

HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING COURSE

DIPLOMA PROJECT

DESIGN OF THE ELECTRICAL SERVICES
OF A COMMERCIAL CENTRE

E/1158

PART A1

YIANNAKOU ANDREAS

JUNE 1998

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ELECTRICAL ENGINEERING COURSE

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HIGHER TECHNICAL INSTITUTE	PROJECT NO. 2893
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**DESIGN OF THE ELECTRICAL
SERVICES OF A COMMERCIAL CENTRE**

**PROJECT REPORT SUBMITTED
BY
YIANNAKOU ANDREAS**

**TO THE DEPARTMENT OF ELECTRICAL ENGINEERING
OF THE HIGHER TECHNICAL INSTITUTE
NICOSIA - CYPRUS**

**IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE DIPLOMA OF**

**TECHNICIAN - ENGINEER
IN
ELECTRICAL ENGINEERING**

JUNE 1998

**PROJECT SUPERVISOR: Mr. EFSTATHIOS MICHAEL,
LECTURER OF THE ELECTRICAL ENGINEERING DEPARTMENT**



I would like to
thank to my parents
for their love and
support.

DEDICATED TO MY FAMILY

ACKNOWLEDGMENTS

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SUMMARY

I would like to express my sincere appreciation and personal thanks to my project supervisor Mr Efstathios Michael, lecturer in Electrical Engineering department at HTI, for his valuable help and guidance to prepare and present this project.

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S U M M A R Y

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The design of the electrical services of a commercial centre is an electrical task which is performed with care, responsibility, and safety for people, livestock and property.

The design of the electrical services of a commercial centre is carried out for power circuits according to IEE Regulations 16th edition as currently ammended and the EAC conditions of supply. For the telephone installation CYTA Regulations are considered. For the illumination design C.I.B.S. codes and interior lighting design codes are considered. All devices and equipment used for power curcuits are selected to comply with the requirements of IEE Regulations 16th edition.

The whole design is divided into chapters to simplify the study of the project. Each part of the design is explained in detail in each chapter. At the end of the project there are 10 appendices. In each appendix there are tables and manufacturer catalogues used in the whole design of the project.

CHAPTER 1
Introduction
1.1 Scope of the project
1.2 Objectives of the project
1.3 Organization of the project
1.4 Summary of the project

CHAPTER 2
General design
2.1 Design of the power supply
2.2 Design of the distribution system
2.3 Design of the lighting system
2.4 Design of the telephone system
2.5 Design of the fire alarm system
2.6 Design of the security system
2.7 Design of the ventilation system
2.8 Design of the heating system
2.9 Design of the cooling system
2.10 Design of the other services

CHAPTER 3
Detailed design
3.1 Design of the power supply
3.2 Design of the distribution system
3.3 Design of the lighting system
3.4 Design of the telephone system
3.5 Design of the fire alarm system
3.6 Design of the security system
3.7 Design of the ventilation system
3.8 Design of the heating system
3.9 Design of the cooling system
3.10 Design of the other services

CHAPTER 4
Appendices
4.1 Appendix 1
4.2 Appendix 2
4.3 Appendix 3
4.4 Appendix 4
4.5 Appendix 5
4.6 Appendix 6
4.7 Appendix 7
4.8 Appendix 8
4.9 Appendix 9
4.10 Appendix 10

I N T R O D U C T I O N

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This project deals with the analytical design of the electrical services of the commercial centre. The whole project is divided into twelve chapters as shown below:

CHAPTER 1

In this chapter illumination design takes place. Calculations of the number of luminaires are carried out.

CHAPTER 2

It deals with the lighting circuits. Calculations are carried out to determine the protective device rating, cable size, conduits size for the lighting installation.

CHAPTER 3

It deals with the socket outlet circuits. Calculations are carried out to determine the protective device rating, cables size conduits size as used in socket outlet circuits.

CHAPTER 4

It deals with the fixed appliances circuits. Calculations are carried out to determine the type of equipment used, the protective device rating, cables size, conduit size as used in fixed appliances circuits.

CHAPTER 5

It deals with the motor circuits. Calculations are carried out to determine the type of protective device rating, isolator rating, cables size, and starter type.

CHAPTER 6

It deals with the balancing of loads, the size of distribution boards, the size of the interconnecting cables, the protective device rating and the fault level calculations.

CHAPTER 7

In this chapter the type of earthing system and the particular definitions are discussed.

CHAPTER 8

It deals with the power factor correction.

CHAPTER 9

It deals with the stand-by supply. Calculation of the generator set size and cables size are carried out.

CHAPTER 10

It deals with the various checks of the installation in order to ensure that the IEE regulations and the EAC conditions of supply are met.

CHAPTER 11

It deals with the telephone installation of the commercial centre.

CHAPTER 12

It deals with the material and labour costing. The analytical method of costing is used. The estimation of the cost is based on the running cost of the material used and the labour rates used by electricity.