**CONTENTS**

**TITLE PAGE NO**

CERTIFICATE ii

DECLARATION iii

ACKNOWLEDGEMENT iv

ABSTRACT v

LIST OF FIGURES ix

LIST OF TABLES x

**TITLE**

**1. INTRODUCTION 1**

1.1 OVERVIEW 1

1.2 AIM OF THE PROJECT 1

1.3 METHODOLOGY 1

1.4 SIGNIFICANCE OF THE WORK 2

1.5 ORGANISATION OF THESIS 3

**2. LITERATURE REVIEW AND THEORY 4**

2.1 ORDINARY INTERCOM 4

2.2 LITERATURE SURVEY 4

**3. INTRODUCTION TO EMBEDDED SYSTEMS 6**

3.1 INTRODUCTION 6

3.2 APPLICATIONS OF EMBEDDED SYSTEMS 7

3.3 TECHNICAL SPECIFICATIONS OF PROJECT 7

**4. HARDWARE DESCRIPTION 8**

4.1 BLOCK DIAGRAM 8

4.2 ARDUINO UNO 8

4.3 FEATURES OF ATMEGA328 9

4.4 PIN DESCRIPTIONS 11

4.5 ARDUINO ARCHITECTURE 12

4.5.1 ALU 15

4.5.2 STATUS REGISTER 15

4.5.3 GENERAL PURPOSE REGISTER FILE 15

4.5.4 STACK POINTER 16

4.5.5 AVR MEMORIES 17

4.5.6 POWER MANAGEMENT AND SLEEP MODES 19

4.6 POWER SUPPLY 22

4.7 MATRIX MEMBRANE KEYPAD 23

4.8 LCD 24

4.9 BUZZER 28

4.10 BC547 TRANSISTOR 29

4.11 BREADBOARD 31

**5. SOFTWARE DESCRIPTION 33**

5.1 ARDUINO SOFTWARE 33

5.1.1 PROGRAMMING 33

5.1.2 HOW TO USE ARDUINO 34

5.2 CODE 34

**6. WORKING 39**

**7. RESULT 41**

**8. MERITS AND DEMERITS 43**

**9. APPLICATIONS 44**

**10. CONCLUSION 45**

**11. FUTURE WORK 46**

**REFERENCES 47**

**LIST OF FIGURES**

**FIGURE NO TITLE PAGE NO**

Figure 3.1 Block diagram of Embedded System 7

Figure 4.1 Block diagram of digital code lock 8

Figure 4.2 Atmega 328 10

Figure 4.2 Pin diagram of ATMEGA328 11

Figure 4.3 Atmega328 architecture 13

Figure 4.4 Keypad 23

Figure 4.5 Lcd pin diagram 26

Figure 4.6 Buzzer 28

Figure 4.7 NPN BC547 transistor 30

Figure 4.8 Npn transistor symbol 31

Figure 4.9 Breadboard 31

Figure 6.1 Enter passkey 41

Figure 6.2 Passkey accepted 41

Figure 6.3 Enter new passkey 42

Figure 6.4 Access denied 42

Figure 9.1 Different applications 44

**LIST OF TABLES**

**TABLES NO TITLE PAGE NO** Table 4.1 Character LCD Pin out 26