

**THE THERMAL COMFORT OF STUDENTS IN AIR-CONDITIONED
LECTURE ROOMS**


MOHD REDZUAN BIN ABD RAHMAN

**Final Year Project Report submitted in Partial Fulfillment of the Requirements
for the Degree of Bachelor of Science (Hons.) Physics
in the Faculty of applied Sciences,
Universiti Teknologi MARA**

NOVEMBER 2006

This Final Year Report entitles “**The thermal comfort of students in air-conditioned lecture rooms**” was submitted by Mohd Redzuan bin Abd Rahman, in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Physics in the Faculty of Applied Sciences,

Prof Dr Azni Zain Ahmed
Supervisor
Institute of Research, Development and Commercialisation (IRDC)
Universiti Teknologi MARA



Dr. Mohd Zu Azhan B. Yahya
Head of Programme
B.Sc. (Hons.) Physics
Universiti Teknologi MARA



Assoc. Prof. Dr. Mohamad Kamal B. Harun
Dean
Faculty of Applied Sciences
Universiti Teknologi MARA

Date: 29 JAN 2007

ACKNOWLEDGEMENT

In the name of Allah the Most Beneficent and Most Merciful.

I would like to express my gratitude and appreciation to my project supervisor, Prof. Dr. Azni Zain Ahmed for providing me with valuable guidance, support, commitment, ideas and constructive comment during the course of this project. Her numerous ideas, comment and guidance until the success of this project is highly appreciated.

My deepest appreciation also goes to my beloved parents, and other family members for their moral, spiritual and financial support.

Last but not least, I would like to take this opportunity to express my gratitude to my highly valued best friends and to all who have been supportive and giving me courage, comfort and advice during the course of this project.

ABSTRACT

Thermal comfort is defined as a condition when mind has satisfied with its environment. Nowadays, Malaysia does not have its own range of thermal comfort for the air-conditioned lecture rooms. The range proposed by MS1525:2001 that are currently in use for the air-conditioned lecture rooms is specially proposed for the office and non-residential use. This research measures thermal conditions in air-conditioned lecture rooms, determines the thermal comfort of students in the lecture rooms using the ASHRAE scale and determines the comfort criteria of students (male and females) in air-conditioned lecture rooms. This project involves the measurement of room temperature, relative air humidity and air velocity. A questionnaire was distributed amongst students to determine the students' thermal comfort using the ASHRAE scale. The students' ages, activities and clothings were recorded. Comfort charts was plotted to determine the students' thermal comfort and finally the comfort criteria was produced. The met and clo values of the occupants was determined. A comparison analysis with established comfort criteria was done. This study have suggested the range of comfort condition is 24.9°C - 30.5 °C of temperature and 47.0 % - 48.0 % of relative humidity. For future studies, it is recommended that bigger sample is taken to get more accurate result. The number of male and female sample has to be equal to investigate whether gender has any influence on the comfort conditions.

TABLE OF CONTENTS

| | Page |
|--|-------------|
| ACKNOWLEDGEMENTS | i |
| TABLE OF CONTENTS | ii |
| LIST OF FIGURES | v |
| LIST OF TABLES | vi |
| ABSTRACT | vii |
| ABSTRAK | viii |
| | |
| 1 INTRODUCTION | 1 |
| 1.1 Problem statement | 2 |
| 1.2 Definition of thermal comfort | 3 |
| 1.3 Objective | 4 |
| 1.4 Scope of work | 5 |
| | |
| 2 LITERATURE REVIEW | |
| 2.1 Introduction | 6 |
| 2.2 Malaysian climate | 6 |
| 2.3 Factors that affecting thermal comfort | 7 |
| 2.3.1 Air temperature | 10 |
| 2.3.2 Clo Value | 12 |
| 2.3.3 Met value | 13 |
| 2.3.4 Relative Humidity | 14 |
| 2.3.5 Wind | 15 |