GRADUATION PROJECT: A COMPLETE GUIDE

First Edition

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INTRODUCTION

1.1 Overview

The word "*engineer*" comes from the Latin word "*ingenium*" which refers to being skillful, intelligent and talented. Indeed, an engineer should comfortably fit into these descriptions if he/she is to make a good engineer and consequently succeed at work and in life. However, having the talent only does not qualify a person to become an engineer; this should be accompanied by undertaking, and successfully, completing an engineering course at an appropriate institution.

At the end of an engineering study, and just prior to graduating, students are expected to display their talents and show their ability to undertake a project and see it through into completion. Of course, the size and complexity of the project are set to fit within the limited amount of time that a student has to complete the project.

1.2 What is the Aim of a Graduation Project?

The answer to this question is clearly realized by all the students once they finish the presentation of their graduation projects!

By the time you have come to that final stage, you would have learnt many things that you will face in real life; specially, when you start to work as an engineer. Examples of what you learn:

- *Knowledge and Expertise*: specializing and acquiring more knowledge of a topic.
- *Time Punctuality*: working on a project with a limited amount of time.
- *Time Management*: being able to organize your work on the project to meet a deadline.
- *Research*: searching various sources to collect information on the topic of your project.
- *Analytical Thinking*: analyzing your collected information.

- *Taking Responsibility*: making decisions and documenting them within the project as a result of your analysis.
- *Engineering Design*: creating and delivering your thoughts based on your analysis and decisions as to what is feasible.
- *Individual Creativity*: suggesting potential and future developments regarding the topic of your project.
- *English Reading & Writing Skills*: your command of the English language will marginally improve by the time you complete your project.
- *Communication Skills*: discussing the development of your work with your supervisor and exchanging ideas and information with your colleagues provides practice into communicating within a technical environment.
- *Self-Confidence*: you may have this already, but the experience of presenting and defending your project in front of the expert members of jury at the end of your work, strengthens your self-confidence even further.

1.3 Using This Book

The primary objective of this book is to provide the computer engineering graduating students with the guidelines and conformity for departmental graduation project regulations. It guides the students into how to choose the project, how to write it, how to prepare for the presentation, and how to present and defend the project.

This book provides answers to many questions that arise during undertaking a graduation project. It can be used in conjunction with the supervisor's help and advice.

The book is divided into several chapters. In Chapter One (Introduction) ..... In Chapter Two (General Information) the..... .

1.4 Final Words

While wishing our graduating students excellent results on the outcome of their graduation projects, we also hope that knowledge and expertise, in a topic that our future engineers choose, are gained.

GENERAL INFORMATION

2.1 Overview

The Engineering Graduation Project is an essential part of fulfilling and completing the degree of Bachelor of Science (BSc.) in Computer Engineering at Near East University. A graduation project is not merely an elaborate term paper, laboratory report or summary of available information on a particular topic. A graduating student, undertaking a graduation project, improves and develops his/her skills in problem solving, analysis, synthesis and evaluation. A typical project content would require the student to investigate some aspects of theory, algorithms, techniques, methods, software or hardware implementations.

2.2 General Regulations

- A graduation project may be undertaken by *one* or *two* students, and supervised and assessed by one academic member of staff (the supervisor) throughout the semester.
- The graduation project must be *registered* by the end of the first month of the semester.
- In order to register for graduation project you will need to complete at least *33 courses* of the undergraduate program.
- The student should maintain at least a *minimum CGPA* of (2.00 / 4.00).
- Each graduating student is expected to spend two hours per week over the semester.
- A graduation project must be presented in a project which should contain *60 - 120 pages*.
- *Two copies* of a completed and bound project must be *submitted* by the project's deadline. One copy will reside in the library of the Department of Computer Engineering (submit to the Chairman), and the second copy will go to the supervisor.

2.3 Topics for a Graduation Project

Current topics for the Computer Engineering Graduation Projects include (and not limited to):

- *Software Development*: Designing and building software programs for implementation into real life applications. Development languages include (C, C++, FoxPro, Delphi and Java).
- *Artificial Intelligence*: Investigating the potential of systems that simulate human ability to make "clever" decisions, and analyzing their potential applications in real life.
- *Neural Networks*: Together with *Genetic Algorithms*, these represent the latest approaches to simulating the human perception, learning and decision-making. Neural networks have a wide range of real life application; such as in medicine, industry, military, robotics or control systems.
- *Expert Systems*: Investigation of yet more artificial intelligent systems, where "clever" systems are designed for use non-experts. In addition to *Fuzzy Logic*, these, also have a wide range of applications.
- *Multimedia and Internet*: Designing and Building web-based applications, creating plug-ins and designing creative websites.
- *Machine Vision*: Investigating the perception aspects of machine and robotics. Image Processing, Medical Imaging and speech processing are examples of these important aspects.

2.4 Student's Responsibility

The graduation project is a student's original work, and thus, he/she is solely responsible for its content. The students must choose a topic, find a graduation project supervisor among the academic staff in Computer Engineering Department, and manage their time schedule with their supervisors. It is the Engineering Faculty policy that a graduating student may *not* undertake a graduation project without faculty guidance. That is why the faculty members (supervisors) agree to assist you so you can fulfill the requirements and successfully graduate.

Etiquette is important in many aspects of life and this is no exception. It is important to remember that it is ultimately the student's responsibility to seek help and guidance, moreover, it is not always true to presume that each graduation project committee member is well-informed of your project topic (example: you are on my graduation project committee so you automatically should know my defense). Your graduation project supervisor and the other members of your committee are all trying to help you accomplish one of your major life goals. They are expected to be given your respect and due courtesy.

GRADUATION PROJECT STRUCTURE

3.1 General Structure

A completed graduation project must contain certain major parts. Some of these parts may not be included; depending on the project topic, and thus are marked as optional. The general structure of a project contains:

- Cover Page (*dark blue* or *navy* color)
- Title Page
- Acknowledgment
- Abstract
- Table of Contents
- List of Abbreviations (*optional*)
- List of Symbols (*optional*)
- Introduction
- Main Chapters (Chapter One, Chapter two, ...etc.)
- Conclusions
- References
- Appendices (*optional*)

3.2 Detailed Structure

This section presents the project structure in detail. Explanations and examples are given in order to provide better understanding of what the project structure.

3.2.1 *Cover Page*

The cover page is the *outside* hardcover of the project. This cover is what you see after the binding process at the end of your work on the project. The preferred color is *dark blue* (or navy). This page should contain: university's name, faculty, department, project title, graduation project code (COM 400), student's name, supervisor's title and name, and the place (city) and time of completing the project (*see Figure 3.1*).

3.2.2 *Title Page*

The title page is the first page *inside* the project. This should be a copy of the cover page. An example of the title page is shown in *Figure 3.1*.

3.2.3 *Acknowledgments*

An acknowledgement is expressing your personal appreciation to others who may have contributed to the success of your work in one way or in another. These are usually presented on a separate page and should not occupy more space than a single page. Dedication of your work may also be made here.

Traditionally, acknowledging your supervisor should come first. This can be followed by acknowledging your sponsor if there is one (i.e. those who provided you with a scholarship). Expressing your feelings for your family and friends could come next. An example of a brief acknowledgement is shown in *Figure 3.2*.

3.2.4 *Abstract*

The word abstract, as a noun, means summary. An abstract is a very important part of the project, and therefore care must be taken when writing an abstract. A good abstract must be contained within *one* page. An abstract is a comprehensive *(200* words) summary that describes the contents of the project.

In the abstract you should summarize *clearly* and *briefly* the entire work that you describe in your project. Remember that this is not an introduction to your project, so elaboration on the contents of your project should be avoided here. Two good examples of abstracts can be seen in *Figure 3.3* and *Figure 3.4*.

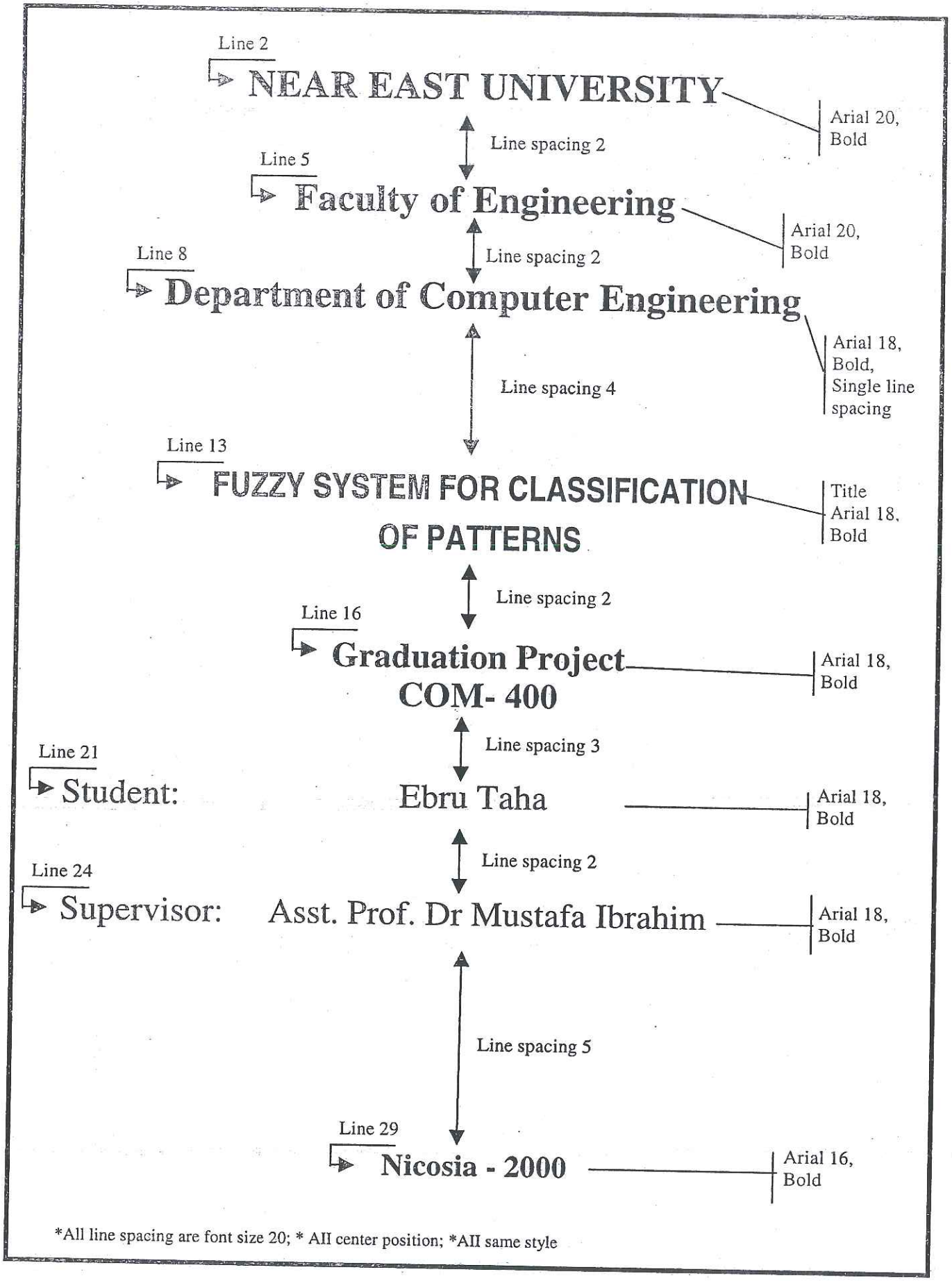

Figure 3.1. Cover Page and Title Page example.

ACKNOWLEDGEMENTS

"First, I would like to thank my supervisor Dr. John Smith for his invaluable advice and belief in my work and myself over the course of this Graduation Project..

Second, I would like to express my gratitude to Near East University for the scholarship that made the work possible.

Third, I thank my family for their constant encouragement and support during the preparation of this project.

Finally, I would also like to thank all my friends for their advice and support."

Figure 3.2. An example of "Acknowledgements".

ABSTRACT

Scale space analysis is an efficient solution to edge detection of objects in low to high-contrast images. However, this approach is time consuming and computationally expensive. The parallel processing properties of a neural network provide an ideal solution to managing the large amounts of data processed in image analysis, however their application to multiscale analysis is still in its infancy.

This project reports on a new approach to detecting 2-dimensional and 3-dimensional objects in low to high-contrast images. The novel idea is based on combining neural network arbitration and scale space analysis to automatically select one optimum scale for the entire image at which scale space edge detection can be applied. Thus, introducing new measures to solve many of the problems existing in the discipline of image processing, such as time consumption, high computational cost, impracticality and poor edge detection in low-contrast images.

This new approach to edge detection is formalised in the automatic edge detection scheme (AEDS). The AEDS is implemented on real-life applications in the military and the medical fields. Results are presented to show the AEDS to be superior to the best existing technique in edge detection within low-contrast images.

Figure 3.3. First example of an "Abstract"

ABSTRACT

Increasing the complexity of the technological processes, the presence of hard formalized and unpredictable information, the uncertainty of environment leads to non-adequate description of these processes by deterministic methods, and so the development of control system with low accuracy. The effective way to solve this problem is the use of artificial intelligence ideas, such as expert systems.

The aim of this project is the development of expert system for medical diagnostics. For this purpose the state of art understanding of expert systems for diagnostic problem solving is given, the structure of expert system and the functions of its main blocks are described.

The main problem of expert system development is the construction of its knowledge base. As a example the diagnosis of stomach and intestinal diseases is taken. Knowledge base of system includes the knowledge obtained from different experienced specialist in this area and from different medical references. This knowledge in expert system is formalized by production rules that have premise and conclusion parts. Premise parts of rules includes the characteristics of stomach and intestinal diseases; conclusion parts are the diagnosis and recommendations for their treatments. The realization of the diagnostic system is performed by using expert system shell ESPLAN.

The obtained results show the efficiency of the application of expert systems both in social area and in industry.

Figure 3.4. Second example of an "Abstract"

3.2.5 Table of Contents

A Table of Contents (or TOC) is a list of headings in a document (your project) that a reader can use to quickly navigate and find a certain topic or section. The TOC usually lists chapters, headers and sub headers; indenting each in turn. An example of TOC is shown in *Figure 3.5*.

The following 3-level scheme can be used for the graduation project:

- Heading 1: Main Headers – (Titles of chapters, ABSTRACT, INTRODUCTION, CONCLUSION, REFERENCES, …etc.). Set "Uppercase", "Times New Roman", font size 14 and Bold).
- Heading 2: Headers - (example: 1.2. Mile stone achievements to the problem). Set "Title Case", "Times New Roman" and font size 14.
- Heading 3: Sub Headers - (example: 2.1.3. Mamdani-type fuzzy processing). Set "Title Case", "Times New Roman", font size 12.

TABLE OF CONTENTS

Figure 3.5. An example of a "Table of Contents"

3.2.6 *List of Abbreviations*

This is an *optional list,* where you can include all the abbreviations and contractions that appear in your project together with the full form of the words that they stand for. A "List of Abbreviations" is a table having two columns. An example of a list of abbreviations is shown in *Figure 3.6.*

LIST OF ABBREVIATIONS

NEU	Near East University
WWW	World Wide Web
ISP	Internet Service Provider
LAN	Local area Network
AI	Artificial Intelligence
ANN	Artificial Neural Network
ES	Expert Systems
DMS	Database Management Systems
LMS	Least Mean Square

Figure 3.6. An example of a "List of Abbreviations"

3.2.7 *List of Symbols*

This is an *optional* list. Mathematical and scientific symbols can be summarized in this list and included together with their values or what they represent. Similarly to "List of Abbreviations" a "List of Symbols" is a table having two columns. An example of a list of symbols is shown in *Figure 3.7.*

LIST OF SYMBOLS

G(x)	Gaussian Function
σ	Standard Deviation
$\mu(x)$	Membership Function
W	Weight Coefficients
cf	Confidence Factor
T	Term sets
α	Momentum Rate
η	Learning Rate

Figure 3.7. An example of a "List of Symbols"

3.2.8 Introduction

This is different from the "Abstract". In the "Introduction" section you briefly *summarize* the topic(s) that you are addressing in the project, while stating some of the reasons why it is a worthwhile topic.

The aims (or objectives) of your project and project must then be described clearly. Finally, the project structure should be outlined, where you describe briefly what each main chapter in your project contains. An example of an "Introduction" of a project entitled "Expert Systems" is shown in *Figure 3.8*. Another example of an "Introduction" of a project entitled "Fuzzy Control" is shown in *Figure 3.9*.

INTRODUCTION

Artificial intelligence (AI) is the sub-field of computer science that attempts to develop machines which are capable of emulating human perception. Initial research into AI was mainly directed toward non-numeric computation and symbolic reasoning, because it was realized that these formed the basis of cognitive activities. Various forms of symbolic notation were defined and clever methodologies were devised to assist in reasoning, planning, and learning in problem domains where conventional numerical approaches were deemed inadequate. Although many of these techniques were successfully applied to practical problems in areas such as speech recognition, image recognition and robotics, the major goal of AI remained unaccomplished. One of perspective branches of AI is expert systems.

The concept of expert systems originated from research in the field of artificial intelligence. Expert systems were born when it was realized that there was at least one aspect of intelligence that was not based on reasoning. An expert dealing with a problem in his field often uses very simple reasoning, relying more upon the *knowledge* gained from years of experience and training. This insight into the role played by knowledge in the cognitive process encouraged AI researchers to build systems that apply simple reasoning mechanisms to knowledge about a very specific area of expertise. Stanford University is generally given the credit for developing the first "expert system", called DENDRAL, in the early seventies. This system was designed for determining the molecular structure of unknown compounds from their spectroscopic data. Systems such as this soon became the first commercially viable applications of artificial intelligence.

The objective of this project is to investigate the development of ES for medical diagnostics of stomach and intestinal diseases. The project consists of introduction, five chapters and conclusion.

Chapter One describes the state of art understanding of ES for diagnostic problem solving and the main steps for development of diagnostic expert system.

Chapter Two presents the architecture of diagnostic ES and the description of functions of its main blocks. The operation principles of ES, interface between system and knowledge engineer and user are described.

Chapter Three presents the representation models of knowledge and the development of knowledge base (KB) for diagnostic problem. The description of knowledge representation models, such as frames, semantic networks, logic predicates, neural networks and production rules are given. For representation of knowledge for diagnostic problem the production rule form is chosen and properties are described. The main steps of the knowledge acquisition one shown.

Chapter Four is devoted to the development of medical expert system for stomach and intestinal diseases. Structure of the system and the model of knowledge base are given. The inference engine operation mechanism is described.

Chapter Five presents the practical results of medical ES application for stomach and intestinal diseases. The obtained results of ES application are analyzed. Finally, the conclusion section presents the important results obtained within the project.

Figure 3.8. First example on writing an "Introduction"

INTRODUCTION

Fuzzy set theory was found to be a very effective mathematical tool for dealing with the modeling and control aspects of complex industrial and not industrial processes as an alternative to other, much more sophisticated mathematical models. Further, the latter circumstance led to the appearance at the beginning of the 1970's of fuzzy logic computer controllers which became a powerfully tool for coping with the complexity and uncertainty with which we are faced in many real-world problems of industrial process control. The first investigations in this field had to answer the question: *Is it possible* to *realize* a *process* controller w*hich deals like* a man w*ith* the *involved linguistic information?* The results of these inquires led to the design of the first fuzzy control systems which implemented in hardware and software a linguistic control algorithm. Such a control algorithm was then formulated by a control engineer on the base of the interviews with human experts who currently work as process operators. The most simple fuzzy feedback control systems contain a fuzzy logic controller (FLC) in the form of a table of linguistic rules, or fuzzy relation matrix and input-output interfaces.

Fuzzy logic has been successfully applied to many of industrial spheres, in robotics, in complex decision making and diagnostic system, for data compression, in TV and others. Fuzzy sets can be used as a universal approximator, that is very important for modeling unknown objects. Fuzzy technology has such characteristics as interpretability, transparency, plausibility, graduality, modeling, reasoning, imprecision tolerance.

In this project the development of fuzzy controller for technological processes is considered. The project consists of introduction, 5 chapters and conclusion.

Chapter One describes the state of application problems of fuzzy technology to solve control problems and the mile stone achievements to the problem.

Chapter Two describes the architecture of fuzzy controllers for technological processes. The structure of fuzzy systems, the functions of its main blocks are described. The structures of PD-like, PI-like and PID-like fuzzy controller are described.

Chapter Three presents the operations in fuzzy system. The description of linguistic rules, their characteristics, fuzzy rules firing, different types of fuzzy processing mechanisms are given. The representation of max-min processing of Zade is described.

Chapter Four describes the development of fuzzy system for technological process control. Using fuzzy desired time response characteristic of the system, fuzzy model of the technological processes the synthesis of fuzzy control system is performed. The development of the synthesis procedures and simulation of fuzzy control system are performed.

Chapter Five describes the simulation of the fuzzy system to control temperature of heater. The results of simulation of PD-like fuzzy controller are described. The efficiency of its application is analyzed.

Conclusion presents the obtained important results and contributions in the project.

Figure 3.9. Second example on writing an "Introduction"

3.2.9 *Main Chapters*

These chapters vary in their contents depending on the project. Therefore, general guidelines are given here on what the main chapters should include.

After the "*Introduction*" chapter, a "*Literature Research*" chapter should follow. This is some times called "*Background*". In this chapter a graduating student should provide general information and background on the main topic of the project.

For example, a project on Neural Networks will have a background chapter describing:

- Definitions of Neural Networks
- History of the Development of Neural Networks
- How Neural Networks "imitate" the function of the brain
- Existing Neural Network architectures (this can also be written in a separate chapter)

Another example is a project on software developing using Delphi. Here the background chapter can describe:

- Definitions in Delphi programming
- History of the development of the language
- Examples of algorithms (flow charts)
- Examples of Delphi programming applications (this can also be written in a separate chapter)

The aim of the background chapter is to provide comprehensive general information on the main topic of the project. Notices that most of your references are most likely to be cited (indicated by a number) in this chapter, because you will be presenting what other people have done. More details on the main topic can be described in the following chapters.

An important part of any project is the chapter that presents "original" work by the student. This usually includes your own ideas, which can be a result of: analysis, creation of new ideas, you software algorithm and/or your comparison between different methods.

3.2.10 Conclusions

This part of the project is very important and should be carefully written. Conclusions are not results, though you may list some results within the conclusion. A simple way to write a good conclusion is as follows:

- Summarize the outcomes of each chapter in your own words.
- List your project aims or objectives (as you wrote them in the "Introduction" chapter) and comment whether you achieved them or not.
- Emphasize your contribution and original work (e.g. YOUR analysis, comparison, software algorithm, potential real-life application, ...etc.).
- Suggest Further work and future improvements on the topic of the project.

Conclusions are *not* a rambling summary of the project: they are *short, concise* statements of the inferences that you have made because of your work. It helps to organize these as short paragraphs, ordered from most to least important. It may also help you to imagine the "*Conclusion*" as a *mirror reflection* of the "*Introduction*". Two examples of parts of conclusions are shown in *Figure 3.10* and *Figure 3.11*.

CONCLUSION

In practice some of processes are characterized by hard formalized and unpredictable information, in addition to uncertainty of environment. Analysis of these processes shows that the use of traditional technology for controls these processes leads to non-adequate their description. To solve this problem, the development of expert system is considered within this project.

The architecture of an expert system for medical diagnostic is proposed and the functions of its main blocks are described. The main problem of expert system development is the construction of knowledge base. Using knowledge of experienced specialists and medical references, the knowledge base for the stomach and intestinal diseases is developed. This knowledge base contains more than 400 productions rules. Premise parts of the rules include the main input characteristics of diseases, whereas the conclusion parts are the diagnosis and recommendation for treatment of illness. After defining diagnosis the system provide recommendation for the treatment of illness. The procedure for interpreting the knowledge base rules is developed.

The realization of the expert system is performed using expert system shell ESPLAN. The obtained results satisfy the efficiency of the applied methodology.

Figure 3.10. Expert Systems Project Conclusion example

CONCLUSION

The analysis of some industrial and non-industrial processes show, that they are characterized with uncertainty of their functioning principle, fuzziness of information. In these condition the fuzzy system is effective mathematical tool for modeling and control both industrial and non-industrial processes.
The structure of fuzzy system for technological processes control is given. The functions of its main blocks- fuzzification, inference engine, defuzzification, fuzzy knowledge base are described.

The development of fuzzy PD-like controller is performed. Using desired time response characteristics of system and fuzzy model of the processes the fuzzy knowledge base for this controller is developed. The inference engine mechanism is realized by using max-min type fuzzy processing of Zade. Defuzzification mechanism is realized by using "Center of Gravity" algorithm.

The modeling of fuzzy controller for control of temperature of heater is carried out. The simulation of system is realized in C programming language. In the result of simulation obtained time response characteristics of system show the efficiency of application of fuzzy controller in complicated processes

Figure 3.11. Fuzzy Systems Project Conclusion example

3.2.11 References

Including references in your project shows that you have done proper research work and reflects the topic area of your project. The IEEE recommendations and standards are used for arranging reference lists and citation. List and number all bibliographical references in 12-point and New Times Roman font. Lines should have 1.5 space. The references should be indicated or cited within the text. This is done by enclosing the citation number in square brackets; for example [1].

Reference to Books:

Author(s) (Name and Surname), *Book Title,* Publisher, Location, Date.

Examples

[1] Schalkoff J.R., *Artificial Intelligence: An Engineering Approach,* McGraw-Hill Publishing Co., NJ, 1990.

[2] Jackson, P. *Introduction to Expert Systems 3rd* ed., Addison Wesley Longman Limited, Edinburgh Gate, England, 1999.

[3] Haykin S. *Neural Networks: A Comprehensive Foundation,2nd ed.*, Prentice-Hall Inc., Englewood Cliffs, NJ, 1999.
[4] Mamedov F .S., *Control System Engineering,* Lecture notes, Near East University Press, Lefkosa, 1999.

Reference to article in Journals or other Periodicals:

Author(s), "Article Title", *Journal,* Volume, Location, Date, pp. 1-10.

Examples

[1] Marks II, R.J., "Intelligence: computational versus artificial", *IEEE Transactions on* . Neural Networks, Vol. 4, 1993, pp. 737-739.
[2] Garvey, A., Lesser, V., "Design-to-time real time scheduling", *IEEE Transactions on Systems, Man, and Cybernetics., 23*, 1993, 1491-1502.
[3] Tong R.M, "The evaluation of fuzzy models derived from experimental data". Fuzzy Sets and Systems, North-Holland Publishing Company, vol.4, 1980, pp.1-12.

Reference to Proceedings:

Examples

[1] Rumpel D, Krost G., "Natural Language Interface and Database Issues in Applaying Expert Systems", Proceeding of the IEEE, Vol. 82(9), pp.123-134, March 1993.
[2] Mamedov F.S., Abiyev R. A., "Digital Signal Processing Using Radial-Basis Neural Networks" , *In Proceeding of IEEE NORDIC Signal Processing Symposium NORSIG2000,* Sweden, pp. 263-265, June 2000.
[3] Wang L.X. "Fuzzy Systems are universal approximators", Proc. *IEEE Int.Conf.on Fuzzy Systems, San Diego, CA, pp.1163*-1169, 1992.

Reference to Dissertations:

Examples

[1] Khashman A., Automatic Edge Detection Scheme (AEDS), *Ph.D. thesis,* Nottingham University Press, Nottingham, 1997.

Reference to Electronic Sources - Online sources from Web:

Examples

[1] A guide for writing research paper, APA style. Retrieved December 6, 1999 from the World Wide Web "http://www.webster.commnet.edu/apa/apa_index.htm".

[2] Academic writing. Retrieved February 10, 1999 from the World Wide Web: "http:/ /www .wisc.edu/writing/handbook/academic-writing.htm".

[3] John, E. M., "Cellular Phone Antenna and Human Health", *"http://www.mcw.edu/gere /cop/telefonos-moviles-salud/toc.htm* ", Retrieved Mart 25, 2000.

[4] Master of science degree program in telecommunication TEL-599 .Thesis Handbook. "

PROJECT WRITING & FORMAT

4.1 Page Setup

Type the manuscript on one side of the standard-sized heavy white bond paper, (*A4 format 297x210, portrait orientations*). The Page setup margins are: (*2.5 cm*) at the *top*, *bottom* and *right*, whereas the left margin is (*3.5 cm*). The reason for increasing the left margin is that the project will be bound and enough space should be left so as not to cover the text. An example of a proper page format is shown in *Figure 4.1*.

In addition to setting up the margins, the following line spacing settings should be used uniformly throughout the project:

- One and half (1.5) spacing throughout the project
- One and half (1.5) spacing after every line of the title, headings, quotations, references, figures, tables, ...etc

Page numbering should be consecutive. Type the numbers in the button center using Arabic numerals for the main parts of the project (i.e. Introduction, the chapters and Conclusion)

- Arrange the pages of the manuscript as follows:
- Title page should not be numbered.
- Acknowledgment should be numbered with *(i)*
- Abstract page should be numbered with *(ii)*
- Contents page(s) should be numbered starting with *(iii)*
- Text start on a new page numbered *(1)*

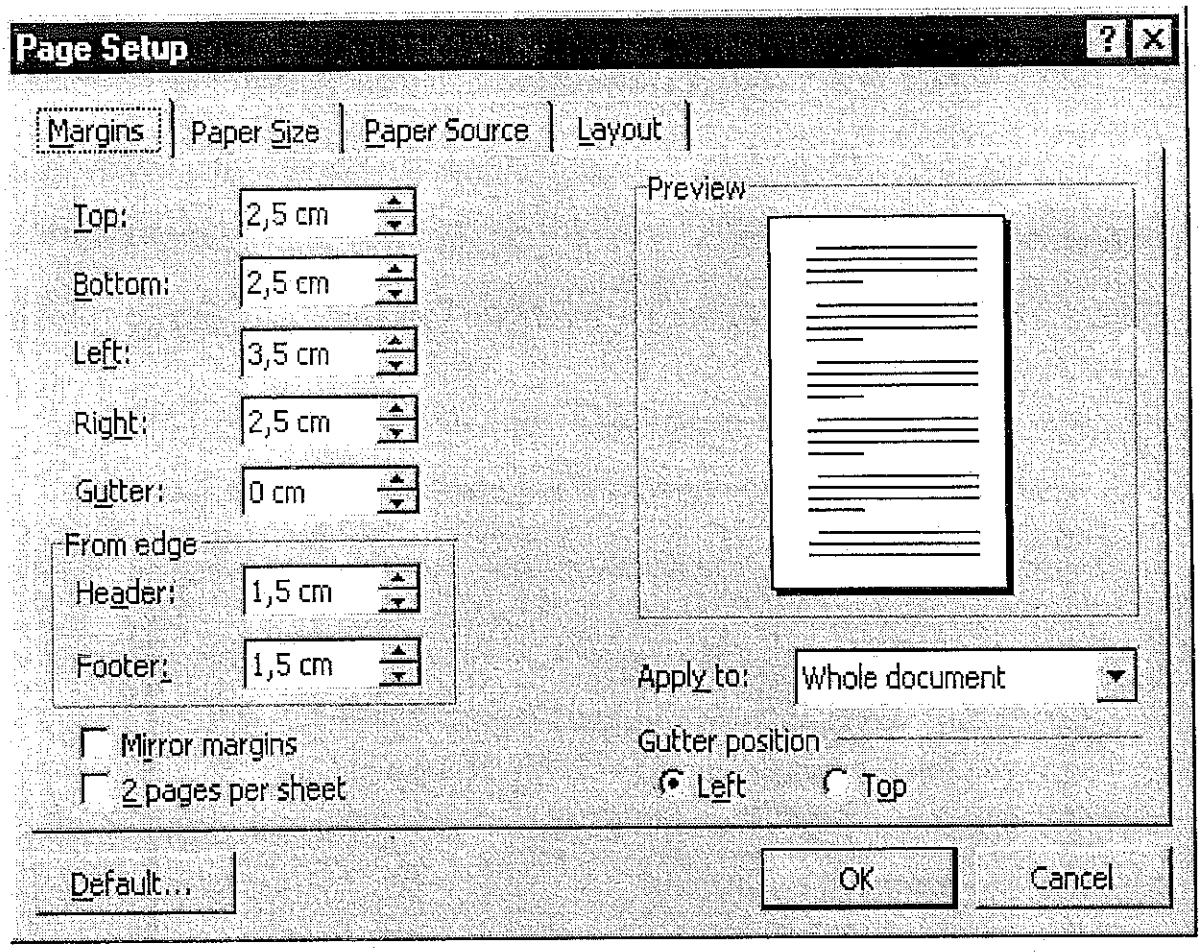

Figure 4.1. Page setup and margins.

Titles and headers should be short and meaningful. The short title is a single, two or three-word derivation of the title of the project. The titles and headers are typed in *Upper case* or *Title case* letters, *centered* on the page. If a title or a header requires more than one line, then use 1.5 spacing between all title or header lines.

4.2 Figures, Graphs and Diagrams

"A picture is worth a thousand words". While figures do not necessarily contain pictures, they do indeed provide quick and professional description of systems, ideas, results, ...etc. A figure can contain diagrams, graphs, drawings, photographs, ...etc.

The figure's number and caption (i.e. description) must be placed **below** the figure with (1.5) space. In each chapter, a figure must be numbered using the chapter's number and the occurrence of the figure within the chapter. For example, in the third chapter, the first figure would be number as (Figure 3.1) and the fourth figure would be number as (Figure 3.4). An example of a figure is shown below in *Figure 4.2*.

If a figure is reproduced (copied!) from any reference, that reference must be indicated at the end of the figure caption in brackets as in *Figure 4.3*.

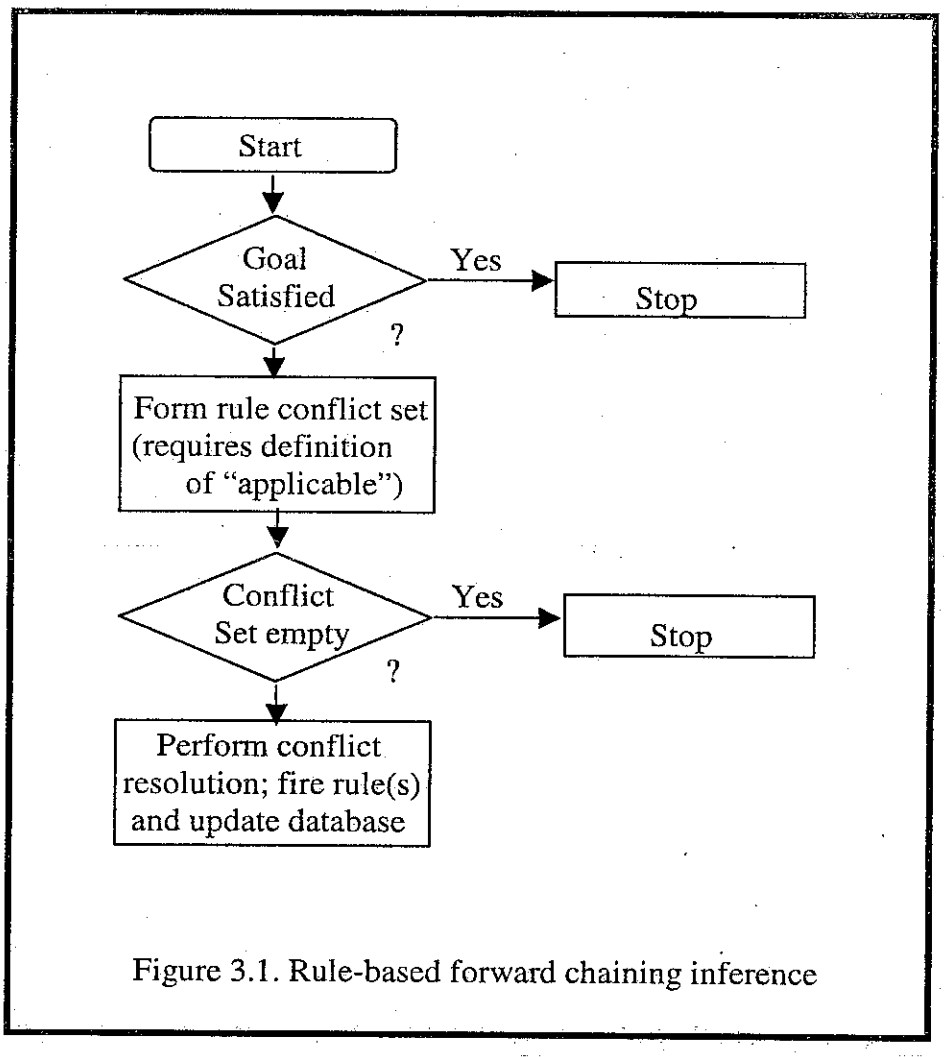

Figure 3.1. Rule-based forward chaining inference

Figure 4.2. Example of Figures - the first figure in the third chapter

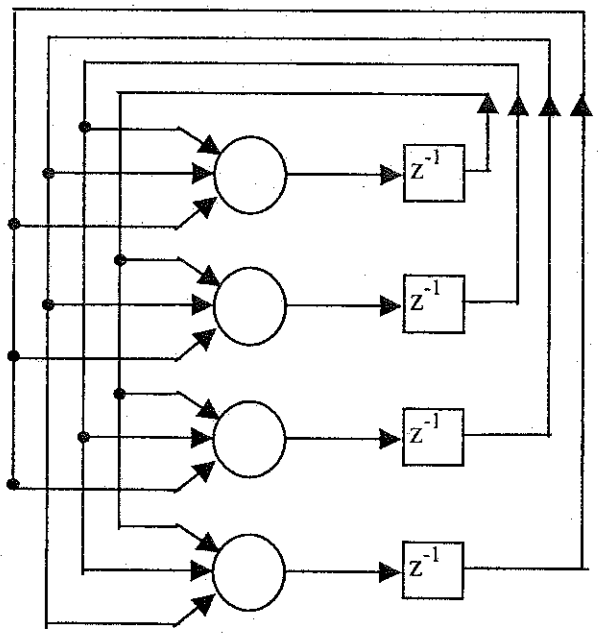

Figure 3.4. Architectural graph of Hopfield network consisting of four neurons [Haykin]

Figure 4.3. Example of Figures with reference- the fourth figure in the third chapter

4.3 Tables

Tables are used to describe parameters, results, comparisons, ...etc. You can quickly create a simple table (using a word processor; e.g. MS Word) by clicking the "Table" menu from the standard toolbar.

- Click "Table" menu on Microsoft Word menu
- Click "Insert Table"
- Select the number of rows and columns, which you want

The table's number and caption (i.e. description) must be placed **above** the table with (1.5) space. In each chapter, a table must be numbered using the chapter's number

and the occurrence of the table within the chapter. For example, in the first chapter, the second table would be number as (Table 1.2) and the sixth table would be number as (Table 1.6). An example of a table (the first table in the third chapter) is shown below in *Figure 4.4.*

If a table is reproduced (copied!) from any reference, that reference must be indicated at the end of the table caption in brackets as in *Figure 4.5.*

Table 3.1 Largest possible sequential knowledge base

Expert systems shell	**Number of rules**	**Execution times in seconds**	**Rules per second**
EXSYS Standard	397	11.3	35.2
Guru	188	5.7	33.0
M.1	264	27.4	9.6
PC Plus	225	45.5	4.9
VP-Expert	17	2.1	7.9
...			

Figure 4.4. Example of Tables - the first table in the third chapter

Table 2.5. AEDS total running time at the various scales.

Ideal Scale (σ_{Ideal})	σ_0	σ_1	σ_2	σ_3	σ_4	σ_5	σ_6
Scale Recognition Time (seconds)	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Edge Detection Time (seconds)	1	2.66	6.03	12.91	26.29	53.92	107.58
Total Time (seconds)	1.63	3.29	6.66	13.54	26.92	54.55	108.21

Figure 4.5. Example of Tables - the fifth table in the second chapter [Khashman]

4.4 Punctuation and Spacing

Punctuation marks provide clearer meaning to the sentences and paragraphs. When using punctuation marks make sure your use spacing adequately as follows:

- One space to appear after all punctuation marks
- Exceptions: No space after internal periods in abbreviation (a.m., i.e., U.S.)
  No space after the colon in ratios (6:1)
  No space before or after Hyphens (trail-by-trail analysis)

4.5 Abbreviations

An abbreviation is a short form of a word that can be obtained by omitting some letters of the *end* of the word. There are also contractions, which are also short forms of words, but obtained by omitting some middle letters of the word.

Example of frequently used common abbreviations are:

- ca. (circa) meaning "at or near a given date".
- cf. (confer, compare, or consult).
- i.e. (id est, "that is").
- et al. (et alii) meaning "and others," to be used for multiple authors, etc.
- e.g. (exampli gratia) meaning "for example".
- n. ("note").
- Passim ("here and there").
- Sic ("thus") italicized in brackets [ ] to indicate error in original quote.
- n.d. ("no date") if no date is given of publication, letter, etc.

PRESENTATION OF A GRADUATION PROJECT

5.1 Overview

All graduating engineering students give oral presentations at the end of their graduation project. The audience usually consists of members of staff (the Jury) and their fellow students.

The graduating student is allowed to schedule his presentation only after his graduation project supervisor has agreed that the graduation project has reached the stage of development where it is ready to be defended.

The duration of the presentation is approximately 20 minutes; during which the student is expected to summarize the research topic and the conclusions that were reached. The student may also provide an account of how the research topic evolved:

- What was the original proposal?
- What difficulties or obstacles were encountered along the way?
- From the student's perspective what are the strengths of the graduation project?
- What are the areas that need more research or investigation?

The members of the graduation project jury are invited to ask questions about the graduation project, the methodology used, the conclusions drawn, ...etc. There is no strict time limitation although it is not expected this may last more than 15 minutes. The graduation project jury will then evaluate the student's presentation.

This chapter is designed to help you give spoken presentations as a student, when you probably have little experience of this activity. It covers your state of mind, visual aids, and preparing and giving the presentation.

5.2 State of Mind

Good English is important when giving a presentation just as it is when writing; but the main problem with speaking is not planning what to say, but managing to say what you have planned once the audience is in front of you. There is nothing wrong with being nervous. Professional performers do not try to eliminate the feeling; it carries out the important function of focusing energy and determination. However, nerves can be a nuisance if they affect your memory or voice or manual dexterity, and that (the nuisance not the nerves) needs to be overcome.

There is only one truly effective way of overcoming the effects of nerves and that is *preparation*. Every good presentation is a well-prepared presentation.

5.3 Visual Aids

The most likely type of visual aid that you will use for your presentation is the Overhead Projector (OHP).

Overhead Projector (OHP)

An overhead projector is a simple machine. One ON/OFF switch controls the light and a cooling fan. Focus is adjusted by moving the reflecting head up or down the supporting column. The image can be moved vertically on the screen by adjusting the angle of the reflector. To change the size of the image or its horizontal position, the whole projector must be moved. An overhead projector can be used in normal lighting.

The transparencies are usually made from clear A4 sheets. They can be produced in a number of ways: by hand using special pens, by photocopying (or thermal copying) from a paper original, or by computer. Whichever method you use, you should make the material (text, figures and tables) large enough to be seen clearly, and not include too much information on each image.

If you are making transparencies by hand you must use OHP pens. Don't use a thin point as the writing will be hard to read. You should use washable (rather than permanent) pens if you want to reuse your slides or correct mistakes easily. Material can be photocopied on to clear sheets ("acetates"); this could be a diagram that you already have on paper (perhaps enlarged on the photocopier). You can create material using large lettering from a word processor or from a computer package for producing visual material. If you photocopy ordinary-sized typing it will not be large enough to be read

clearly. The acetate sheets that go into photocopiers have paper backing-sheets attached. These are removed before the transparencies are shown, and you should do this before your presentation. Tearing the backing-sheet from each acetate during a presentation can become irritating to the audience. Overhead transparencies based on computer lettering usually look far more professional than those that are hand written.

5.4 Preparing

For a student presentation neither reading nor memorising is likely to be appropriate. Reading is not appropriate because your audience will quickly become bored unless you are an expert at reading. It is very important that you look at the audience while you are speaking, and if you are reading from a script you cannot be looking up at the same time. Memorising every word is not appropriate because your delivery will sound unnatural, and you will run the risk of disaster in the event of memory-loss.

Your presentation must be based on notes of what you plan to say. Your notes must be detailed enough to prevent you from leaving out something important, but brief enough to allow you to look at the audience while you are speaking. Your notes must be prepared with great care — they will be your main support during the presentation. You may also want to illustrate your presentation with transparencies for the overhead projector giving subheadings and keywords. Some people combine this overhead projector material with their personal notes. They do not use paper for their personal notes, they prepare overhead projector transparencies with the dual function of reminding them of what they want to say and acting as a visual aid for the audience. This is a method well worth considering for student presentations.

Think carefully about the beginning and end. It is often a good idea to prepare an introductory overhead transparency giving your name and the title of your presentation. Even if someone introduces your presentation and gives your name and subject, it is still worth showing this first overhead. You will say something like "here again is the title of my presentation There is nothing wrong with the repetition; the audience may not have taken it in the first time.

Think about what your audience needs to know. Remember: you know something that they don't — that's why you are giving the presentation. In your introduction, give an outline of the structure of what you are going to say.

Think of a positive way of ending. At the very least say "That concludes my presentation. Thank you." The worst way of ending is a pause during which you realise there is nothing more to say, followed by ". . . well that's it".

5.5 Practising

Try to practise as much as you can. You can practise at home, speaking quietly and looking at your overhead transparencies on a white sheet of paper on a table. Think about how long each overhead should be shown. Time the whole presentation and try to pace yourself.

Try also to practise in the room in which the presentation will be given (or a similar one). Find a position at the front of the room where you are comfortable. Stand on the side of the screen that allows you to point with your best arm, and work out where on the table to leave your overheads or notes. Do this with the overhead projector switched on to make sure that your papers are not blown away by the current of air produced by the fan.

When the big day arrives, get to the room well before the session starts and have one more think about where to put things and where to stand.

5.6 Giving The Presentation

Maintain good eye contact with the audience. Don't spend the whole time looking down at your notes, or backwards at the screen, or down to the top of the overhead projector. It doesn't matter who you look at; look at someone, anyone, and keep looking around the audience; try in effect to look at everyone. Of course you will have to look away to operate visual aids or read notes, but then look back.

You must aim to be heard clearly at the back of the room, but don't shout. Try not to speak in a monotone, but don't give your voice unnatural intonation. Most people speak too quickly when they are nervous. If you try consciously to speak slowly it will give you time to think, and allow you to be heard more clearly. If you need to pause, do so. You can pause for longer than you think without worrying the audience.

Show enthusiasm, try to be yourself, smile when it is natural to do so. A little humour may even be appropriate, but bear two things in mind. Don't try to be artificially formal or informal. The formality or informality of the occasion will look after itself.

When you are talking about an overhead you must be careful not to stand in the way: neither blocking the light shining on the screen, nor preventing one section of the audience from seeing the screen. After you have changed a transparency, it is best to look quickly at the screen yourself to check the focus and position. If you are showing a diagram, you may wish to point at certain features. One way is to point with a pen, or special pointer, on the surface of the transparency itself. The profile of the pen or pointer will then show up on the screen. The alternative is to point with an arm at the screen.

5.7 Timing and Pacing

This is one of the hardest aspects of all. First of all, it is easy to forget to look at your watch when you start. Also it is easy to say more than you planned, and then realise right at the end that you still have a lot to cover. In that situation the best thing is simply to drop some of your material. Do not try to speak very quickly, or keep saying "I'm sorry, I know I'm running out of time, but I really must describe . . .

There are no special techniques for time-keeping. Just prepare carefully, practise, and keep an eye on the time.

5.8 Style

Dress depends on the occasion. You may feel a little uncomfortable if you are dressed very smartly and nobody else is, but you will feel worse if you
are the only person who is not dressed smartly. Feeling smarter than usual will help to put you in the right state of mind.

Don't stand rigidly. Move around and gesture in a natural way. Keep your approach simple and direct. Don't get too concerned about controlling body language or audience psychology. It may be time to work harder at gestures and refinements to technique when you have more experience. As a student, if you have something interesting to say, and you have prepared well, your presentation should be a success.

5.9 Group Presentations

All of the material in this chapter is relevant to group presentations. In addition you must make sure that a group presentation is well coordinated. The introduction should name the members and define what each will cover. There should be a prepared handover between group members: "I will now hand over to Ali who will give more detail on the planning of the tests". Use each other's normal familiar names, do not try to be formal by referring to each other as Mr . . ., Miss . . . etc.

5.10 Answering Questions

Responding to a question that you can answer well will be the most relaxed part of your presentation. This is your reward for "knowing your stuff". If you are asked a question which exposes an area of weakness, don't try to bluff. The best thing is usually to make comments in a related area where you do have some knowledge, but to make it clear that; that is what you are doing.

5.11 Project Presentation Grading

The performance of each student in the Graduation Project is assessed using two main components given by the *supervisor* and by the *presentation jury committee*. The description and the weight of each component are shown in *Table 5.1*.

Table 5.1. Graduation project grading scheme

SUPERVISOR'S PROJECT GRADING	
Title page	2%
Acknowledgements	2%
Abstract	10%
Table of contents	3%
Introduction	10%
Conclusion	10%
References	5%
Chapters/Appendices:	
- Contribution & Originality	15%
- Others	18%
Total	**75 %**
JURY'S PRESENTATION GRADING	
Style/English	5%
Transparencies	5%
Knowledge of subject	10%
Discussion ability	5%
Total	**25 %**

CONCLUSION

This book presents comprehensive instructions and guidelines for writing and presenting an engineering graduation project. The aims of undertaking a graduation project are clarified.

The graduating engineering students are provided with explicit information about the structure and format of the graduation project. In addition, a complete relative guide into writing style and skills is presented within this book to help the students in preparing their project.

The book contains many illustrations and examples to help the students better understand the contents and the instructions. These include detailed information about drawing pictures and tables, in addition to writing abstracts, introduction, contents of table and conclusions.

The presentation of a graduation project can be a challenging experience for a student. This book takes the student through all the necessary steps into delivering a successful presentation. These steps include formulizing ideas, preparing the presentation, group presentation and answering questions.

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