLE ENERGY ITEMS			
1	150W Solar PV Panels	3	25,000	75,000
2	150Ah Luminous Tubular batteries	2	130,000	260,000
3	12V, 2.0 KVA Inverter system	1	55,000	55,000
4	30A, PWM Charge controller	1	15,000	15,000
	ELECTRICAL CONNECTION			
5	40X25 Trunking pipes	1	5,000	5,000
6	100A Knife switch	1	2,500	2,500
7	Single phase ELCB	1	2,500	2,500
8	DC Cables and lugs	1	5000	5,000
9	$16mm^2$ copper cable	1	5000	5,000
	CASING			
10	Battery Rack	1	5,000	5,000
11	VAT (7.5%)	-	-	-
	INSTALLATION			
12	Installation and (3 months maintenance)	-	70,000	70,000
	Grand Total			**N500,000**