



# UNION CHRISTIAN COLLEGE ALUVA-2



SSR 5<sup>th</sup> CYCLE 2023



Criterion 1

## 1.3.2 Student Projects and Internships

# DEPARTMENT OF PHYSICS



## **B.Sc. Physics** **Supporting Documents**

**UNION CHRISTIAN COLLEGE ALUVA  
DEPARTMENT OF PHYSICS  
MAHATMA GANDHI UNIVERSITY KOTTAYAM**



**CERTIFICATE OF COMPLETION**

**Certified that this project report "Lissajous Figures: Analysis and Visualization Using Oscilloscope and Python Programming" is the bonafide work of "SNIYA VS (200021037145)" who carried out the project work under my supervision.**

  
**Signature of Guide**  
Dr. Manu John

  
**Signature of HOD**  
Dr. Manu John

**UNION CHRISTIAN COLLEGE ALUVA  
DEPARTMENT OF PHYSICS  
MAHATMA GANDHI UNIVERSITY KOTTAYAM**



**CERTIFICATE OF COMPLETION**

Certified that this project report "Lissajous Figures: Analysis and Visualization Using Oscilloscope and Python Programming" is the bonafide work of "RAKESH RAMACHANDRAN (200021037140)" who carried out the project work under my supervision.

Signature of Guide

*Dr Manu Punnen John*

Signature of HOD

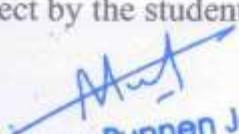
*Dr Manu Punnen John*

**UNION CHRISTIAN COLLEGE, ALUVA**  
**DEPARTMENT OF PHYSICS**  
(Affiliated to Mahatma Gandhi University- Kottayam)



**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled SOIL MOISTURE SENSOR AND AUTOMATIC IRRIGATION SYSTEM USING ARDUINO is submitted by DETEENA CHACKO in partial fulfilment of the requirements for the award of the Bachelor's degree in PHYSICS under the guidance of DR. MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

  
Dr. Manu Punnen John  
Signature of Guide

  
Dr. Manu Punnen John  
Signature of HOD

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**DEPARTMENT OF PHYSICS**

(Affiliated to Mahatma Gandhi University- Kottayam)



**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled BURGLAR ALARM is submitted by ATHIRAMOL N S (200021037127) in partial fulfillment of the requirements for the award of the Degree in PHYSICS under the guidance of MANU PUNNAN JOHN. The work is carried out as an in-house project by the student.

Signature of Guide

Signature of HoD

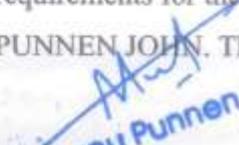
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DEPARTMENT OF PHYSICS**

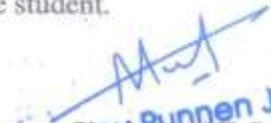
(Affiliated to Mahatma Gandhi University- Kottayam)



**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled AUTOMATIC TRAFFIC SIGNAL USING IC 555 AND IC 4017 is submitted by ATHUL K.N (200021037109) in partial fulfillment of the requirements for the award of the Degree in PHYSICS under the guidance of Dr. MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

  
Signature of Guide

  
Signature of HoD

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**(Affiliated to Mahatma Gandhi University-Kottayam)**



**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled SONAR is submitted by HARI S NARAYANAN (200021037112) in partial fulfillment of the requirements for the award of the Degree in PHYSICS under the guidance of Dr. MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

Signature \_\_\_\_\_  
Guide

*Manu Punnen John*  
Dr. Manu Punnen John

Signature \_\_\_\_\_  
of HOD

*Manu Punnen John*  
Dr. Manu Punnen John

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**DEPARTMENT OF PHYSICS**  
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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled Li-Fi USING ARDUINO is submitted by A ANAGHA(200021037122) in partial fulfillment of the requirements for the award of the Degree in Physics under the guidance of Dr MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

Signature of Guide

*Manu Punnen John*  
Dr Manu Punnen John

Signature of HoD

*Manu Punnen John*  
Dr Manu Punnen John

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**DEPARTMENT OF PHYSICS**  
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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled Li-Fi USING ARDUINO is submitted by AATHILA FAISAL K M (200021037103) in partial fulfillment of the requirements for the award of the Degree in Physics under the guidance of Dr MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

Signature of Guide

*Manu Punnen John*  
Dr Manu Punnen John

Signature of HoD

*Manu Punnen John*  
Dr Manu Punnen John

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DEPARTMENT OF PHYSICS**

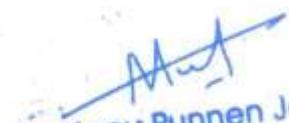
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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled **SIMULATION OF TRAJECTORY OF A CHARGED PARTICLE IN ELECTRIC AND MAGNETIC FIELD** is submitted by **AMANI ABBAS** (Reg No-200021037124) in partial fulfillment of the requirements for the award of the Degree in **BACHELOR OF SCIENCE IN PHYSICS** under the guidance Of **Dr Manu Punnen John**. The work is carried out as an in-house project by the student.

  
**Dr Manu Punnen John**  
Signature of Guide

  
**Dr Manu Punnen John**  
Signature of HoD

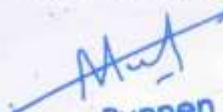
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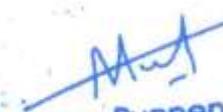


**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled **SIMULATION OF TRAJECTORY OF A CHARGED PARTICLE IN ELECTRIC AND MAGNETIC FIELD** is submitted by **ASHIL MADHUSUDHANAN** (Reg No-200021037126) in partial fulfillment of the requirements for the award of the Degree in **BACHELOR OF SCIENCE IN PHYSICS** under the guidance Of **Dr Manu Punnen John**. The work is carried out as an in-house project by the student.

  
**Dr Manu Punnen John**

Signature of Guide

  
**Dr Manu Punnen John**

Signature of HoD

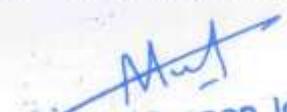
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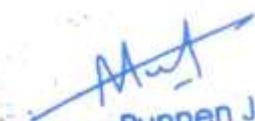
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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled **SIMULATION OF TRAJECTORY OF A CHARGED PARTICLE IN ELECTRIC AND MAGNETIC FIELD** is submitted by **BIBIN VARGHESE** (Reg No-200021037129) in partial fulfillment of the requirements for the award of the Degree in **BACHELOR OF SCIENCE IN PHYSICS** under the guidance Of Dr Manu Punnen John. The work is carried out as an in-house project by the student.

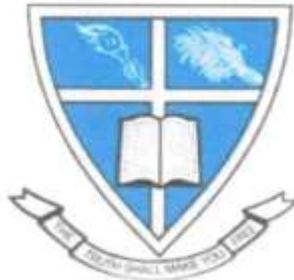
  
Dr Manu Punnen John  
Signature of Guide

  
Dr Manu Punnen John  
Signature of HoD

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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled GAS LEAKAGE DECTECTOR is submitted by GREESHMA SHINE (200021037132) in partial fulfillment of the requirements for the award of the DEGREE IN PHYSICS under the guidance of Dr. MANU PUNNAN JOHN. The work is carried out as an in-house project by the student.

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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled GAS LEAGAGE DECTECTOR is submitted by LAKSHMI PRIYA CS (200021037114) in partial fulfillment of the requirements for the award of the Degree in PHYSICS under the guidance of Dr. MANU PUNNAN JOHN. The work is carried out as an in-house project by the student.

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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled GAS LEAGAGE DECTECTOR is submitted by THEHINNA BABU (200021037120) in partial fulfillment of the requirements for the award of the Degree in PHYSICS under the guidance of Dr. MANU PUNNAN JOHN. The work is carried out as an in-house project by the student.

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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled "**Obstacle avoiding car using Arduino**" is submitted by **Sooryanath T (PRN: 200021037119)** in partial fulfillment of the requirements for the award of the **Degree in Physics** under the guidance of **Dr. Manu Punnen John**. The work is carried out as an in-house project by the student.

Signature of Guide

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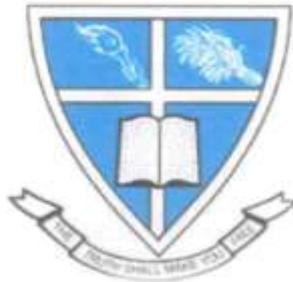
**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled "**Obstacle avoiding car using Arduino**" is submitted by **George C Reji (PRN: 200021037110)** in partial fulfillment of the requirements for the award of the **Degree in Physics** under the guidance of **Dr. Manu Punnen John**. The work is carried out as an in-house project by the student.

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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled "**Obstacle avoiding car using Arduino**" is submitted by **Albin Raju (PRN: 200021037123)** in partial fulfillment of the requirements for the award of the **Degree in Physics** under the guidance of **Dr. Manu Punnen John**. The work is carried out as an in-house project by the student.

Signature of Guide

*Dr Manu Punnen John*

Signature of HOD

*Dr Manu Punnen John*

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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled **OBJECT COUNTER USING IR SENSOR** is submitted by **SNEHA MARTIN (200021037144)** in partial fulfillment of the requirements for the award of the Degree in **PHYSICS** under the guidance of **Dr MANU PUNNEN JOHN**. The work is carried out as an in-house project by the student.

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Signature of HoD

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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled **OBJECT COUNTER USING IR SENSOR** is submitted by **NEHA M ASHRAF (200021037117)** in partial fulfillment of the requirements for the award of the Degree in **PHYSICS** under the guidance of **Dr MANU PUNNEN JOHN**. The work is carried out as an in-house project by the student.

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**DEPARTMENT OF PHYSICS**

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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled **OBJECT COUNTER USING IR SENSOR** is submitted by **MELVIN C SANTHOSH (200021037115)** in partial fulfillment of the requirements for the award of the Degree in **PHYSICS** under the guidance of **Dr MANU PUNNEN JOHN**. The work is carried out as an in-house project by the student.



Signature of Guide



Signature of HoD

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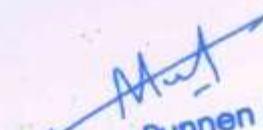
## DEPARTMENT OF PHYSICS

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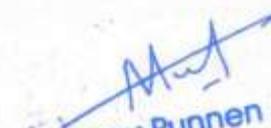


### CERTIFICATE OF COMPLETION

This is to certify that the project entitled **AUTOMATIC STREET LIGHT USING LDR AND BC547** is submitted by **ANNA ELDO P** (Reg No: 200021037107 ) in partial fulfilment of the requirements for the award of the Degree in **BACHELOR OF SCIENCE IN PHYSICS** under the guidance of **DR. MANU PUNNEN JOHN**. The work is carried out as an in-house project by the student.

  
Dr Manu Punnen John

Signature of Guide

  
Dr Manu Punnen John

Signature of HOD

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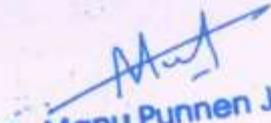
## DEPARTMENT OF PHYSICS

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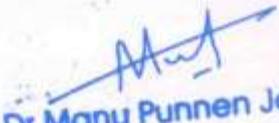


### CERTIFICATE OF COMPLETION

This is to certify that the project entitled **AUTOMATIC STREET LIGHT USING LDR AND BC547** is submitted by **SAMRIN FAISAL**(Reg No: 200021037142 ) in partial fulfilment of the requirements for the award of the Degree in **BACHELOR OF SCIENCE IN PHYSICS** under the guidance of **DR. MANU PUNNEN JOHN**. The work is carried out as an in-house project by the student.

  
Dr Manu Punnen John

Signature of Guide

  
Dr Manu Punnen John

Signature of HOD

# UNION CHRISTIAN COLLEGE, ALUVA

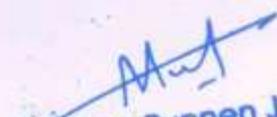
## DEPARTMENT OF PHYSICS

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### CERTIFICATE OF COMPLETION

This is to certify that the project entitled **AUTOMATIC STREET LIGHT USING LDR AND BC547** is submitted by **VYSHNAV V KAMATH** (Reg No: 200021037146 ) in partial fulfilment of the requirements for the award of the Degree in **BACHELOR OF SCIENCE IN PHYSICS** under the guidance of **DR. MANU PUNNEN JOHN**. The work is carried out as an in-house project by the student.

  
Dr Manu Punnen John

Signature of Guide

  
Dr Manu Punnen John

Signature of HOD

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**DEPARTMENT OF PHYSICS**  
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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled ELECTRONIC PIANO USING IC 555 is submitted by KRISHNANJANA S (Reg no:200021037135) in partial fulfillment of the requirements for the award of the Degree in PHYSICS under the guidance of DR MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

Signature of Guide

Signature of HOD

**DEPARTMENT OF PHYSICS**  
(Affiliated to Mahatma Gandhi University- Kottayam)



**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled ELECTRONIC PIANO USING IC 555 is submitted ANAGHA A VADAKKEDATH (200021037106) in partial fulfillment of the requirements for the award of the Degree in PHYSICS under the guidance of DR MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

  
Signature of Guide

  
Signature of HOD

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**DEPARTMENT OF PHYSICS**  
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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled SOIL MOISTURE SENSOR AND AUTOMATIC IRRIGATION SYSTEM USING ARDUINO is submitted by UMAR MUKTHAR T.S in partial fulfilment of the requirements for the award of the Bachelor's degree in PHYSICS under the guidance of DR. MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

Signature of Guide

*Manu Punnen John*  
Dr Manu Punnen John

Signature of HOD

*Manu Punnen John*  
Dr Manu Punnen John

**UNION CHRISTIAN COLLEGE, ALUVA**

**DEPARTMENT OF PHYSICS**

(Affiliated to Mahatma Gandhi University- Kottayam)



**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled **BURGLAR ALARM** is submitted by **IRFANA T S** (200021037113) in partial fulfillment of the requirements for the award of the Degree in **PHYSICS** under the guidance of **MANU PUNNAN JOHN**. The work is carried out as an in-house project by the student.

Signature of Guide

Signature of HoD

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**DEPARTMENT OF PHYSICS**

(Affiliated to Mahatma Gandhi University- Kottayam)



**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled **BURGLAR ALARM** is submitted by **GOPIKA RADHAKRISHNAN (200021037131)** in partial fulfillment of the requirements for the award of the Degree in **PHYSICS** under the guidance of **MANU PUNNAN JOHN**. The work is carried out as an in-house project by the student.

Signature of Guide

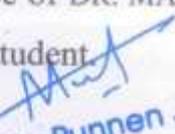
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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled SOIL MOISTURE SENSOR AND AUTOMATIC IRRIGATION SYSTEM USING ARDUINO is submitted by ATHIRA R in partial fulfilment of the requirements for the award of the Bachelor's degree in PHYSICS under the guidance of DR. MANU PUNNEN JOHN. The work is carried out as an in-house project by the student

  
Dr Manu Punnen John  
Signature of Guide

  
Dr Manu Punnen John  
Signature of HOD

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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled Lissajous Figure is submitted by Samarjith Raj BP (200021037141) in partial fulfillment of the requirements for the award of the Degree in Bsc Physics under the guidance of Manu Punnen John. The work is carried out as an in-house project by the student.

Signature of Guide

*Manu Punnen John*  
Dr Manu Punnen John

Signature of HoD

*Manu Punnen John*  
Dr Manu Punnen John

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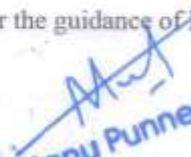
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**Dr Manu Punnen John**  
Signature of Guide

  
**Dr Manu Punnen John**  
Signature of HoD

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**CERTIFICATE OF COMPLETION**

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Dr Manu Punnen John  
Signature of Guide

  
Dr Manu Punnen John  
Signature of HoD

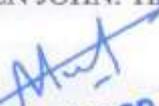
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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled AUTOMATIC TRAFFIC SIGNAL USING IC 555 AND IC 4017 is submitted by NASEEH YOUSUF (200021037138) in partial fulfillment of the requirements for the award of the Degree in PHYSICS under the guidance of Dr. MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

  
Signature of Guide  
**Dr Manu Punnan John**

  
Signature of HoD  
**Dr Manu Punnan John**

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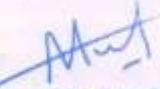
**DEPARTMENT OF .....**

(Affiliated to Mahatma Gandhi University- Kottayam)



**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled.....NAME OF PROJECT) is submitted by..... (Name of the student with register number) in partial fulfillment of the requirements for the award of the Degree in .....(subject name) under the guidance of .....(Name of Guide). The work is carried out as an in-house project by the student.

  
**Dr Manu Punnen John**  
Signature of Guide

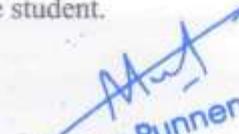
  
**Dr Manu Punnen John**  
Signature of HoD

**UNION CHRISTIAN COLLEGE, ALUVA**  
**DEPARTMENT OF PHYSICS**  
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This is to certify that the project entitled SONAR is submitted by GOUTHAM KRISHNAN P (200021037111) in partial fulfillment of the requirements for the award of the Degree in PHYSICS under the guidance of Dr. MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

  
Dr. Manu Punnen John  
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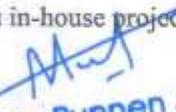
  
Dr. Manu Punnen John  
Signature of HOD

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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled ELECTRONIC VOTING MACHINE USING ARDUINO is submitted by JERIN SAJI , 200021037133 in partial fulfillment of the requirements for the award of the Degree in BSC PHYSICS under the guidance of MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

  
Dr Manu Punnen John  
Signature of Guide

  
Dr Manu Punnen John  
Signature of HoD

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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled ELECTRONIC VOTING MACHINE is submitted by ABHIJITH C B -200021037104 in partial fulfillment of the requirements for the award of the Degree in physics under the guidance of Dr.Manu Punnen John. The work is carried out as an in-house project by the student.

Signature of Guide

Signature of HoD

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**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled ELECTRONIC VOTING MACHINE USING ARDUINO is submitted by AKASH UDAYAN-200021037105 in partial fulfillment of the requirements for the award of the Degree BSC PHYSICS under the guidance of MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

Signature of Guide

Signature of HoD

**UNION CHRISTIAN COLLEGE, ALUVA**  
**DEPARTMENT OF PHYSICS**  
(Affiliated to Mahatma Gandhi University- Kottayam)



**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled Li-Fi USING ARDUINO is submitted by SANDEEP P S(200021037118) in partial fulfillment of the requirements for the award of the Degree in Physics under the guidance of Dr MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

Signature of Guide

*Manu Punnen John*  
Dr Manu Punnen John

Signature of Guide

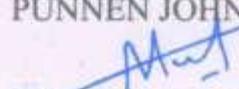
*Manu Punnen John*  
Dr Manu Punnen John

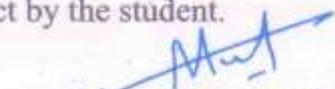
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**DEPARTMENT OF PHYSICS**  
(Affiliated to Mahatma Gandhi University- Kottayam)



**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled "Solar Mobile Charger Circuit" is submitted by MELWIN T. JOSHY (200021037136) in partial fulfillment of the requirements for the award of the Degree in PHYSICS under the guidance of DR. MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

  
**Dr. Manu Punnen John**  
Signature of Guide

  
**Dr. Manu Punnen John**  
Signature of HOD

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**DEPARTMENT OF PHYSICS**  
(Affiliated to Mahatma Gandhi University- Kottayam)



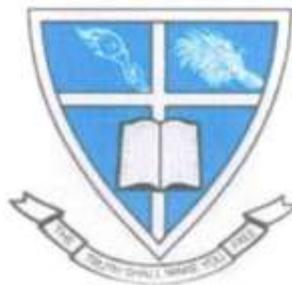
**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled “Solar Mobile Charger Circuit” is submitted by MUHAMMED RAZIK M.N (200021037116) in partial fulfillment of the requirements for the award of the Degree in PHYSICS under the guidance of DR. MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

Signature of Guide  
Dr Manu Punnen John

Signature of HOD  
Dr Manu Punnen John

**UNION CHRISTIAN COLLEGE, ALUVA**  
**DEPARTMENT OF PHYSICS**  
(Affiliated to Mahatma Gandhi University- Kottayam)



**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled "DIGITAL CLIMATE MONITOR: Arduino Based Thermohygrometer" is submitted by FEZIN PUTHANPURAYIL (200021037139) in partial fulfillment of the requirements for the award of the Degree in PHYSICS under the guidance of DR. MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

Signature of Guide

*Manu Punnen John*  
Dr Manu Punnen John

Signature of HoD

*Manu Punnen John*  
Dr Manu Punnen John

**UNION CHRISTIAN COLLEGE, ALUVA**  
**DEPARTMENT OF PHYSICS**  
(Affiliated to Mahatma Gandhi University- Kottayam)



**CERTIFICATE OF COMPLETION**

This is to certify that the project entitled "DIGITAL CLIMATE MONITOR: Arduino Based Thermohygrometer" is submitted by ANJALY S MENON (200021037125) in partial fulfillment of the requirements for the award of the Degree in PHYSICS under the guidance of DR. MANU PUNNEN JOHN. The work is carried out as an in-house project by the student.

Signature of Guide

*Manu Punnen John*  
Dr. Manu Punnen John

Signature of HoD

*Manu Punnen John*  
Dr. Manu Punnen John

DEPARTMENT OF PHYSICS  
UNION CHRISTIAN COLLEGE, ALUVA



CERTIFICATE

This is to certify that the Project work entitled "RECYCLING OF TEXTILE EFFLUENT WATER BY PHOTOCATALYTIC DEGRADATION USING LEAD FREE PEROVSKITE  $CsTiBr_3$ " is a bonafide record of the project work done by ALENE SARA VARGHESE carried out at Department of Physics, Union Christian College, Aluva in partial fulfillment for the award of Master of Science in Physics from Mahatma Gandhi University, Kottayam during the academic year 2021-2023 under my guidance and supervision and the work reported here in does not form part of any other thesis of dissertation.

  
Dr. MANU PUNNEN JOHN  
Head of the Department  
Department of physics  
Union Christian College, Aluva

  
Dr. RESHMI RAMAN  
(Supervising Guide)  
Assistant Professor  
Department of Physics  
Union Christian College, Aluva

External Examiner 1 

External Examiner 2 

DEPARTMENT OF PHYSICS  
UNION CHRISTIAN COLLEGE



CERTIFICATE

This is to certify that the Project work entitled "QUANTUM ENTANGLEMENT" is a bonafide record of the project work done by Namitha Manoharan T. T. Reg.No.210011013279 carried out at Department of Physics, Union Christian College, Kerala in a partial fulfilment for the award of Master of Science in Physics from Mahatma Gandhi University, Kerala during the academic year 2021-2023 under my guidance and supervision and the work reported here in does not form part of any other thesis of dissertation.

Dr. Manu P John  
Head of the Department  
Department of Physics  
U.C. College, Kerala

Dr. Pramod Dominic  
Supervising Guide  
Department of Physics  
U.C. College, Kerala

External Examiners

1.

2.

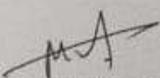
**DEPARTMENT OF PHYSICS**  
**UNION CHRISTIAN COLLEGE,**  
**ALUVA**

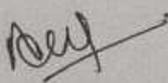
Affiliated to **Mahatma Gandhi University, Kottayam**  
Accredited with A grade (NAAC)



**CERTIFICATE**

This is to certify that the project work entitled " **TUNING THE CRYSTALLINITY OF TITANIUM DIOXIDE NANOTUBES**" is a Bonafide work of **SAINADH C U, Reg. No: 210011013280** carried out at Department of Physics, Union Christian College, Aluva, in partial fulfilment for the award of Master-of Science in Physics from Mahatma Gandhi University, Kottayam during the academic year 2022-2023 under my guidance and supervision and the work reported here in does not form part of any other thesis of dissertation.

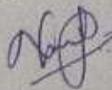
  
**Dr. MANU PUNNEN JOHN**  
Head of the Department of Physics  
Union Christian College, Aluva

  
**Dr. AIJO JOHN K**  
(Supervising Guide)

Submitted for project valuation held on .....

External Examiners

I. 

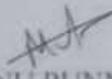
II. 

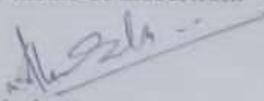
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**UNION CHRISTIAN COLLEGE, ALUVA**



**CERTIFICATE**

This is to certify that the Project work entitled "COLLECTIVE DEGRADATION OF CRYSTAL VIOLET AND MALACHITE GREEN BY LEAD FREE PEROVSKITE  $\text{CsTiBr}_3$ " is a bonafide record of the project work done by AISWARYA A S carried out at Department of Physics, Union Christian College, Aluva in partial fulfillment for the award of Master of Science in Physics from Mahatma Gandhi University, Kottayam during the academic year 2021-2023 under my guidance and supervision and the work reported here in does not form part of any other thesis of dissertation.

  
Dr. MANU PUNNEN JOHN  
Head of the Department  
Department of physics  
Union Christian College, Aluva

  
Dr. Alex Mathew  
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Assistant Professor  
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Union Christian College, Aluva

External Examiner 1 

External Examiner 2 

DEPARTMENT OF PHYSICS  
UNION CHRISTIAN COLLEGE



CERTIFICATE

This is to certify that the Project work entitled "QUANTUM ENTANGLEMENT" is a bonafide record of the project work done by Anaghananda E K, Reg No.210011013270 carried out at Department of Physics, Union Christian College, Kerala in a partial fulfilment for the award of Master of Science in Physics from Mahatma Gandhi University, Kerala during the academic year 2021-2023 under my guidance and supervision and the work reported here in does not form part of any other thesis of dissertation.

Dr. Manu P John  
Head of the Department  
Department of Physics  
U.C. College, Kerala

Dr. Pramod Dominic  
Supervising Guide  
Department of Physics  
U.C. College, Kerala

External Examiners

1.

2.

**DEPARTMENT OF PHYSICS  
UNION CHRISTIAN COLLEGE  
ALUVA**



**CERTIFICATE**

This is to certify that the project work entitled "**HYDROTHERMAL SYNTHESIS AND CHARACTERIZATION OF PURE AND DOPED GALLIUM (III) OXIDE**" is a bonafide work of **GAYATHRI T. U**, Reg. No: **210011013276** carried out at Department of Physics, Union Christian College, Aluva, in partial fulfilment for the award of Master of Science in Physics from Mahatma Gandhi University, Kottayam during the year 2022-2023 under my guidance and supervision and the work reported here in does not form part of any other thesis of dissertation.

**Dr. MANU PUNNEN JOHN**  
Head of the Department of Physics  
Union Christian College, Aluva

**Ms. RAKHY RAPHAEL**  
(Supervising Guide)  
Assistant Professor  
Union Christian College, Aluva

External Examiners

I.

II.

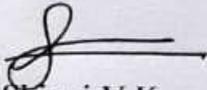
**DEPARTMENT OF PHYSICS**  
**UNION CHRISTIAN COLLEGE**



**CERTIFICATE**

This is to certify that the Project work entitled "Quality analysis of edible oils utilizing optical methods" is a bonafide record of the project work done by Miss Anusree Ajay, Reg No.210011013272 carried out at Department of Physics, Union Christian College, Kerala in a partial fulfilment for the award of Master of Science in Physics from Mahatma Gandhi University, Kerala during the academic year 2021-2023 under my guidance and supervision and the work reported here in does not form part of any other thesis of dissertation.

Dr. Manu P John  
Head of the Department  
Department of Physics  
U.C. College, Kerala

  
Dr. Shinoj V K  
Supervising Guide  
Department of Physics  
U.C. College, Kerala

External Examiners

1. 

2. 

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CERTIFICATE

This is to certify that the Project work entitled "Quality analysis of edible oils utilizing optical methods" is a bonafide record of the project work done by Miss Malavika Ramesh, Reg No.210011013278 carried out at Department of Physics, Union Christian College, Kerala in a partial fulfilment for the award of Master of Science in Physics from Mahatma Gandhi University, Kerala during the academic year 2021-2023 under my guidance and supervision and the work reported here in does not form part of any other thesis of dissertation.

Dr. Shinoj V K

Supervising Guide

Department of Physics

U.C. College, Kerala

Dr. Manu P John

Head of the Department

Department of Physics

U.C. College, Kerala

External Examiners

1. Vimala George.

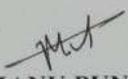
2. Neena P.

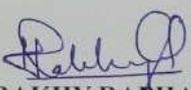
DEPARTMENT OF PHYSICS  
UNION CHRISTIAN COLLEGE  
ALUVA



CERTIFICATE

This is to certify that the project work entitled "HYDROTHERMAL SYNTHESIS AND CHARACTERIZATION OF PURE AND DOPED GALLIUM (III) OXIDE" is a bonafide work of ARYA P. N, Reg. No: 210011013274 carried out at Department of Physics, Union Christian College, Aluva, in partial fulfilment for the award of Master of Science in Physics from Mahatma Gandhi University, Kottayam during the year 2022-2023 under my guidance and supervision and the work reported here in does not form part of any other thesis of dissertation.

  
**Dr. MANU PUNNEN JOHN**  
Head of the Department of Physics  
Union Christian College, Aluva

  
**Ms. RAKHY RABHAEL**  
(Supervising Guide)  
Assistant Professor  
Union Christian College, Aluva

External Examiners

I. 

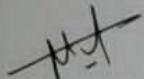
II. 

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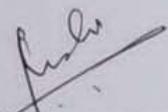
**CERTIFICATE**

This is to certify that the Project work entitled "**RECYCLING OF TEXTILE EFFLUENT WATER BY PHOTOCATALYTIC DEGRADATION USING LEAD FREE PEROVSKITE CsTiBr<sub>3</sub>**" is a bonafide record of the project work done by **CHINNU SABU** carried out at Department of Physics, Union Christian College, Aluva in partial fulfillment for the award of Master of Science in Physics from Mahatma Gandhi University, Kottayam during the academic year 2021-2023 under my guidance and supervision and the work reported here in does not form part of any other thesis of dissertation.

  
**Dr. MANU PUNNEN JOHN**  
**Head of the Department**  
**Department of physics**  
**Union Christian College, Aluva**

External Examiner 1 

External Examiner 2 

  
**Dr. RESHMI RAMAN**  
**(Supervising Guide)**  
**Assistant Professor**  
**Department of Physics**  
**Union Christian College, Aluva**

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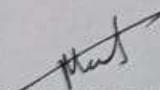
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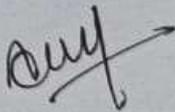
## CERTIFICATE

This is to certify that the project work entitled " **TUNING THE CRYSTALLINITY OF TITANIUM DIOXIDE NANOTUBES**" is a Bonafide work of **ALEX J THACHIL, Reg. No: 210011013269** carried out at Department of Physics, Union Christian College, Aluva, in partial fulfilment for the award of Master of Science in Physics from Mahatma Gandhi University, Kottayam during the academic year 2022-2023 under my guidance and supervision and the work reported here in does not form part of any other thesis of dissertation.

  
**Dr. MANU PUNNEN JOHN**

Head of the Department of Physics

Union Christian College, Aluva

  
**Dr. AIJO JOHN K**

(Supervising Guide)

Submitted for project valuation held on .....

External Examiners

I. 

II. 