HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING

DEPARTMENT

DIPLOMA PROJECT

DESIGN OF THE ELECTRICAL SERVICES OF A LUXURY HOUSE

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DESIGN OF THE ELECTRICAL SERVICES OF A LUXURY HOUSE

PROJECT REPORT SUBMITTED BY
MARIOS CONSTANTINOU

TO THE DEPARTMENT OF ELECTRICAL ENGINEERING OF THE HIGHER TECHNICAL INSTITUTE

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR AWARD OF THE DIPLOMA OF TECHNICIAN ENGINEER

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SUMMARY

DESIGN OF THE ELECTRICAL SERVICES OF A LUXURY HOUSE

Submitted by: Marios Constantinou

The purpose of this work is the design of the electrical services of a luxury house.

The whole design was carried out in accordance to IEE Wiring Regulations 16th Edition and CYTA's requirements.

This project includes 19 chapters. These chapters cover the Illumination design, Power Circuits (swimming pool, A/C, storage heaters, socket outlets etc.), Lighting, Fire and Intruder alarm systems, Telephone, TV and data distribution, Lightning Protection, Photovoltaics and Materials and Costing.

The project includes typical calculations, analytical tables and detailed architectural drawings.

Also appendices are included at the end to the report giving specifications of the equipment used, the relevant regulations and all the tables used for the calculations.

The whole design must be carried out with care and responsibility since it is directly involved with the safety of people.

INTRODUCTION

This project examines in detail all the electrical services which are included in a modern luxury house.

It consists of 19 chapters which are listed below:

Chapter 1: Illumination Design

This chapter deals with the illumination design of every room in the house using the Lumen method.

Chapter 2: Lighting Circuit Design

This chapter deals with the lighting circuit calculations for the selection of the protective devices, conductors, conduits and other equipment.

Chapter 3: Socket Outlets Design

This chapter deals with the socket outlets circuit calculations for the selection of the protective devices, conductors and conduits.

Chapter 4: Fixed Electrical Appliances

This chapter deals with the selection of the fixed electrical appliances and the calculations for the selection of the protective devices, conductors, conduits and other equipment.

Chapter 5: Air Condition Design

This chapter deals with the selection of the proper A/C unit for each room as well as all the calculations needed for the selection of the protective devices, conductors, conduits and other equipment.

Chapter 6: Storage Heaters and Calculations of the Supply Cables

This chapter deals with the selection of the proper KW rating of each storage heater for each room as well as all the calculations needed for the selection of the protective devices, conductors, conduits and other equipment.

Chapter 7: Swimming Pool Design

This chapter examines the power rating of the swimming pool panel and all the calculations needed for the selection of the protective devices, conductors, conduits and other equipment.

Chapter 8: Automatic Sliding Gate

This chapter deals with the complete design of an automatic sliding gate as well as all the calculations needed for the selection of the protective devices, conductors, conduits and other equipment.

Chapter 9: Supply Cables to the Distribution Boards and Load Balancing

This chapter deals with the power rating of the distribution boards as well as the proper balancing between the loads. The chapter includes all the calculations needed for the selection of the protective devices, conductors, conduits and other equipment.

Chapter 10: Single Line Diagrams

This chapter includes the single line diagrams of every distribution board of the installation, showing clearly the ratings of the protective devices of each circuit, the phase used for each circuit, the RCDs used and the cross sectional area of each conductor.

Chapter 11: Bonding and Earthing Conductors

This chapter refers to the selection of the main equipotential bonding and supplementary bonding conductors of the installation.

Chapter 12: Inspection and Testing

This chapter provides all the necessary steps for the inspection and testing of the electrical installation as stated by the 16th Edition Wiring Regulations.

Chapter 13: Structured Cabling

This chapter deals with the complete design of a data distribution system and telephone system.

Chapter 14: TV and Satellite Antenna

This chapter deals with the design of a TV and Satellite Antenna system.

Chapter 15: Intruder Alarm System

This chapter deals with the design of an intruded alarm system. It explains clearly the equipment used as well as the position of each equipment.

Chapter 16: Fire Alarm System

This chapter deals with the design of a fire alarm system. It explains clearly the equipment used as well as the position of each equipment.

Chapter 17: Lightning Protection System

This chapter deals with the design of a lightning protection system, providing the necessary information for the operation of such a system, the effects of a lightning strike, the estimation of exposure risk, the equipment used etc.

Chapter 18: Photovoltaics

This chapter deals with the design of a grid-connected photovoltaic system. It includes the theory around the operation of the system, the advantages of such a system, the cost estimation of the system, the single line diagrams etc.

Chapter 19: Materials and Costing

This chapter estimates the overall cost of the installation taking into consideration the material and labour cost.

Terms and Conditions

1. Three-phase 415Vrms, 50Hz TT earthing system.
2. External earth fault loop impedance Ze=0.5 Ohms.
3. Power Factor, $\cos\varphi=0.85$.
4. The whole design is based on IEE Wiring Regulations 16th Edition, CIBS code for illumination design, EAC conditions of supply and CYTA requirements.
5. The house will be fed by an underground supply system.
6. Architectural drawings will be provided.