FINAL YEAR PROJECT REPORT

Designing and implementation of versatile all-terrain robot (Hexterbot)

BACHELOR OF SCIENCE

IN

AEROSPACE AND AVIONICS

Submitted by:

Hafiz Ajlal Saleem 13005066012

Advisor:

Miss Zunaira Nazir

UNIVERSITY OF MANAGEMENT AND TECHNOLOGY
SCHOOL OF SYSTEMS AND TECHNOLOGY

Designing and implementation of Versatile All-Terrain Robot

An Undergraduate Final Year Project report submitted to the

Department of Informatics and Systems

Bachelor of Science in

Aerospace and Avionics

By

Hafiz Ajlal Saleem **13005066012**

Supervised by:

Zunaira Nazir

Advisor Signature:_____

FYP committee

Usman Inayat _____

Fahad Ali _____

Syed Mohsin Ali _____

Chairperson: _____

Department of Informatics and Systems

Schools of Systems and Technology

University of Management and Technology, Lahore

2017

DEDICATION OF ORIGINALITY

This is to certify that this project **“Designing and implementation of Versatile All-Terrain Robot (Hexterbot)”**along with the project report (document) is created and compiled originally by the effort and research carried out by submitter. Itis submitted to University of Management and Technology, Lahore, in partial fulfillment of the requirement for the award of the degree of **BS Aerospace and Avionics**, which is a genuine effort carried out by me under the guidance of **Miss Zunaira Nazir**. I hereby proclaim that the work done and the scholarly substance in this report are my very own real diligent work. This undertaking and report has never been submitted or distributed to any of the foundation, neither to this institute or any other. It is carried out and accomplished under the observation and guidance of our valued supervisors and teaching members in our department.

Hafiz AjlalSaleem13005066012 _____

Abstract

This document (report) is written to have a detailed introduction, briefing and analysis of all the work being done in order to accomplish the final year project. It explains everything including the project (Hexterbot), the experience and effort being made, observations and all the data being gathered while making. The components used, modules, structure, parts, assembling, source code which is related to the internal, software of the project, will be discussed along with the future aspects as well. The idea, implementation and the working will be explained in detail in this report. It was a really good experience and above all, the interaction with different kind of people and engineers of their field was a step forward and provided me with immense motivation. It wasn't a mere learning experience but a gateway to my working abilities and agitation to be a part of enhanced, equipped and fully technical world.

Acknowledgement

I am really keen to mention everybody who served as an immense motivation in doing this project. The fun, learning and specially the experience was highly appreciable and necessary at the same time. I got to know much more and visited placed which I don't think I ever had visited and knew personally. There is a great and vast deal of science and engineering which I came to know after when I entered and attempted to start building it. Some of the experience includes steel and engineering works, different types of welding, iron sheets (JastiChadar) cutting, drilling and also searching for suitable components, their working, these were the best ever experience of my life. I'm really grateful to my teacher (advisor) for motivating me that much. I'll like to appreciate and mention here my friends, who helped me suggesting and solving different problems. It was really great to get the highly valuable suggestions.

Table of Contents

List of Figures

List of Tables

List of Flow Chart

Acronyms

PWM	Pulse Width Modulation
ISM	Industrial Scientific and Medical Band
IC	Integrated Circuit
GND	Ground
En	Enable
UNO	‘One’ in Italy
Li-Po	Lithium Polymer
RPM	Revolution per Minute
DC	Direct Current
ESC	Electronic Signal Controller
RC	Remote Control
ATV	All-Terrain Vehicle
V	Voltage
mAh	milli Ampere hour
K	Kilo
I/O	Input/output
NiMH	Nickel-Metal Hydride
NiCd	Nickel Cadmium
C	Centigrade
C	Capacity
DMM	Digital Multi-Meter

Chapter 1

INTRODUCTION

1.1 Introduction to ‘HEXTERBOT’

The name I have chosen for my project almost sums it all what it is capable to do. I have very carefully suggested the name of it as it has to define the nature and functionality as well. The name ‘HEXTERBOT’ actually consists of combination of three words. ‘HEX’, from the Greek origin, defines six, as the robot is containing six C-shaped legs, three on one side and three on the other. ‘TER’ defines the term terrain, as it can follow multiple terrains or surfaces. ‘BOT’ indicates the term robot. So, together it makes the title ‘Hexterbot’. A robot, machine or a model vehicle which will be able to walk and withstand on different kinds of terrains including even surface, uneven, rough, rocky, grassy and can maneuver on mud too. It can walk up inclines, can also get past the rail track as well.