

ALL SAINTS' COLLEGE  
TRIVANDRUM, KERALA

ADD ON COURSE  
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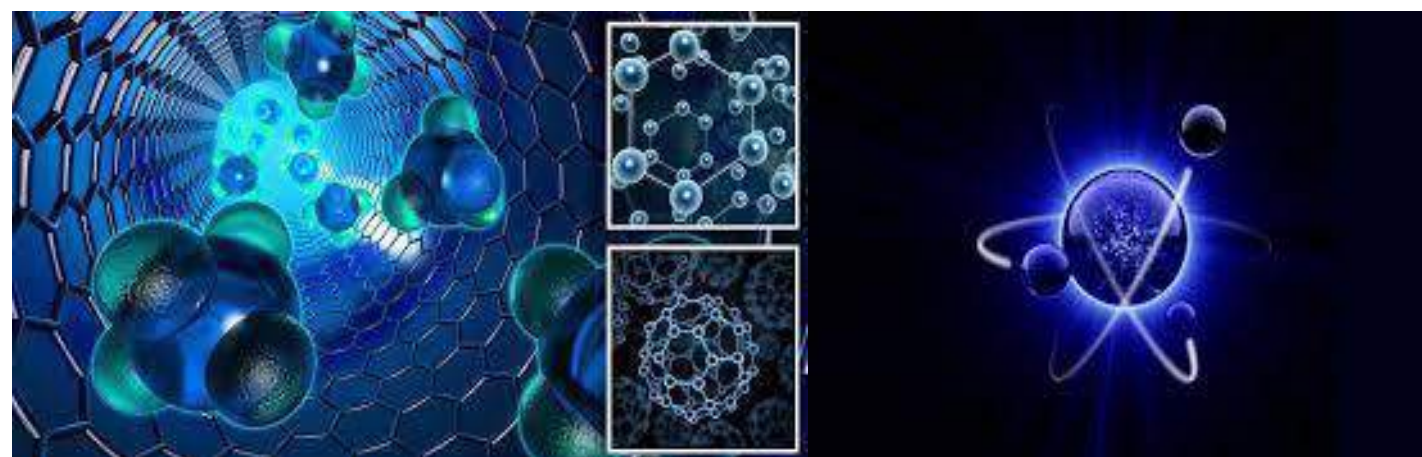


# **ALL SAINTS' COLLEGE**

**THIRUVANANTHAPURAM, KERALA**

**Add on Course**

**“Introduction to Nanoscience  
and  
Nanotechnology”**



**Conducted by**

**Department of Physics**

**2020-2021**

**Eligibility:** UG ongoing students

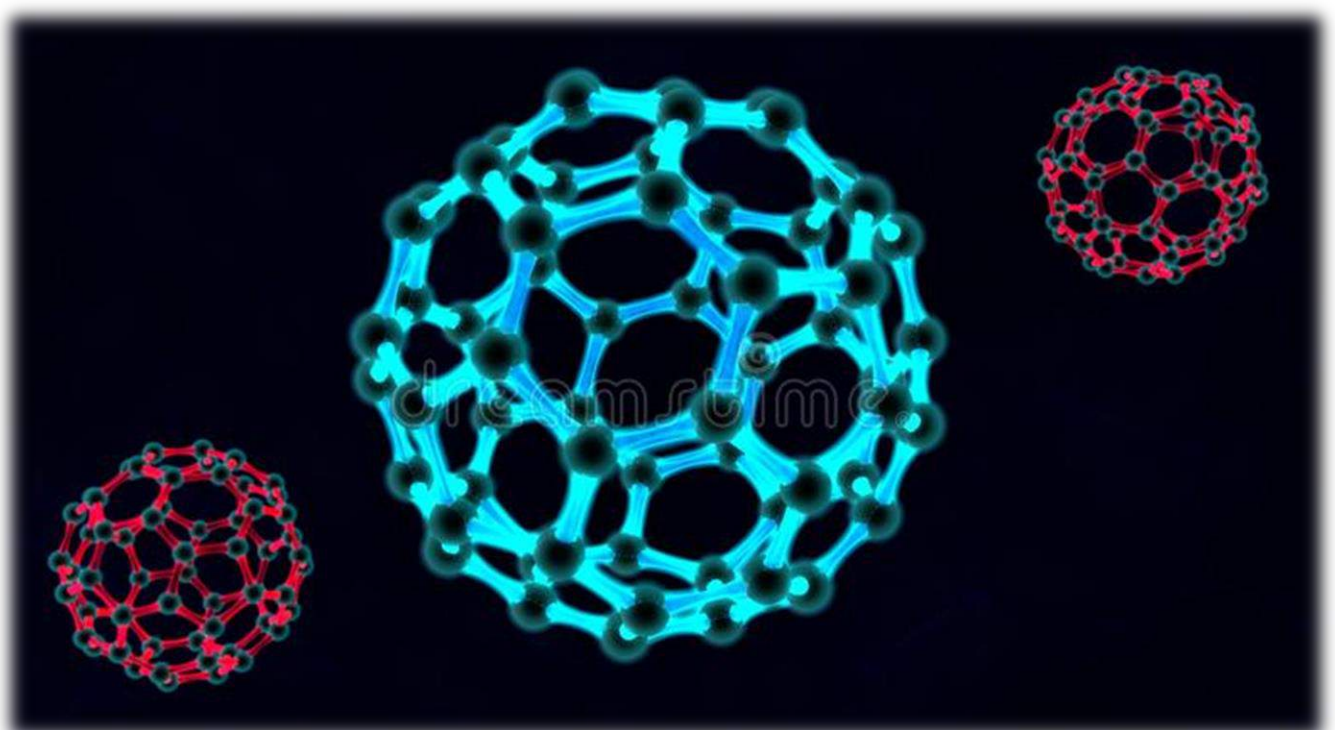
**Course period:** 30 hrs

**Features:** After completing the above course successfully, the learner thoroughly understands the Principle involved in the synthesis, Properties, characterization and applications of nanomaterials.

**Course Content:** Introduction & Synthesis of nanomaterials, Characterisation, Properties & Applications

**Benefits:**

At the end of this course, you will be able to create awareness about the wide and vast field of Nano science and to help students pursue their higher education and career in this field. The course content is designed in such a way that it covers multidisciplinary field of science, so that any science student or faculty can understand the fundamentals of Nano science.





Department of Physics

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## Introduction to Nano Science and Technology

(PHY.A.20.1)

Course Duration 30hrs

Teacher in Charge - Dr. Anjana P S

### Course Description

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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

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

### Course Outcomes

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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



## Syllabus

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### 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, Nanobiometrics, Potential applications, Expected benefits from nanotechnologies, Can nanotechnology helps in addressing various challenges?, Energy and Energy Efficiency, new energy producers, Medicine, security, Other Applications.

### Evaluation

Project Based Assessment : 50



*Reshmi*  
**Principal**  
All Saints' College  
Thiruvananthapuram-7



*For  
Adj-Pr*







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CERTIFICATE OF COMPLETION

WE HERE BY RECOGNIZE

*Aswathy B*

for completing the Add on Course (30 hrs) on

*“Introduction to Nano Science & Technology-  
(PHY.A.20.1)”*

Organized by the Department of Physics during the year 2020-2021

*Deepa*

**Dr. Deepa M**  
PRINCIPAL

*CBMendez*

**Dr. Caroline Beena Mendez**  
Head of the Department

*Aj PS*

**Dr. Anjana P S**  
Course Coordinator

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*Theresa Mathew*

for completing the Add on Course (30 hrs) on

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(PHY.A.20.1)”*

Organized by the Department of Physics during the year 2020-2021

*Deepa*

**Dr. Deepa M**  
PRINCIPAL

*CBMendez*

**Dr. Caroline Beena Mendez**  
Head of the Department

*AP S*

**Dr. Anjana P S**  
Course Coordinator



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*Adithya B*

for completing the Add on Course (30 hrs) on

*“Introduction to Nano Science & Technology-  
(PHY.A.20.1)”*

Organized by the Department of Physics during the year 2020-2021

*Deepa*

**Dr. Deepa M**  
PRINCIPAL

*CB Mendez*

**Dr. Caroline Beena Mendez**  
Head of the Department

*Aj PS*

**Dr. Anjana P S**  
Course Coordinator

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*Gopika M*

for completing the Add on Course (30 hrs) on

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(PHY.A.20.1)“*

Organized by the Department of Physics during the year 2020-2021

*Deepa*

**Dr. Deepa M**  
PRINCIPAL

*CBMendez*

**Dr. Caroline Beena Mendez**  
Head of the Department

*AP S*

**Dr. Anjana P S**  
Course Coordinator

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*Agitha Jyothish*

for completing the Add on Course (30 hrs) on

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(PHY.A.20.1)“*

Organized by the Department of Physics during the year 2020-2021

*Deepa*

**Dr. Deepa M**  
PRINCIPAL

*CB Mendez*

**Dr. Caroline Beena Mendez**  
Head of the Department

*Aj PS*

**Dr. Anjana P S**  
Course Coordinator



## Department of Physics

### Course Summary

#### Introduction to Nano Science and Technology (PHY.A.20.1)

The Add on course on 'Introduction to Nanoscience and Technology' is organized and conducted by the Department of Physics, All Saint's College, Thiruvananthapuram. The course is specially designed to provide an understanding about nanoscience and the creation of a comprehensive knowledge base for evaluation of the potential risks and benefits of nanotechnology to the environment. The course has a flexible structure which allows the students to manage their regular studies. The course was co-ordinated by Dr. Anjana. P.S, who planned and organized various modes of teaching to ensure pro-active learning throughout the study. The duration of the course was 30 days. This academic year 30 students enrolled for this course. The add on course started on 08/02/2021 and terminated on 02/3/2021. All the students attended the exit exam which was held on 10/04/2021 and certificate was also issued to them on the successful completion of the course. The mentioned course outcome has been achieved by all the students. The students acquired a foundational knowledge and broad outline of Nanoscience, Nanotechnology, Applications and related fields.

Anj-PS



Rashmi

Principal  
All Saints' College  
Thiruvananthapuram-7