**Fayoum University**



**Engineering Faculty**

**Electrical Engineering Department**

B. Eng. Final Year Project

**PROJECT TITLE**

By:

*Student Name*

Supervised By:

*Supervisor(s) Date of examination*

DEDICATION

We would like to dedicate this project to all those who supported and guided us throughout this journey:

To Dr. Mohamed Hamdy,  
For your invaluable guidance in choosing the project idea and your constant support in developing and refining it. Your mentorship was a key pillar in turning this vision into reality.

To the college management,  
For your dedication to fostering a strong academic environment, and for providing us with the tools, laboratories, and resources that made this work possible.

With sincere gratitude, we dedicate this work to all of you.

To our beloved families,  
For your unwavering love, encouragement, and sacrifices. Your support gave us strength and motivation every step of the way. This achievement belongs to you as much as it does to us.

Acknowledgment

invaluable supervision, continuous guidance, and encouragement throughout every stage of this project. His insight and experience played a vital role in shaping the idea and bringing it to life.

We would also like to extend our sincere appreciation to the faculty members of the Electronics and Communication Engineering Department. Their dedication, support, and the knowledge they shared with us have been instrumental in building the foundation of this work.

Our heartfelt thanks go to the college management and technical staff for providing us with access to laboratories, tools, and essential components. Their support and cooperation enabled us to carry out practical experiments and implement our project effectively.

We gratefully acknowledge the Scientific Research Organization for their financial support, which was crucial in enabling us to acquire the necessary resources and tools for this project.

Finally, we are deeply thankful to our families for their patience, encouragement, and emotional support throughout our academic journey. Their belief in us gave us strength and motivation during every step of this work.

DECLARATION

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Bachelor of Science in *Electrical Engineering* is entirely my own work, that I have exercised reasonable care to ensure that the work is original, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

Signed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Registration No.: \_\_\_\_\_\_\_\_\_\_\_

Date: Day, xx Month Year.

ABSTRACT

This project presents the development of a secure networking terminal designed for offline message and audio communication using a Raspberry Pi and a TFT touchscreen interface. The system is tailored for environments where internet access is unavailable or unreliable, such as remote field operations, military zones, or disaster response areas. It allows users to easily send and receive text and voice messages through a graphical user interface (GUI) powered by the LVGL graphics library, ensuring a user-friendly interaction experience.

The core hardware includes a Raspberry Pi, a TFT touch display (ILI9341), a touch controller (XPT2046), a transceiver module with up to 500 meters of wireless range, a microphone, and a speaker. Software communication with the display and touch input is handled via the BCM2835 SPI library. The system facilitates message encryption, user interaction through the touch interface, voice recording, playback, and real-time message exchange over the transceiver. This report details the system architecture, hardware integration, software design, user interface implementation, and testing results. The project demonstrates the feasibility of developing a reliable and portable secure communication device without dependence on internet infrastructure.

Table of Contents

[List of figures ii](#_Toc222557974)

[list of tables iii](#_Toc222557975)

[LIST OF ACRONYMS/ABBREVIATIONS iv](#_Toc222557976)

[1 Introduction 1](#_Toc222557977)

[2 formatting description 2](#_Toc222557978)

[2.1 Title Page 2](#_Toc222557979)

[2.2 General Project Layout 3](#_Toc222557980)

[2.3 Page and Text Setting 4](#_Toc222557981)

[2.3.1 Sub-Heading Level 1 5](#_Toc222557982)

[2.4 Figures and Tables 6](#_Toc222557983)

[2.4.1 Figure Captions and Table Titles 6](#_Toc222557984)

[2.4.2 Numbering of Figures and Tables 7](#_Toc222557985)

[2.4.3 Referring to Figures and Tables in Text 7](#_Toc222557986)

[2.5 General Recommendations 8](#_Toc222557987)

[2.5.1 Units 8](#_Toc222557988)

[2.5.2 Abbreviations and Acronyms 8](#_Toc222557989)

[2.5.3 Equations 8](#_Toc222557990)

[2.5.4 Other Recommendations 9](#_Toc222557991)

[3 citation and referencing 10](#_Toc222557992)

[3.1 References Format 10](#_Toc222557993)

[3.2 References to Electronic Sources 12](#_Toc222557994)

List of figures

[Figure ‎1‑1: Page settings. 4](#_Toc211232407)

[Figure ‎1‑2: Paragraph settings. 5](#_Toc211232408)

[Figure ‎1‑3: Setting caption numbering to include chapter number. 7](#_Toc211232409)

[Figure ‎1‑4: Using Cross-reference. 8](#_Toc211232410)

list of tables

[Table ‎1‑1: List of headings and their formatting. 5](#_Toc211232411)

LIST OF ACRONYMS/ABBREVIATIONS

|  |  |
| --- | --- |
| ACRONYM | Definition of Acronym |
|  |  |

Chapter One

# Introduction

This document was developed in order to standardize the method of writing final year projects and to fulfill the requirements for the accreditation by the Fayoum university and the basic criteria required for the preparation of the projects are as listed below:

1. The projects should not be dependent on internet information
2. Images/figures … etc. should be referenced.
3. The experimentation, if any, should be subject to review of the work done, results obtained, implications, conclusions, reflections … etc.
4. The text format should be consistent between chapters and the standard of English used in the text should not be varied.
5. The project should contain strong elements of Design and Analysis activity, experimental work where appropriate, manufacturing elements as appropriate and include some business decisions such costing … etc.
6. The literature review should not be more than an account of the work undertaken by students.
7. The conclusions should not be very short.

The details of how to format your document correctly and how to include your citations and references are given in the following chapters of this document.

Chapter Two

# formatting description

The physical layout and formatting of your final year project report is highly important, yet is very often neglected. A tidy, well laid-out and consistently formatted document makes for easier reading and is suggestive of a careful and professional attitude towards its preparation.

In effect, this document has been developed to give you the guidelines for preparing reports for your final year project. Use this document as a template if you are using Microsoft Word 6.0 or later. Otherwise, use this document as an instruction set. General Recommendations

### Abbreviations and Acronyms

Define abbreviations and acronyms the first time they are used in the text, even after they have already been defined in the abstract. Abbreviations such as SI, ac, and dc do not have to be defined. Abbreviations that incorporate periods should not have spaces: write “C.N.R.S.,” not “C. N. R. S.” Do not use abbreviations in the title unless they are unavoidable.

### Equations

Number equations consecutively with equation numbers in parentheses flush with the right margin, as in (1). First use the equation editor to create the equation. Then select the “Equation” mark-up style. Press the tab key and write the equation number in parentheses. Use parentheses to avoid ambiguities in denominators. Punctuate equations when they are part of a sentence, as in

 (1)

Be sure that the symbols in your equation have been defined before the equation appears or immediately following. Refer to equations as “Equation (1) is…”; even if it is in the middle of a sentence.

### Other Recommendations

Use one space after periods and colons. Hyphenate complex modifiers: “zero-field-cooled magnetization.” Avoid dangling participles, such as, “Using (1), the potential was calculated.” [It is not clear who or what used (1).] Write instead, “The potential was calculated by using (1),”

Use a zero before decimal points: “0.25,” not “.25.” Use “cm3,” not “cc.” Indicate sample dimensions as “0.1 cm × 0.2 cm,” not “0.1 × 0.2 cm2.”

Do not mix complete spellings and abbreviations of units: use “Wb/m2” or “webers per square meter,” not “webers/m2.”

When expressing a range of values, write “7 to 9” or “7-9,” not “7~9.”

A parenthetical statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.) In American English, periods and commas are within quotation marks, like “this period.” Other punctuation is “outside”!

Avoid contractions; for example, write “do not” instead of “don’t.”

The serial comma is preferred: “A, B, and C” instead of “A, B and C.”

If you wish, you may write in the first person singular or plural and use the active voice (“I observed that ...” or “We observed that ...” instead of “It was observed that ...”). However, passive voice is preferred.

Remember to check spelling.

Chapter Three

# citation and referencing

The report should be based on the student’s own work and in case of using any parts or copying any figures or diagrams from previous work this should be properly referenced according to the format explained below.

A numbered list of references must be provided at the end of the paper. The list should be arranged in the order of citation in text, not in alphabetical order. List only one reference per reference number.

Each reference number should be enclosed by square brack­ets. In text, citations of references may be given simply as “in [1] . . .” rather than as “in reference [1] . . .” Similarly, it is not necessary to mention the authors of a reference unless the mention is relevant to the text. It is almost never useful to give dates of references in text. These will usually be deleted by Staff Editors if included.

Footnotes or other words and phrases that are not part of the reference format do not belong on the reference list. Phrases such as “For example,” should not introduce references in the list, but should instead be given in parentheses in text, followed by the reference number, i.e., “For example, see [5].”

## References Format

Sample correct formats for various types of references are as follows.

*Books:*

1. G. O. Young, “Synthetic structure of industrial plastics,” in *Plastics*, 2nd ed., vol. 3, J. Peters, Ed. New York: McGraw-Hill, 1964, pp. 15–64.
2. W.-K. Chen, *Linear Networks and Systems*. Belmont, CA: Wadsworth, 1993, pp. 123–135.

*Periodicals:*

1. J. U. Duncombe, “Infrared navigation—Part I: An assess­ment of feasibility,” *IEEE Trans. Electron Devices*, vol. ED-11, pp. 34–39, Jan. 1959.
2. E. P. Wigner, “Theory of travelling-wave optical laser,” *Phys. Rev.*, vol. 134, pp. A635–A646, Dec. 1965.
3. E. H. Miller, “A note on reflector arrays,” *IEEE Trans. Antennas Propagat.*, tobe published.

*Articles from Conference Proceedings (published):*

1. D. B. Payne and J. R. Stern, “Wavelength-switched pas­sively coupled single-mode optical network,” in *Proc. IOOC-ECOC*, 1985, pp. 585–590.

*Papers Presented at Conferences (unpublished):*

1. D. Ebehard and E. Voges, “Digital single sideband detec­tion for interferometric sensors,” presented at the 2nd Int. Conf. Optical Fibre Sensors, Stuttgart, Germany, 1984.

*Standards/Patents:*

1. G. Brandli and M. Dick, “Alternating current fed power supply,” U.S. Patent 4 084 217, Nov. 4, 1978.

*Technical Reports:*

1. E. E. Reber, R. L. Mitchell, and C. J. Carter, “Oxygen absorption in the Earth’s atmosphere,” Aerospace Corp., Los Angeles, CA, Tech. Rep. TR-0200 (4230-46)-3, Nov. 1968.

## References to Electronic Sources

The guidelines for citing electronic information as offered below are a modified illustration of the adaptation by the International Standards Organization (ISO) documentation sys­tem and the American Psychological Association (APA) style. Three pieces of information are required to complete each reference: 1) protocol or service; 2) location where the item is to be found; and 3) item to be retrieved. It is not necessary to repeat the protocol (i.e., http) in Web addresses after “Available” since that is stated in the URL.

*Books:*

1. J. Jones. (1991, May 10). *Networks*. (2nd ed.) [Online]. Available: <http://www.atm.com>

*Journals:*

1. R. J. Vidmar. (1992, Aug.). On the use of atmospheric plasmas as electromagnetic reﬂectors. *IEEE Trans. Plasma Sci.* [Online]. *21(3)*, pp. 876–880. Available: <http://www.halcyon.com/pub/journals/21ps03-vidmar>

*Papers Presented at Conferences:*

1. PROCESS Corp., MA. Intranets: Internet technologies deployed behind the firewall for corporate productivity. Presented at INET96 Annu. Meeting. [Online]. Available: <http://home.process.com/Intranets/wp2.htp>

*Reports and Handbooks:*

1. S. L. Talleen. (1996, Apr.). The Intranet Ar­chitecture: Managing information in the new paradigm. Amdahl Corp., CA. [Online]. Available: <http://www.amdahl.com/doc/products/bsg/intra/infra/html>

*Computer Programs and Electronic Documents:*

1. A. Harriman. (1993, June). Compendium of genealog­ical software. *Humanist*. [Online]. Available e-mail: HUMANIST@NYVM Message: get GENEALOGY REPORT