

NANOTECHNOLOGY - THE EMERGING SCIENCE

PHY.A.22.1



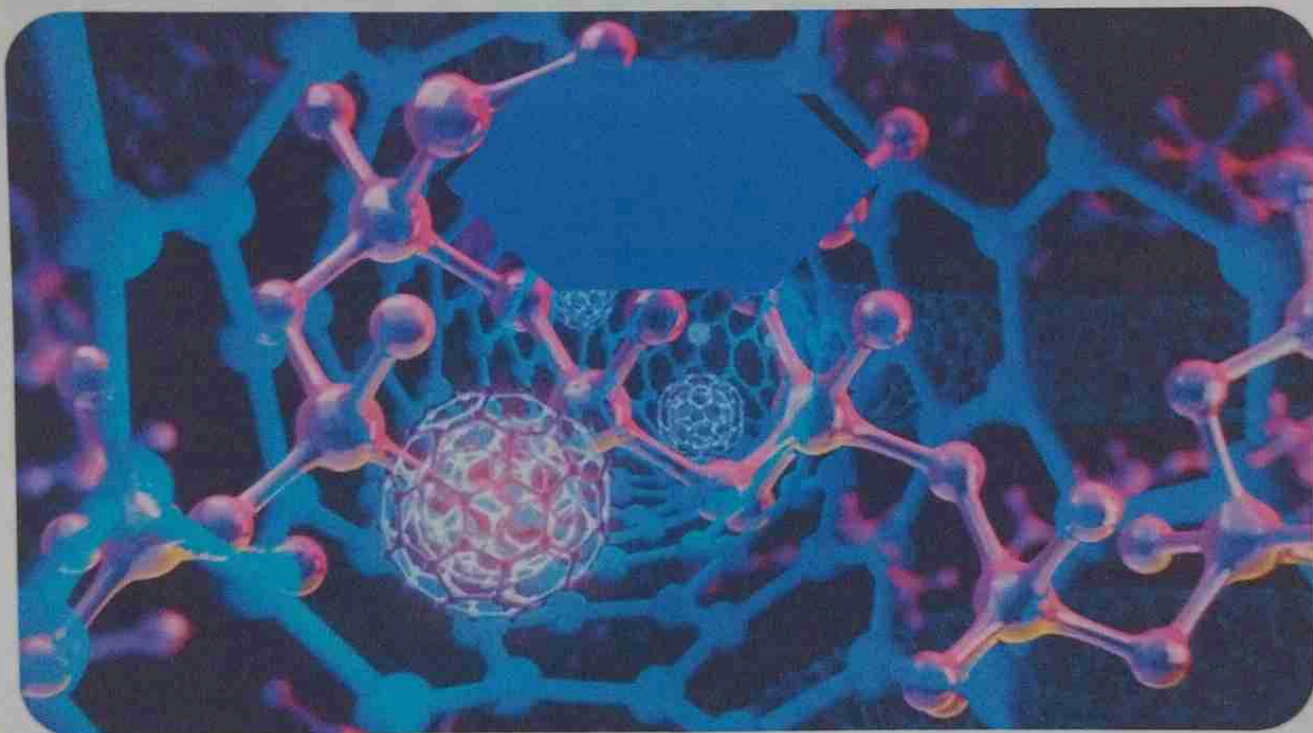


ALL SAINTS' COLLEGE
THIRUVANANTHAPURAM



ADD ON COURSE

NANOTECHNOLOGY - THE EMERGING SCIENCE



CONDUCTED BY
DEPARTMENT OF PHYSICS

2022-23



Reshmi
PRINCIPAL
All Saint's College
Thiruvananthapuram

About the Course

Eligibility: UG/PG ongoing students

Course period: 30 hrs

Features

This course will provide an introduction to the field of nanotechnology, covering the history, principles, and applications of nanotechnology.

Course Content

The size and scale of nanomaterials, properties of nanomaterials, synthesis and characterization of nanomaterials, applications of nanotechnology in different fields, such as medicine, energy, materials science, and electronics

Benefits

At the end of this course, you will be able to

- **Understand the basic principles of nanotechnology**
- **Describe the properties of nanomaterials**
- **Explain the synthesis and characterization of nanomaterials**
- **Discuss the potential applications of nanotechnology in different fields**

For more details contact

*Course Coordinator/ HoD Physics,
All Saints' College, Thiruvananthapuram
Or Mail to physicsallsaints@gmail.com*



Reshmi
PRINCIPAL
All Saint's College
Thiruvananthapuram



All Saints' College
Trivandrum

Department of Physics

Introduction to Nano Technology – The emerging Science (PHY.A.22.1)

Course Duration 30hrs

Teacher in Charge - Dr. Dhanya Chandran

Course Description

This is a graduate level course designed to develop a basic knowledge in the field of nano science and technology and related applications. The ultimate goal of this course is to provide better understanding of the present developments in the field

Course Objectives

- Basic understanding of Nano Science
- Idea about nanotechnology
- Applications
- Networking Essentials

Course Outcomes

After completing this course students will be able to:

- Learn about the background on Nanoscience
- Understand the synthesis of nanomaterials and their application and the impact of nanomaterials on environment



Reshmi
PRINCIPAL
All Saint's College
Thiruvananthapuram

Syllabus

Module 1-Introduction (7hrs)

Length scales in Physics- nanometre- Nanostructures: Zero, One Two and Three dimensional nanostructures, Band Structure and Density of State at nanoscale: Energy Bands, Density of States at low dimensional structures.

Module 2-Electrical Transport in Nanostructure: (15 hours)

Electrical conduction in metals, The free electron model. Conduction in insulators/ionic crystals - Electron transport in semiconductors - Various conduction mechanisms in 3D (bulk), 2D(thin film) and low dimensional systems: Thermionic emission, field enhanced thermionic emission

Module 3-Application of Nano Technology (8 hrs)

Applications of nanotechnology: (Elementary ideas only, Carbon nanotube, nano diamond, BN Nanotube, Nanoelectronics - single electron transistor (no derivation), Molecular machine, Nanobiomaterials, Potential applications, Expected benefits from nanotechnologies, Can nanotechnology help in addressing various challenges?, Energy and Energy Efficiency, new energy producers, Medicine, security, Other Applications.

Evaluation

Exam Based Assessment : 50



Reshmi
PRINCIPAL
All Saint's College
Thiruvananthapuram



Department of Physics
All Saints' College, Thiruvananthapuram

'Nanotechnology – The Emerging Science' (Phy. A.22.1)

Course Summary

The Add on course on 'Nanotechnology – The Emerging Science' is organized and conducted by the Department of Physics, All Saints' College, Thiruvananthapuram. This course envisages an introduction to the field of nanotechnology, covering the history, synthesis, characterisation and applications of nanotechnology. The course has a flexible structure which allows the students to learn effectively along with their regular studies. Dr. Dhanya Chandran coordinated the course, ensuring proactive learning throughout the study by planning and organizing various modes of teaching. The duration of the course was 30 hours. This academic year 35 students enrolled for the course. The certificate course commences on 12-12-2022 and concluded on 17-02-2023. All the students attended the exit exam which was held on 17-02-2023, and certificate was also issued to them on the successful completion of the course. The course outcome has been achieved by all the students. By the end of the course students were able to understand the basic principles of nanotechnology, various characterization techniques and its potential applications in various fields.



Reshmi
PRINCIPAL
All Saint's College
Thiruvananthapuram



All Saints' College
Trivandrum

Department of Physics

Course Report

Add on course on

'Nanotechnology – The Emerging Science' (Phy. A.22.1)

The Add on course on '*Nanotechnology – The Emerging Science*' is a great initiative by the Department of Physics, All Saint's College, Thiruvananthapuram. The course is specially designed to provide students an opportunity to learn about the latest developments in nanotechnology and how they can be applied to education. The course is well-designed and covers a range of topics, including the synthesis, characterisation and applications of nanotechnology. The duration of the course was 30 days. This academic year thirty-five students registered for this course. The add on course commenced on 12/12/2022 and ended on 17/02/2023. Exam based evaluation was conducted for the students and a certificate was also awarded to them upon successful completion of the course. Students gained basic knowledge of various areas of nanotechnology and are ready to take on the challenges of the next level.



Reshmi
PRINCIPAL
All Saint's College
Thiruvananthapuram

2025

[illegible]




All Saints' College
Thiruvananthapuram


C E R T I F I C A T E

This is to certify that **Amrutha K U** *of Second year M.Sc Physics*
has successfully completed the 30 hours Odd-on certificate course on

"Nanotechnology - The Emerging Science"

from 12/12/2022 to 17/02/2022, which was organised by the
Department of Physics, All Saints' College, Thiruvananthapuram

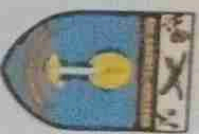

Dr. Dhanya Chandran
Course Co-ordinator


Dr. P S Anjana
Head of the Department


Dr. Reshmi R Prasad
Principal



All Saints' College
Thiruvananthapuram



All Saints' College
Thiruvananthapuram

C E R T I F I C A T E

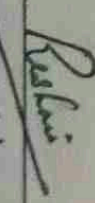
This is to certify that **Meenu Krishna** *of First year B.Sc Physics*
has successfully completed the 30 hours Add-on certificate course in

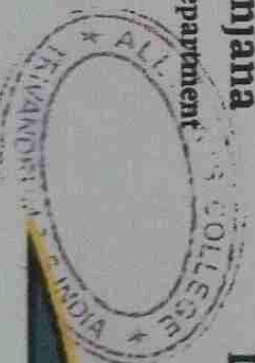
"Nanotechnology - The Emerging Science"

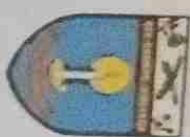
from 12/12/2022 to 17/02/2022, which was organised by the
Department of Physics, All Saints' College, Thiruvananthapuram


Dr. Dhanya Chandran
Course Co-ordinator


Dr. P S Anjana
Head of the Department


Dr. Reshmi R Prasad
Principal
All Saints' College







All Saints' College
Thiruvananthapuram

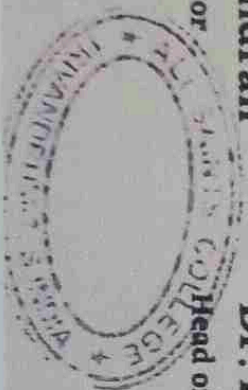
C E R T I F I C A T E

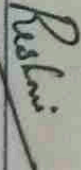
This is to certify that **Shani Shaji** *of First year B.Sc Physics*
has successfully completed the 30 hours Add-on certificate course on
"Nanotechnology - The Emerging Science"

from 12/12/2022 to 17/02/2022, which was organised by the
Department of Physics, All Saints' College, Thiruvananthapuram


Dr. Dhanya Chandran
Course Co-ordinator


Dr. P S Anjana
Head of the Department




Dr. Reshmi R Prasad
Principal
All Saints' College



All Saints' College
Thiruvananthapuram

C E R T I F I C A T E

This is to certify that **Amritha Saju** *of First year B.Sc Physics*
has successfully completed the 30 hours Add-on certificate course on

"Nanotechnology - The Emerging Science"

from 12/12/2022 to 17/02/2022, which was organised by the

Department of Physics, All Saints' College, Thiruvananthapuram

Dr. Dhanya Chandran

Course Co-ordinator

Dr. P S Anjana

Head of the Department

Dr. Reshmi R Prasad

Principal



Principal
All Saints' College



All Saints' College
Thiruvananthapuram

C E R T I F I C A T E

This is to certify that **Amritha Saju** *of First year B.Sc Physics*
has successfully completed the 30 hours Add-on certificate course on

"Nanotechnology - The Emerging Science"

from 12/12/2022 to 17/02/2022, which was organised by the

Department of Physics, All Saints' College, Thiruvananthapuram

Dr. Dhanya Chandran

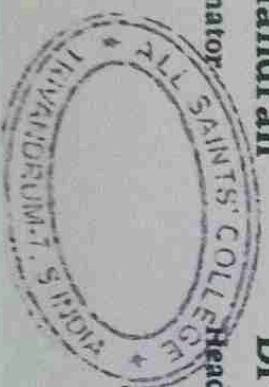
Course Co-ordinator

Dr. P S Anjana

Head of the Department

Dr. Reshmi R Prasad

Principal



Principal
All Saints' College