ACKNOWLEDGMENT

First and foremost, I would like to thank my parents for what I am and where I am today,

without whose hard work and sacrifice, I would not be here today.

I owe my wholehearted gratitude and appreciation to my external guide Mr. Manoj Kumar

Acharya, the staff of the Vitvara Technologies for his cooperation and assistance during my

internship.

I deem it a privilege and honor to place on record the deep sense of gratitude to my internal

guide Mr. Ajay Prinston Pinto, Assistant Professor, Dept. of ECE, who always stood behind

me and supported in every step of the work.

I am grateful to Dr. Vinayambika S Bhat, Head of the Department, Electronics and

Communication Engineering for her support and encouragement.

I am indebted to our respected Principal Dr. G. L. Easwara Prasad for his support throughout

the year.

I am thankful to our beloved Chairman Mr. Rajesh Chowta and the management of Mangalore

Institute of Technology and Engineering, Moodabidri for having provided all the facilities that

helped me in the timely completion of this report.

I hope that I build upon the experience and knowledge that I gained and make a valuable

contribution to the industry in the coming future.

Finally, I would like to thank all the teaching and non-teaching staff of the Department of

Electronics and Communication Engineering for their valuable help and support.

SHILPA.J

4MT16EC081

i

TABLE OF CONTENTS

Chapter		Title	Page No
		ACKNOWLEDGEMENT	I
		TABLE OF CONTENTS	Ii
	34	LIST OF FIGURES	Iii
	2	LIST OF TABLES	Iv
		ABBREVIATIONS	V
Chapter	1	COMPANY PROFILE	1-2
	1.1	About the Company	1
		1.1.1 Products and Services	1
	1.2	About the Trainer	2
Chapter	2	TASK PERFORMED	3-30
	2.1	Week 1: Getting started with Arduino	3
		2.1.1 Introduction to Arduino IDE	4
		2.1.2 Libraries	9
		2.1.3 Making pins input or output	10
		2.1.4 To select the board	10
		2.1.5 Bootloader	12
		2.1.6 Introduction to Arduino uno	12
	2.2	Week 2: Introduction to Embedded Systems	13
		2.2.1 Introduction to various type of Microcontrollers	15
		2.2.2 Execution of Mini projects Assigned	17
	2.3	Week 3: Introduction to IoT Applications	23
		2.3.1 API and Database in IoT	24
	2.4	Week 4: Working on the Assigned Project	27
		2.4.1 RFID card reader	28

		REFERENCES	41
Chapter	3	CONCLUSION	40
		2.4.3 ESP32 NodeMCU	30
		2.4.2 RFID card	29

LIST OF FIGURES

Figure	No	Description	Page No.
Figure	2.1	Introduction to Arduino IDE	5
Figure	2.2	Content of File	5
Figure	2.3	The preference section	6
Figure	2.4	The Hex file generated window	6
Figure	2.5	The Menu tab	7
Figure	2.6	The Serial Monitor Output	8
Figure	2.7	The Text Editor	8
Figure	2.8	The Output window	9
Figure	2.9	The list of libraries	9
Figure	2.10	The board menu	10
Figure	2.11	The COM4	11
Figure	2.12	The tool bar	12
Figure	2.13	Arduino UNO	13
Figure	2.14	Block diagram of Embedded System	14
Figure	2.15	IoT Applications	23
Figure	2.16	NodeMCU	25
Figure	2.17	Preferences	26
Figure	2.18	Adding ESP8266 Board Manager	26
Figure	2.19	ESP8266 Board Package	27
Figure	2.20	RDM6300 RFID Card Reader	28
Figure	2.21	RFID cards	29
Figure	2.22	Inner look of RFID card	30

Figure	2.23	Tag antenna with single and multiple turns	31
Figure	2.24	ESP32 NodeMCU	32
Figure	2.25	Pins on the NodeMCU ESP32 development board.	33
Figure	2.26	Block diagram of IoT based RFID attendance system	34
Figure	2.27	Screenshot of database	35

LIST OF TABLES

Table	No.	Description	Page No.
Table	1.1	Products and Services offered 2	2
Table	2.1	Comparison of Various Microcontrollers	15

ABBREVIATIONS

Abbreviation Description

IOT Internet of Things

ASIC Application Specific Integrated Circuit

ISO International Standards Organization

QCI Quality Council of India

ATL Atal Tinkering Labs

PC Personal Computer

MAC Media Access Control

IDE Integrated Development Environment

USB Universal Serial Bus

EEPROM Electrically Erasable Programmable Read Only Memory

TX & RX LED Transmitter and Receiver Light Emitting Diode

RAM Random Access Memory

ROM Read Only Memory

CD Compact Disk

INTEL Integrated Electronics

AMD Advanced Micro Devices

CPU Central Processing Unit

ATMS Automated Tiller Machines

TV Television

DVD Digital Versatile Disc

PDA's Personal Digital Assistants

PLC's Programmable Logic Controllers

IC Integrated Circuit

OS Operating System

MCU Micro Controller Unit

SDK Software Development Kit

SPIFFS Serial Peripheral Interface Flash File System

Wi-Fi Wireless Fidelity

ESP Extra Sensory Perception

DIP Dual In Package

WAN Wide Area Network

API Application Programming Interface

RFID Radio Frequency Identification