

Table of contents

Content	Page
الأية	i
Dedication	ii
Acknowledgment	iii
Abstract	iv
المستخلص	v
Table of Contents	vi
List of Figures	ix
Abbreviations	xi
Chapter One: Introduction	
1.1 General Concept	1
1.2 Problem Statement	1
1.3 Objectives	1
1.4 Methodology	2
1.5 Thesis Layout	2
Chapter Two: Literature Review	
2.1 Introduction	3

2.2 Previous Works	3
2.3 Renewable Energy	7
2.4 Wind Energy	7
2.4.1 Wind Electric Conversion System	9
2.4.2 Induction Machine	9
2.5 Wind Turbine	11
2.6 Types of Wind Turbines	12
2.7 Wind Resource In Sudan	14
2.8 Automatic Irrigation System	14
2.8.1 Sensor	16
2.8.2 Pumps	16
2.8.3 Valves	17
Chapter Three : System Design	
3.1 Introduction	18
3.2 Microcontroller	19
3.3 Sensors	20
3.3.1 Moisture Sensor	20
3.3.2 Temperature Sensor	21
3.3.3 Level Sensor	22

3.3.4 Wind Speed Sensor	23
3.4 Liquid crystal display	24
3.5 Water Pump	25
3.6 Induction Motor	25
3.7 Water Valve	27
3.8 Relays	27
3.9 Bridge Rectifier	28
3.10 ULN 2803 Driver	28
Chapter Four : Simulation and Results	
4.1 Introduction	30
4.2 Methodology	30
4.3 Simulation	32
Chapter Five : Conclusion and Recommendations	
5.1 Conclusion	37
5.2 Recommendations	37
References	38
Appendix	41