

PYTHON IN PHYSICS

Submitted by

NAME: AKSHAY GOPAN M

REG. NO: CCAUSPH050

In partial fulfillment of Requirements for the Degree

Bachelor of science in physics

Supervised by

Asst. Prof. Anjaly Joby



Department of Physics

Christ College (Autonomous) Irinjalakuda

University of Calicut

April 2023

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

DEPARTMENT OF PHYSICS

2022-2023

BONA-FIDE CERTIFICATE

This is to certify that the dissertation entitled, "PYTHON IN PHYSICS" is a bona-fide record of research work carried out by **AKSHAY GOPAN M**, Reg.No **CCAUSPH050** during the sixth semester of BSc.Physics of the academic year 2022-2023

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10/04/23
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DECLARATION

I, AKSHAY GOPAN M, declare that the work presented in this project report is based on the original work done by me under the guidance Mrs. Anjaly Joby, Assistant professor of Department of Physics (Self), Christ College, Irinjalakuda.

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April 2023

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ACKNOWLEDGEMENT

I owe my deepest gratitude to my guide Mrs. Anjali Joby, Assistant professor of Physics (Self), Christ College , Irinjalakuda , for her valuable guidance , encouragement and support throughout the project.

I would like to thank Prof V P Anto, Coordinator of Department of Physics (Self) and my class teacher Mrs. Simmy Nixon for suggestions and guidance.

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I am indebted to the faculty members in the Department of Physics for their help and corporation.

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I would like to express my special gratitude to Mr. Baiju, faculty at SMEClabs, kaloor , for the inspiration.

Akshay Gopan M

CONTENTS

*Preface

1.Introduction

1.1 Why Python?

1.2 Introduction to Pycharm

1.3 Analytical methods v/s Simulation

2.Methodology

2.1 Quantum Tunneling

2.2 Code

2.3 Output

3.Conclusion

4.Reference

**“Automated Irrigation System Based on Soil
Moisture using Arduino”**

Project Report submitted to

CHRIST COLLEGE (AUTONOMOUS)

In partial fulfilment of the requirement for the award of the degree of

BACHELOR OF PHYSICS

Submitted by

AMAL P SAJEEV

(CCAUSPH051)

Under the supervision of

Aswathi K Sivarajan



DEPARTMENT OF PHYSICS

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

UNIVERSITY OF CALICUT

MARCH 2023

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

CALICUT UNIVERSITY



DEPARTMENT OF PHYSICS CERTIFICATE

This is to certify that the project report entitled “**Automated Irrigation System Based on Soil Moisture using Arduino**” is a bonafide record of project done by **AMAL P SAJEEV**, Reg. No. CCAUSPH051, under my guidance and supervision in partial fulfilment of the requirement for the award of the degree of BACHELOR OF PHYSICS and it has not previously formed the basis for any Degree, Diploma and Associateship or Fellowship.

Prof. V.P Anto

Co-ordinator

Ms Aswathi K Sivarajan

Project Guide

DECLARATION

I, **AMAL P SAJEEV**, hereby declare that the project work entitled “**Automated Irrigation System Based on Soil Moisture using Arduino**” is a record of independent and bonafide project work carried out by me under the supervision and guidance of Ms. Aswathi K Sivarajan Asst. Professor, Department of Physics, Christ College (Autonomous), Irinjalakuda.

The information and data given in the report is authentic to the best of my knowledge. The report has not been previously submitted for the award of any Degree, Diploma, Associateship or other similar title of any other university or institute.

Place: Irinjalakuda

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Date:

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ACKNOWLEDGEMENT

I would like to take the opportunity to express my preferred thanks and gratitude to all people who have helped me with sound advice and able guidance.

Above all, I express my eternal gratitude to the Lord Almighty under whose divine guidance; I have been able to complete this work successfully.

I would like to express my sincere obligation to Rev. Dr. Jolly Andrews CMI our principal, for providing various facilities.

I am thankful to Prof. V.P Anto, Co-ordinator of the Department, for providing proper help and encouragement in the preparation of this report.

I express my sincere gratitude to Ms Aswathi K Sivarajan, Asst. Professor-On contract, whose guidance and support throughout the period helped me to complete this work successfully.

I would like to express my preferred gratitude to all the faculties of the department for their interest and cooperation in this regard.

I extend my hearty gratitude to the librarian and other library staffs of my college for their wholehearted cooperation.

I express my sincere thanks to my friends and family for their support in completing this report successfully.

Place: Irinjalakuda

AMAL P SAJEEV

Date:

Automated
Irrigation System
Based on Soil Moisture
using
Arduino

INDEX

Chapter 1: AUTOMATED IRRIGATION SYSTEM USING SOIL SENSOR

INTRODUCTION

ABSTRACT

WHAT IS ARDUINO?

COMPONENTS OF ARDUINO

WHY ARDUINO?

ARDUINO SOFTWARE IDE

Chapter 2: SOIL MOISTURE SENSOR -WORKING AND PRINCIPLE

SOIL MOISTURE SENSOR

WORKING PRINCIPLE

FLOW CHART

COMPONENTS REQUIRED

Chapter 3: CODING WITH ARDUINO – WORKING & TESTING

PROGRAMMING

CIRCUIT DIAGRAM

WORKING

Chapter 4: INFERENCE

TESTING

CONCLUSION

CHAPTER 5: MERITS & DEMERITS

MERITS

DEMERITS

Chapter 6: Application

APPLICATION

BIBLIOGRAPHY

DEPENDENCE OF TEMPERATURE ON V-I CHARACTERISTICS OF DIFFERENT DIODES

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Bachelor of Science in Physics

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This is to certify that the work presented in this project report is a bonafide work done by **ARANDA NOMA ROCHA** Reg.no **CCAUSPH052** under my guidance in the Dept. of Physics, Christ College, Irinjalakuda.

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I, ARANDA NOMA ROCHA , declare that the work presented in this project report is based on the original work done by me under the guidance of Miss Simmy Jose, Lecturer Department of physics, Christ College, Irinjalakuda.

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ACKNOWLEDGEMENT

I, owe my deepest gratitude to my guide Miss. Simmy Jose, Assistant Professor (ad hoc), Department of Physics (Unaided), Christ College, Irinjalakuda, for her valuable guidance, encouragement, and support throughout the project.

I would like to thank Prof V.P. Anto, Head of Department of Physics(Unaided), for suggestions and guidance.

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I offer my regards and blessing to all those who supported me in any respect during the project work.

Last but not the least, I thank GOD Almighty for all the blessings showering upon me.

ARANDA NOMA ROCHA

ABSTRACT

The temperature dependence of voltage-current (V-I) characteristics is an important aspect of semiconductor devices, including Light Emitting Diodes (LEDs) and Zener diodes. In this project, we investigate the effect of temperature on the V-I characteristics of these devices.

We begin by studying the basic principles of semiconductor diode and the operation of LEDs and Zener diodes. We then design and conduct experiments to measure the V-I characteristics of these devices at various temperatures, ranging from room temperature to elevated temperatures.

Our experimental results reveal that temperature has a significant impact on the V-I characteristics of these devices. Specifically, we observe changes in the forward and reverse bias voltages, as well as in the current levels. These changes are attributed to the temperature-dependent properties of semiconductors, such as carrier mobility and bandgap energy.

Furthermore, we analyse the data and develop mathematical models to describe the temperature dependence of the V-I characteristics. Our findings provide valuable insights into the performance and reliability of these devices in different temperature environments, which can have important implications for practical applications.

Overall, this project contributes to a deeper understanding of the temperature dependence of V-I characteristics in semiconductor devices, particularly LEDs and Zener diodes, and provides useful information for device design and optimization in various temperature-dependent applications.

INDEX

1. DIODES		
1.1	Introduction	1
1.2	Different types of diodes	2
1.21	Rectifier diode	2
1.22	Zener diode	3
1.23	Schottky diode	3
1.24	Varactor diode	4
1.25	Light emitting diode	4
1.26	Some other diodes	5
1.3	Advantages of diodes	5
1.4	Disadvantages of diodes	7
1.5	Applications of diodes	8
2. WORKING PRINCIPLE OF DIODE		
2.1	Diode P-N junction	10

2.2	Operating principle	11
2.3	Principle of Zener diode	13
2.4	Principle of LED diode	14
2.5	Python code	15
3. CHARACTERISTICS OF DIODES		
3.1	V-I characteristic of semiconductor diode	16
3.2	V-I characteristic of Zener diode	17
3.3	V-I characteristic of LED	17
4. EXPERIMENTAL STUDY		
4.1	Room temperature	19
4.2	Low temperature	20
4.3	High temperature	21
4.4	Graphs	22
5. INFERENCE		
5.1	Knee voltage/ Zener voltage	28
5.2	Temperature dependence	29

**SPECTROMETER: REFRACTIVE INDEX OF DIFFERENT
LIQUIDS USING HOLLOW PRISM**

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BONA-FIDE CERTIFICATE

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JISS SABU VARGHESE

INDEX

1.	<u>Introduction</u>	
1.1	Refractive index	
1.1.1	Mathematical Relation	
1.1.2	Relative Refractive index	
1.1.3	Applications of refractive index	
1.2	Prism	
1.2.1	Applications of prism	
1.2.2	Types of prism	
1.2.3	Liquid prism	
1.3	Spectrometer	
1.3.1	Types of spectrometers	
1.3.2	Applications of spectrometer	

2.	<u>Theory</u>	
2.1	Refractive index of material using Snell's law	
2.2	Concentration of a solution	

3.	<u>Experimental setup</u>	
3.1	Apparatus	
3.2	Procedure	
3.3	Observations	
3.3.1	Refractive index of water	
3.3.2	Refractive index of salt solution	
3.3.3	Refractive index of sugar solution	
3.3.4	Refractive index of turmeric solution	
3.3.5	Refractive index of coconut oil (KPL brand)	
3.3.6	Refractive index of copper sulphate solution	

4.

Inferences

5.

Application

5.1

Spectroscopy

5.2

Laser beam steering

5.3

Optical communication

5.4

Polarization control

5.5

Optical sensing

5.6

Adaptive optics

5.7

Optical tweezers

Bibliography

SPECTROMETER: REFRACTIVE INDEX OF DIFFERENT LIQUIDS USING HOLLOW PRISM

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ACKNOWLEDGEMENT

I owe my deepest gratitude to my guide Mr. Jose Sunny, Assistant Professor of Physics (Unaided), Christ College, Irinjalakuda, for his valuable guidance, encouragement and support throughout the project.

I would like to thank Prof V. P. Anto, Coordinator of Department of Physics (Unaided) and my class teacher Mrs. Simmy Nixon for suggestions and guidance.

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JOE PAYYAPPILLY

INDEX

1.	<u>Introduction</u>	
1.1	Refractive index	
1.1.1	Mathematical Relation	
1.1.2	Relative Refractive index	
1.1.3	Applications of refractive index	
1.2	Prism	
1.2.1	Applications of prism	
1.2.2	Types of prism	
1.2.3	Liquid prism	
1.3	Spectrometer	
1.3.1	Types of spectrometers	
1.3.2	Applications of spectrometer	

2.	<u>Theory</u>	
2.1	Refractive index of material using Snell's law	
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3.	<u>Experimental setup</u>	
3.1	Apparatus	
3.2	Procedure	
3.3	Observations	
3.3.1	Refractive index of water	
3.3.2	Refractive index of salt solution	
3.3.3	Refractive index of sugar solution	
3.3.4	Refractive index of turmeric solution	
3.3.5	Refractive index of coconut oil (KPL brand)	
3.3.6	Refractive index of copper sulphate solution	

4.	<u>Inferences</u>	
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5.	<u>Application</u>	
5.1	Spectroscopy	
5.2	Laser beam steering	
5.3	Optical communication	
5.4	Polarization control	
5.5	Optical sensing	
5.6	Adaptive optics	
5.7	Optical tweezers	
	<u>Bibliography</u>	

PYTHON IN PHYSICS

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I, KAVYA C VARMA, declare that the work presented in this project report is based on the original work done by me under the guidance Mrs. Anjaly Joby, Assistant professor of Department of Physics (Self), Christ College, Irinjalakuda.

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April 2023

KAVYA C VARMA

ACKNOWLEDGEMENT

I owe my deepest gratitude to my guide Mrs. Anjali Joby, Assistant professor of Physics (Self), Christ College , Irinjalakuda , for her valuable guidance , encouragement and support throughout the project.

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KAVYA C VARMA

CONTENTS

*Preface

1.Introduction

1.1 Why Python

1.2 Introduction to Pycharm

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**SPECTROMETER: REFRACTIVE INDEX OF DIFFERENT
LIQUIDS USING HOLLOW PRISM**

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ACKNOWLEDGEMENT

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PYTHON IN PHYSICS

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CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

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Aiswarya Dinesan

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DEPENDENCE OF TEMPERATURE ON V-I CHARACTERISTICS OF DIFFERENT DIODES

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CERTIFICATE

This is to certify that the work presented in this project report is a bonafide work done by **AKSHAY S** Reg.no **CCAUSPH059** under my guidance in the Dept. of Physics, Christ College, Irinjalakuda.

Irinjalakuda

April 2023

Examiner:

DECLARATION

I, AKSHAY S, declare that the work presented in this project report is based on the original work done by me under the guidance of Miss Simmy Jose, Lecturer Department of physics, Christ College, Irinjalakuda.

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AKSHAY S

April 2023

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AKSHAY S

ABSTRACT

The temperature dependence of voltage-current (V-I) characteristics is an important aspect of semiconductor devices, including Light Emitting Diodes (LEDs) and Zener diodes. In this project, we investigate the effect of temperature on the V-I characteristics of these devices.

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INDEX

1. DIODES		
1.1	Introduction	1
1.2	Different types of diodes	2
1.21	Rectifier diode	2
1.22	Zener diode	3
1.23	Schottky diode	3
1.24	Varactor diode	4
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2.4	Principle of LED diode	14
2.5	Python code	15
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3.1	V-I characteristic of semiconductor diode	16
3.2	V-I characteristic of Zener diode	17
3.3	V-I characteristic of LED	17
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4.1	Room temperature	19
4.2	Low temperature	20
4.3	High temperature	21
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5.2	Temperature dependence	29

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In partial fulfilment of the requirement for the award of the degree of

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Prof. V.P Anto

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Ms Aswathi K Sivarajan

Project Guide

DECLARATION

I, **AKSHAYA THOMAS**, hereby declare that the project work entitled “**Automated Irrigation System Based on Soil Moisture using Arduino**” is a record of independent and bonafide project work carried out by me under the supervision and guidance of Ms. Aswathi K Sivarajan Asst. Professor, Department of Physics, Christ College (Autonomous), Irinjalakuda.

The information and data given in the report is authentic to the best of my knowledge. The report has not been previously submitted for the award of any Degree, Diploma, Associateship or other similar title of any other university or institute.

Place: Irinjalakuda

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CCAUSPH060

ACKNOWLEDGEMENT

I would like to take the opportunity to express my preferred thanks and gratitude to all people who have helped me with sound advice and able guidance.

Above all, I express my eternal gratitude to the Lord Almighty under whose divine guidance; I have been able to complete this work successfully.

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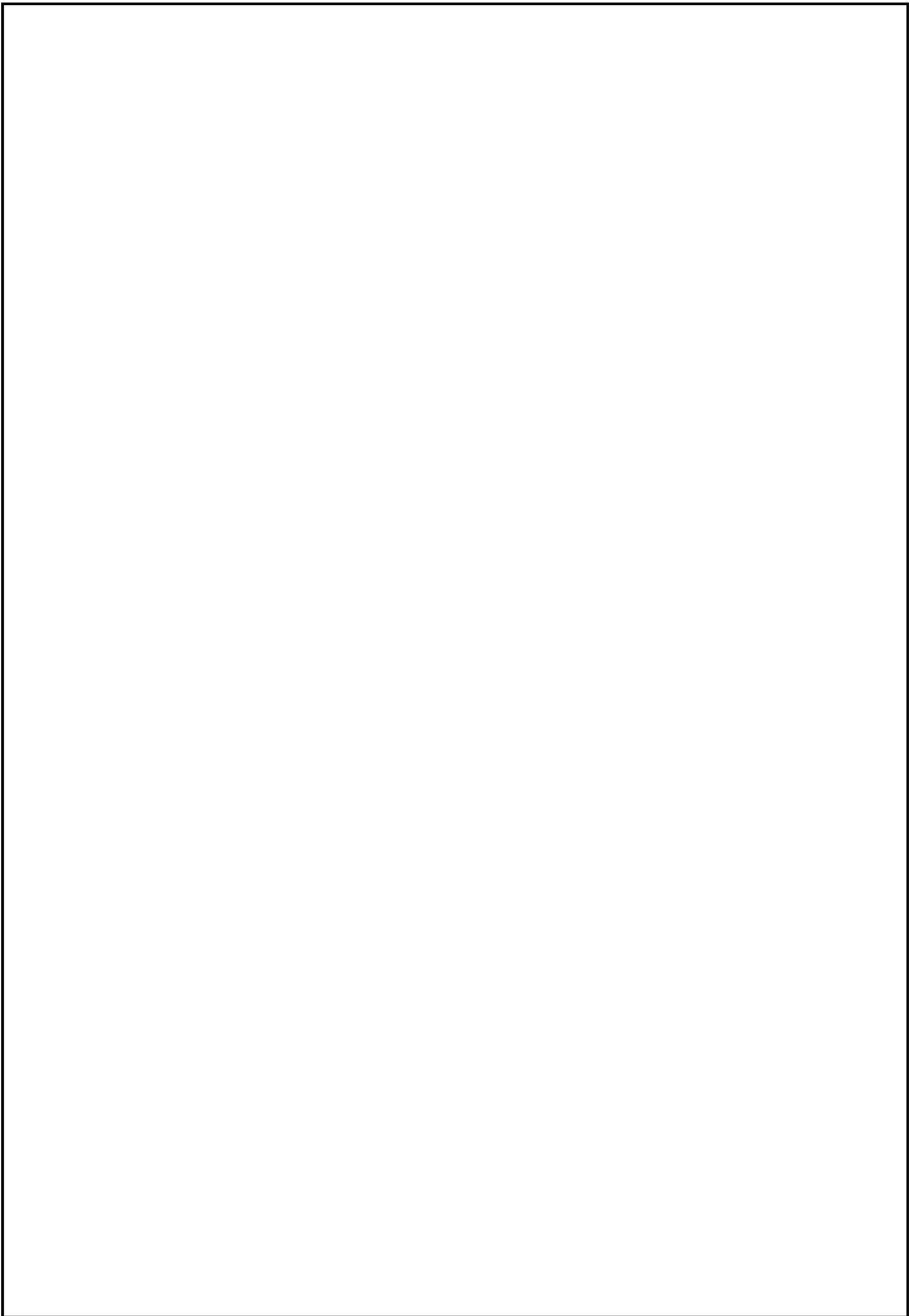
I extend my hearty gratitude to the librarian and other library staffs of my college for their wholehearted cooperation.

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Place: Irinjalakuda

AKSHAYA THOMAS

Date:



Automated Irrigation System

Based on Soil Moisture
using
Arduino

INDEX

Chapter 1: AUTOMATED IRRIGATION SYSTEM USING SOIL SENSOR

INTRODUCTION

ABSTRACT

WHAT IS ARDUINO?

COMPONENTS OF ARDUINO

WHY ARDUINO?

ARDUINO SOFTWARE IDE

Chapter 2: SOIL MOISTURE SENSOR -WORKING AND PRINCIPLE

SOIL MOISTURE SENSOR

WORKING PRINCIPLE

FLOW CHART

COMPONENTS REQUIRED

Chapter 3: CODING WITH ARDUINO – WORKING & TESTING

PROGRAMMING

CIRCUIT DIAGRAM

WORKING

Chapter 4: INFERENCE

TESTING

CONCLUSION

CHAPTER 5: MERITS & DEMERITS

MERITS

DEMERITS

Chapter 6: Application

APPLICATION

BIBLIOGRAPHY

DEPENDENCE OF TEMPERATURE ON V-I CHARACTERISTICS OF DIFFERENT DIODES

Submitted By

Name: ANSLIN JOHNSON

REG.NO: CCAUSPH061

In Partial Fulfilment of the Requirements for the Degree

Bachelor of Science in Physics

Supervised by

Miss. Simmy Jose



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April 2023

ANSLIN JOHNSON

ACKNOWLEDGEMENT

I, owe my deepest gratitude to my guide Miss. Simmy Jose, Assistant Professor (ad hoc), Department of Physics (Unaided), Christ College, Irinjalakuda, for her valuable guidance, encouragement, and support throughout the project.

I would like to thank Prof V.P. Anto, Head of Department of Physics(Unaided), for suggestions and guidance.

I, also express my gratitude to Dr. Fr. Jolly Andrews, Principal of ChristCollege for his immense support.

I am indebted to the faculty members in the Department of Physics for their help and corporation.

I would like to thank my classmates, non-teaching staffs for their corporation during the project work.

I would also like to acknowledge my gratitude to all my family members for their constant support and love.

I offer my regards and blessing to all those who supported me in any respect during the project work.

Last but not the least, I thank GOD Almighty for all the blessings showering upon me.

ANSLIN JOHNSON

ABSTRACT

The temperature dependence of voltage-current (V-I) characteristics is an important aspect of semiconductor devices, including Light Emitting Diodes (LEDs) and Zener diodes. In this project, we investigate the effect of temperature on the V-I characteristics of these devices.

We begin by studying the basic principles of semiconductor diode and the operation of LEDs and Zener diodes. We then design and conduct experiments to measure the V-I characteristics of these devices at various temperatures, ranging from room temperature to elevated temperatures.

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INDEX

1. DIODES		
1.1	Introduction	1
1.2	Different types of diodes	2
1.21	Rectifier diode	2
1.22	Zener diode	3
1.23	Schottky diode	3
1.24	Varactor diode	4
1.25	Light emitting diode	4
1.26	Some other diodes	5
1.3	Advantages of diodes	5
1.4	Disadvantages of diodes	7
1.5	Applications of diodes	8
2. WORKING PRINCIPLE OF DIODE		

2.1	Diode P-N junction	10
2.2	Operating principle	11
2.3	Principle of Zener diode	13
2.4	Principle of LED diode	14
2.5	Python code	15
3. CHARACTERISTICS OF DIODES		
3.1	V-I characteristic of semiconductor diode	16
3.2	V-I characteristic of Zener diode	17
3.3	V-I characteristic of LED	17
4. EXPERIMENTAL STUDY		
4.1	Room temperature	19
4.2	Low temperature	20
4.3	High temperature	21
4.4	Graphs	22
5. INFERENCE		
5.1	Knee voltage/ Zener voltage	28
5.2	Temperature dependence	29

**“Automated Irrigation System Based on Soil
Moisture using Arduino”**

Project Report submitted to

CHRIST COLLEGE (AUTONOMOUS)

In partial fulfilment of the requirement for the award of the degree of

BACHELOR OF PHYSICS

Submitted by

ARYADAS K H

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Under the supervision of

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MARCH 2023

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This is to certify that the project report entitled “**Automated Irrigation System Based on Soil Moisture using Arduino**” is a bonafide record of project done by **ARYADAS K H** , Reg No. CCAUSPH062 , under my guidance and supervision in partial fulfilment of the requirement for the award of the degree of BACHELOR OF PHYSICS and it has not previously formed the basis for any Degree, Diploma and Associateship or Fellowship.

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Ms Aswathi K Sivarajan

Project Guide

DECLARATION

I, ARYADAS K H, hereby declare that the project work entitled “**Automated Irrigation System Based on Soil Moisture using Arduino**” is a record of independent and bonafide project work carried out by me under the supervision and guidance of Ms. Aswathi K Sivarajan Asst. Professor, Department of Physics, Christ College (Autonomous), Irinjalakuda.

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ACKNOWLEDGEMENT

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Above all, I express my eternal gratitude to the Lord Almighty under whose divine guidance; I have been able to complete this work successfully.

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INDEX

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INTRODUCTION

ABSTRACT

WHAT IS ARDUINO?

COMPONENTS OF ARDUINO

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ARDUINO SOFTWARE IDE

Chapter 2: SOIL MOISTURE SENSOR -WORKING AND PRINCIPLE

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CIRCUIT DIAGRAM

WORKING

Chapter 4: INFERENCE

TESTING

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DEPENDENCE OF TEMPERATURE ON V-I CHARACTERISTICS OF DIFFERENT DIODES

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ACKNOWLEDGEMENT

I, owe my deepest gratitude to my guide Miss. Simmy Jose, Assistant Professor (ad hoc), Department of Physics (Unaided), Christ College, Irinjalakuda, for her valuable guidance, encouragement, and support throughout the project.

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DEVIKA KR

ABSTRACT

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INDEX

1. DIODES		
1.1	Introduction	1
1.2	Different types of diodes	2
1.21	Rectifier diode	2
1.22	Zener diode	3
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3.2	V-I characteristic of Zener diode	17
3.3	V-I characteristic of LED	17
4. EXPERIMENTAL STUDY		
4.1	Room temperature	19
4.2	Low temperature	20
4.3	High temperature	21
4.4	Graphs	22
5. INFERENCE		
5.1	Knee voltage/ Zener voltage	28
5.2	Temperature dependence	29

**SPECTROMETER: REFRACTIVE INDEX OF DIFFERENT
LIQUIDS USING HOLLOW PRISM**

Submitted by

Name: JOEL JOJU

Reg.No: CCAUSPH064

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Supervised by

Asst. Prof. JOSE SUNNY



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April 2023

**CHRIST COLLEGE (AUTONOMOUS), IRINJAIKUDA
DEPARTMENT OF PHYSICS
2020-2023**

BONA-FIDE CERTIFICATE

This is to certify that the dissertation entitled, "**Spectrometer Refractive Index of Different Liquids Using Hollow Prism**" is a bona-fide record of research work carried out by **JOEL JOJU**, Reg.No **CCAUSPH064** during the sixth semester of Bsc.Physics of the academic year 2020-2023

Mr. JOSE SUNNY (Guide)

Submitted for the examination held on _____

INTERNAL EXAMINER

EXTERNAL EXAMINER

DECLARATION

I, JOEL JOJU, declare that the work presented in this project report is based on the original work done by me under the guidance Mr. Jose Sunny, Assistant professor of Department of Physics (Unaided), Christ College, Irinjalakuda.

IRNJALAKUDA

April 2023

JOEL JOJU

CCAUSPH064

ACKNOWLEDGEMENT

I owe my deepest gratitude to my guide Mr. Jose Sunny, Assistant Professor of Physics (Unaided), Christ College, Irinjalakuda, for his valuable guidance, encouragement and support throughout the project.

I would like to thank Prof V. P. Anto, Coordinator of Department of Physics (Unaided) and my class teacher Mrs. Simmy Nixon for suggestions and guidance.

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JOEL JOJU

INDEX

1.	<u>Introduction</u>	
1.1	Refractive index	
1.1.1	Mathematical Relation	
1.1.2	Relative Refractive index	
1.1.3	Applications of refractive index	
1.2	Prism	
1.2.1	Applications of prism	
1.2.2	Types of prism	
1.2.3	Liquid prism	
1.3	Spectrometer	
1.3.1	Types of spectrometers	
1.3.2	Applications of spectrometer	

2.	<u>Theory</u>	
2.1	Refractive index of material using Snell's law	
2.2	Concentration of a solution	

3.	<u>Experimental setup</u>	
3.1	Apparatus	
3.2	Procedure	
3.3	Observations	
3.3.1	Refractive index of water	
3.3.2	Refractive index of salt solution	
3.3.3	Refractive index of sugar solution	
3.3.4	Refractive index of turmeric solution	
3.3.5	Refractive index of coconut oil (KPL brand)	
3.3.6	Refractive index of copper sulphate solution	

4.	<u>Inferences</u>	
-----------	--------------------------	--

5.	<u>Application</u>	
5.1	Spectroscopy	
5.2	Laser beam steering	
5.3	Optical communication	
5.4	Polarization control	
5.5	Optical sensing	
5.6	Adaptive optics	
5.7	Optical tweezers	
	<u>Bibliography</u>	

**“Automated Irrigation System Based on Soil
Moisture using Arduino”**

Project Report submitted to

CHRIST COLLEGE (AUTONOMOUS)

In partial fulfilment of the requirement for the award of the degree of

BACHELOR OF PHYSICS

Submitted by

MEGHNA MARIYA K. B

(CCAUSPH065)

Under the supervision of

Aswathi K Sivarajan



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MARCH 2023

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

CALICUT UNIVERSITY



DEPARTMENT OF PHYSICS CERTIFICATE

This is to certify that the project report entitled “**Automated Irrigation System Based on Soil Moisture using Arduino**” is a bonafide record of project done by **MEGHNA MARIYA K. B**, Reg. No. CCAUSPH065, under my guidance and supervision in partial fulfilment of the requirement for the award of the degree of BACHELOR OF PHYSICS and it has not previously formed the basis for any Degree, Diploma and Associateship or Fellowship.

Prof. V.P Anto

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Ms Aswathi K Sivarajan

Project Guide

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Place: Irinjalakuda

MEGHNA MARIYA K. B

Date:

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System
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using
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INDEX

Chapter 1: AUTOMATED IRRIGATION SYSTEM USING SOIL SENSOR

INTRODUCTION

ABSTRACT

WHAT IS ARDUINO?

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ARDUINO SOFTWARE IDE

Chapter 2: SOIL MOISTURE SENSOR -WORKING AND PRINCIPLE

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WORKING PRINCIPLE

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CIRCUIT DIAGRAM

WORKING

Chapter 4: INFERENCE

TESTING

CONCLUSION

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MERITS

DEMERITS

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APPLICATION

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This is to certify that the dissertation entitled, "**PYTHON IN PHYSICS**" is a bona-fide record of research work carried out by **NEHA T S**, Reg.No **CCAUSPH066** during the sixth semester of BSc.Physics of the academic year 2022-2023

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INTERNAL EXAMINER

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I, NEHA T S, declare that the work presented in this project report is based on the original work done by me under the guidance Mrs. Anjaly Joby, Assistant professor of Department of Physics (Self), Christ College, Irinjalakuda.

IRINJALAKUDA

April 2023

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ACKNOWLEDGEMENT

I owe my deepest gratitude to my guide Mrs. Anjali Joby, Assistant professor of Physics (Self), Christ College , Irinjalakuda , for her valuable guidance , encouragement and support throughout the project.

I would like to thank Prof V P Anto, Coordinator of Department of Physics (Self) and my class teacher Mrs. Simmy Nixon for suggestions and guidance.

I, also express my gratitude to Dr. Fr. Jolly Andrews, Principal of Christ College for his immense support.

I am indebted to the faculty members in the Department of Physics for their help and corporation.

I would like to thank my team members and classmates, nonteaching staffs for their corporation during project work.

I would like to express my special gratitude to Mr. Baiju, faculty at SMEClabs, kaloor , for the inspiration.

Neha T S

CONTENTS

*Preface

1.Introduction

1.1 Why Python?

1.2 Introduction to Pycharm

1.3 Analytical methods v/s Simulation

2.Methodology

2.1 Quantum Tunneling

2.2 Code

2.3 Output

3.Conclusion

4.Reference

**CALCULATION OF OPTICAL DEPTH OF
ATMOSPHERIC AEROSOLS USING
MATLAB**

Submitted by

Name: **AKHILA U A**

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ATMOSPHERIC AEROSOLS USING
MATLAB” is a bona-fide record of research work carried out
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Submitted for the examination held on _____

INTERNAL EXAMINER

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ACKNOWLEDGEMENT

I owe my deepest gratitude to my guide Prof. V P Anto HOD of Department of Physics (Self), Christ College, Irinjalakuda, for his valuable guidance, encouragement and support throughout the project.

I would like to thank my class teacher Mrs. Simmy Nixon for her suggestions and guidance.

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I, also express my gratitude to Dr. Fr. Jolly Andrews, Principal of Christ College for his immense support.

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AKHILA U A

INDEX

Chapter 1 AEROSOL AND AEROSOL OPTICAL DEPTH

- 1.1 INTRODUCTION
- 1.2 TYPES OF AEROSOLS
- 1.3 EFFECT OF AEROSOLS ON CLIMATE
- 1.4 ABSORPTION OF RADIATION BY AEROSOLS
- 1.5 RADIATIVE FORCING
- 1.6 AEROSOL OPTICAL DEPTH(AOD)
- 1.7 APPLICATIONS OF AOD
- 1.8 MEASURING AOD

Chapter 2 SMWR SYSTEM- PRINCIPLE AND WORKING

- 2.1 INTRODUCTION
- 2.2 FILTER WHEEL RADIOMETRY
- 2.3 INSTRUMENT SETUP
- 2.4 MWR PRINCIPLE/ BOUGER-LAMBERT-BEER LAW
- 2.5 MWR MAJOR SUBSYSTEMS

Chapter 3 DATA ACQUISITION AND SOFTWARE-COMPUTATION USING MATLAB

- 3.1 WAVELENGTH AND BANDWIDTH SELECTION BY FILTERWHEEL
- 3.2 DATA ANALYSIS
- 3.3 MATLAB
- 3.4 ALGORITHM TO DETERMINE AOD

3.5 SOURCE CODE

3.6 MATLAB FUNCTIONS USED

Chapter 4 INFERENCE

4.1 OUTPUT

4.2 CONCLUSION

Chapter 5 APPLICATIONS

5.1 WEATHER FORECASTING

5.2 AIR QUALITY MONITORING

5.3 REMOTE SENSING

5.4 CLIMATE STUDIES

REFERENCES

CALCULATION OF OPTICAL DEPTH OF ATMOSPHERIC AEROSOLS USING MATLAB

submitted by

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2020-2023

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Prof. V P Anto

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Submitted for the examination held on _____

INTERNAL EXAMINER

EXTERNAL EXAMINER

DECLARATION

I, **ANNMARIYA**, declare that the work presented in this project report is based on the original work done by me under the guidance of Prof. V P Anto, HOD of Department of Physics (Self), Christ College, Irinjalakuda.

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APRIL 2023

ACKNOWLEDGEMENT

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ANNMARIYA

INDEX

Chapter 1 AEROSOL AND AEROSOL OPTICAL DEPTH

- 1.1 INTRODUCTION
- 1.2 TYPES OF AEROSOLS
- 1.3 EFFECT OF AEROSOLS ON CLIMATE
- 1.4 ABSORPTION OF RADIATION BY AEROSOLS
- 1.5 RADIATIVE FORCING
- 1.6 AEROSOL OPTICAL DEPTH(AOD)
- 1.7 APPLICATIONS OF AOD
- 1.8 MEASURING AOD

Chapter 2 SMWR SYSTEM- PRINCIPLE AND WORKING

- 2.1 INTRODUCTION
- 2.2 FILTER WHEEL RADIOMETRY
- 2.3 INSTRUMENT SETUP
- 2.4 MWR PRINCIPLE/ BOUGER-LAMBERT-BEER LAW
- 2.5 MWR MAJOR SUBSYSTEMS

Chapter 3 DATA ACQUISITION AND SOFTWARE-COMPUTATION USING MATLAB

- 3.1 WAVELENGTH AND BANDWIDTH SELECTION BY FILTERWHEEL
- 3.2 DATA ANALYSIS
- 3.3 MATLAB
- 3.4 ALGORITHM TO DETERMINE AOD

3.5 SOURCE CODE

3.6 MATLAB FUNCTIONS USED

Chapter 4 INFERENCE

4.1 OUTPUT

4.2 CONCLUSION

Chapter 5 APPLICATIONS

5.1 WEATHER FORECASTING

5.2 AIR QUALITY MONITORING

5.3 REMOTE SENSING

5.4 CLIMATE STUDIES

REFERENCES

**“Automated Irrigation System Based on Soil
Moisture using Arduino”**

Project Report submitted to

CHRIST COLLEGE (AUTONOMOUS)

In partial fulfilment of the requirement for the award of the degree of

BACHELOR OF PHYSICS

Submitted by

HARISANKAR S

(CCAUSPH069)

Under the supervision of

Aswathi K Sivarajan



DEPARTMENT OF PHYSICS

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

UNIVERSITY OF CALICUT

MARCH 2023

CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA

CALICUT UNIVERSITY



DEPARTMENT OF PHYSICS CERTIFICATE

This is to certify that the project report entitled “**Automated Irrigation System Based on Soil Moisture using Arduino**” is a bonafide record of project done by **HARISANKAR S**, Reg. No. CCAUSPH069, under my guidance and supervision in partial fulfilment of the requirement for the award of the degree of BACHELOR OF PHYSICS and it has not previously formed the basis for any Degree, Diploma and Associateship or Fellowship.

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I, **HARISANKAR S**, hereby declare that the project work entitled “**Automated Irrigation System Based on Soil Moisture using Arduino**” is a record of independent and bonafide project work carried out by me under the supervision and guidance of Ms. Aswathi K Sivarajan Asst. Professor, Department of Physics, Christ College (Autonomous), Irinjalakuda.

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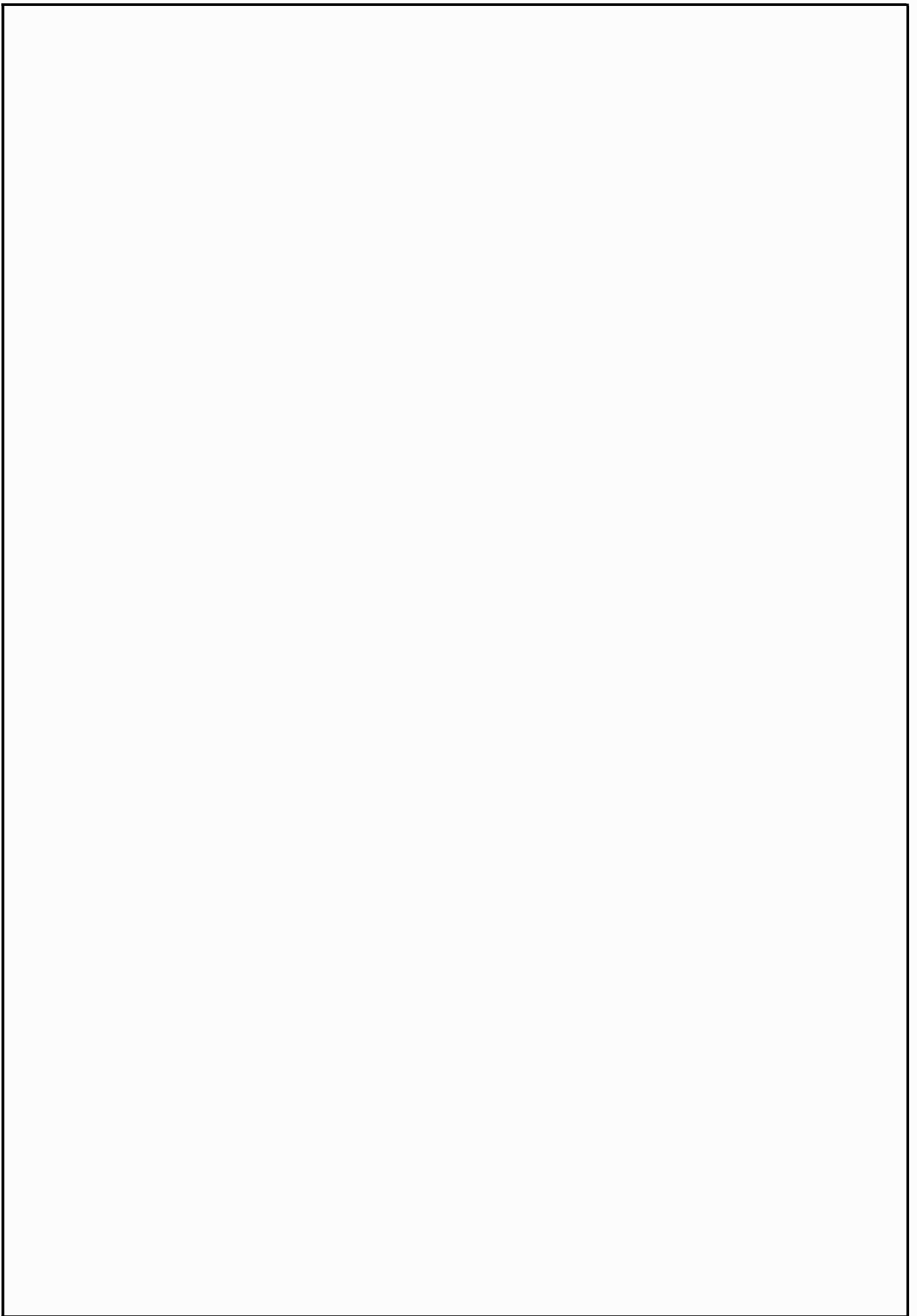
I extend my hearty gratitude to the librarian and other library staffs of my college for their wholehearted cooperation.

I express my sincere thanks to my friends and family for their support in completing this report successfully.

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Date:



**Automated Irrigation
System
Based on Soil Moisture
using
Arduino**

INDEX

Chapter 1: AUTOMATED IRRIGATION SYSTEM USING SOIL SENSOR

INTRODUCTION

ABSTRACT

WHAT IS ARDUINO?

COMPONENTS OF ARDUINO

WHY ARDUINO?

ARDUINO SOFTWARE IDE

Chapter 2: SOIL MOISTURE SENSOR -WORKING AND PRINCIPLE

SOIL MOISTURE SENSOR

WORKING PRINCIPLE

FLOW CHART

COMPONENTS REQUIRED

Chapter 3: CODING WITH ARDUINO – WORKING & TESTING

PROGRAMMING

CIRCUIT DIAGRAM

WORKING

Chapter 4: INFERENCE

TESTING

CONCLUSION

CHAPTER 5: MERITS & DEMERITS

MERITS

DEMERITS

Chapter 6: Application

APPLICATION

BIBLIOGRAPHY

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I owe my deepest gratitude to my guide Prof. V P Anto HOD of Department of Physics (Self), Christ College, Irinjalakuda, for his valuable guidance, encouragement and support throughout the project.

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I offer my regards and blessing to all those who supported me during my project.

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INDEX

Chapter 1 AEROSOL AND AEROSOL OPTICAL DEPTH

1. INTRODUCTION
2. TYPES OF AEROSOLS
3. EFFECT OF AEROSOLS ON CLIMATE
4. ABSORPTION OF RADIATION BY AEROSOLS
5. RADIATIVE FORCING
6. AEROSOL OPTICAL DEPTH (AOD)
7. APPLICATIONS OF AOD
8. MEASURING AOD

Chapter 2 SMR SYSTEM- PRINCIPLE AND WORKING

1. INTRODUCTION
2. FILTER WHEEL RADIOMETRY
3. INSTRUMENT SETUP
4. MWR PRINCIPLE/BOUGER-LAMBERT-BEER LAW
5. MWR MAJOR SUBSYSTEMS

Chapter 3 DATA ACQUISITION AND SOFTWARE- COMPUTATION USING MATLAB

1. WAVELENGTH AND BANDWIDTH SELECTION BY FILTER WHEEL
2. DATA ANALYSIS
3. MATLAB
4. ALGORITHM TO DETERMINE AOD

5. SOURCE CODE
6. MATLAB FUNCTIONS USED

Chapter 4 INFERENCE

1. OUTPUT
2. CONCLUSION

Chapter 5 APPLICATIONS

1. WEATHER FORECASTING
2. AIR QUALITY MONITORING
3. REMOTE SENSING
4. CLIMATE STUDIES

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I owe my deepest gratitude to my guide Prof. V P Anto HOD of Department of Physics (Self), Christ College, Irinjalakuda, for his valuable guidance, encouragement and support throughout the project.

I would like to thank my class teacher Mrs. Simmy Nixon for her suggestions and guidance.

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SREENIDHI

INDEX

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REFERENCES

DEPENDENCE OF TEMPERATURE ON V-I CHARACTERISTICS OF DIFFERENT DIODES

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April 2023

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TWINKLE SHAJU

ABSTRACT

The temperature dependence of voltage-current (V-I) characteristics is an important aspect of semiconductor devices, including Light Emitting Diodes (LEDs) and Zener diodes. In this project, we investigate the effect of temperature on the V-I characteristics of these devices.

We begin by studying the basic principles of semiconductor diode and the operation of LEDs and Zener diodes. We then design and conduct experiments to measure the V-I characteristics of these devices at various temperatures, ranging from room temperature to elevated temperatures.

Our experimental results reveal that temperature has a significant impact on the V-I characteristics of these devices. Specifically, we observe changes in the forward and reverse bias voltages, as well as in the current levels. These changes are attributed to the temperature-dependent properties of semiconductors, such as carrier mobility and bandgap energy.

Furthermore, we analyse the data and develop mathematical models to describe the temperature dependence of the V-I characteristics. Our findings provide valuable insights into the performance and reliability of these devices in different temperature environments, which can have important implications for practical applications.

Overall, this project contributes to a deeper understanding of the temperature dependence of V-I characteristics in semiconductor devices, particularly LEDs and Zener diodes, and provides useful information for device design and optimization in various temperature-dependent applications.

INDEX

1. DIODES		
1.1	Introduction	1
1.2	Different types of diodes	2
1.21	Rectifier diode	2
1.22	Zener diode	3
1.23	Schottky diode	3
1.24	Varactor diode	4
1.25	Light emitting diode	4
1.26	Some other diodes	5
1.3	Advantages of diodes	5
1.4	Disadvantages of diodes	7
1.5	Applications of diodes	8
2. WORKING PRINCIPLE OF DIODE		
2.1	Diode P-N junction	10

2.2	Operating principle	11
2.3	Principle of Zener diode	13
2.4	Principle of LED diode	14
2.5	Python code	15
3. CHARACTERISTICS OF DIODES		
3.1	V-I characteristic of semiconductor diode	16
3.2	V-I characteristic of Zener diode	17
3.3	V-I characteristic of LED	17
4. EXPERIMENTAL STUDY		
4.1	Room temperature	19
4.2	Low temperature	20
4.3	High temperature	21
4.4	Graphs	22
5. INFERENCE		
5.1	Knee voltage/ Zener voltage	28
5.2	Temperature dependence	29