

HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING DEPARTMENT

(academic year : 1989)

ELECTRICAL INSTALLATION SERVICES
OF A MEDICAL CENTER

Project report submitted by KYPRIANOU CONSTANTINOS in part of satisfaction of the award of diploma of Technician engineer in Electrical engineering of the higher technical Institute , Nicosia , Cyprus .

Project supervisor : Mr G. Kourtellis

Type of project : Individual

typed by : Kyprianou Constantinos

HIGHER TECHNICAL INSTITUTE	PROJECT NO 1511
----------------------------------	--------------------

Abstract

Electrical installation projects , in general , are not so easy to carry out . Many real facts of life govern any decision taken for that , so for these projects personal experience is vital . The knowledge of the regulations and conditions to be applied isn't adequate .

In order to understand the needs of a medical canter , the first thing done was to study the drawings of other medical centers . This aimed to see the various circuits applied in medical centers , which are almost identical to usual installations . The only serious difference been the ooperating theaters installations and the need for installation of an uninterruptable power supply system .

The objectives of this project were carried out and completed in such a sequence that an objective couldnt affect the previous ones . Firstly , an illumination design concerning the various big rooms of the project was accomplished . This is the first chapter of the project . The second , and biggest , chapter deals with power circiut design , beginning with final circuit design , going forward with distribution board details and ending with all the results tabulated on the relevant tables . The single line diagrams , whitch complete this chapter , appear at the end of the project .

After that a complete telephone network , which includes all the facilities demanded by a modern medical center . This

network was designed according to CY.T.A. regulations .

Following the telephone network design , a central antenna system was designed in such a way so as to serve the TV room , the waiting area and the nurse station .

Means for communication between the patients and the nurse staff is achieved via the Nurse call system , which follows . This gives some explanations about the facilities provided form this particular NC system , which is locally made .

Finally , the selected patient room system is illustrated in chapter 6 . This system is a must for a medical center nowadays , since technology provives the patient with many types of services which are covered by such systems . Finally the drawings were prepared and the various tables and single line diagrams were completed .

This project includes also some appandixes , which outline the information given by the manufacturers of the equipment used in this project.

CONTENTS

	page
Acknowledgment	i
Abstract	ii
Introduction	1
CHAPTER 1	3
Illumination	3
Illumination calculations	7
Points to mention	11
Tables	13
CHAPTER 2	16
Power circuit design	16
Circuit design	19
Lighting circuits	19
Small power installations	24
Single phase power installations	30
Three phase loads	34
Power distribution - distribution boards	37
Balancing of single phase loads	38
Fault level - energy let through calculations	41
Stand by - UPS	46
Power factor correction	48
Tables	49
CHAPTER 3	55
Telephone network design	55
CHAPTER 4	62
Television antenna distribution	62
CHAPTER 5	66
The nurse call system	66
CHAPTER 6	70
The patient room system	70
Conclusions	82
Appendix 1 - Illumination	84
Appendix 2 - Power circuits	90
Appendix 3 - Telephone network	119
Appendix 4 - Television antenna	125
Appendix 5 - Diversity factors	128
Appendix 6 - Single line diagrams	129
References	146