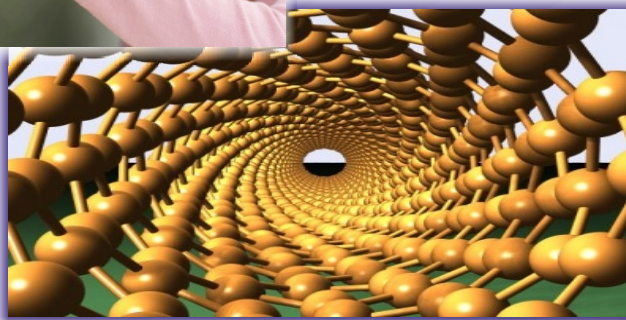
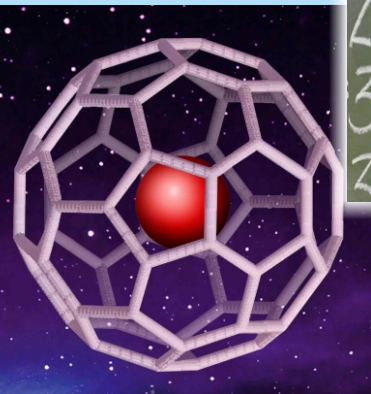




A Nanotechnology platform

# Nanotechnology Teacher's Training Program



A Golden Opportunity!

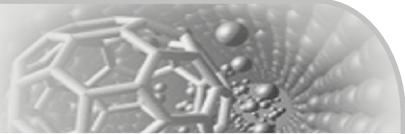
Join Now!

**Nano Science & Technology Consortium**

(Consultancy . Research . Outsourcing . Technology)

[www.nstc.in](http://www.nstc.in)

Prospectus



## **NSTC: An Overview**

NSTC is a non-governmental, privately run body, which came into existence in the year 2005. It aims to provide the services that lead to awareness creation, research and development, consultancy, collaborations, technology transfer and commercialization of budding Nano-based technologies. With over 250 corporate and industrial members and Nanotechnology programmes being run by government bodies (National Small Industries Corporation - Govt. of India), NSTC has positioned itself as a unique and dependable resource for providing quality Nanotechnology education. NSTC also runs India's only primary journal in the field of Nanotechnology, entitled “**Nanotrends**”.

## **What are NanoScience and Nanotechnology?**

NanoScience and Nanotechnology are the current frontiers of all scientific and technological advancement. They deal with manipulation of materials at the  $10^{-9}$ m scale. This essentially means rearranging bonds at the atomic level to create new substances with hitherto unheard of properties. Nanocomposites  $1/6^{\text{th}}$  the weight of steel yet a hundred times stronger, extremely efficient solar panels, cement which is far stronger than existing concrete, unimaginably small and fast electronic circuits, and revolutionary new medical applications have already started changing human life as we know it. There is absolutely no area of human existence that can remain untouched by these advancements.

For example, the unbelievable increase in speed of communication over the past 10 years has affected business, social networking, travel, education, technological transfer and a host of other areas. This increase has only been possible because of advancements in computer technology, mobile phone technology and the internet. The increase power of these devices owes its origin to miniaturization, that has only been made possible by Nanoscience and Nanotechnology.

Looking at how technology is being influence by this fundamental science, it is inevitable that all streams of teaching will soon be incomplete without a thorough grounding in Nanoscience. The need for good teachers in the area has already gone up exponentially, with over 60 institutions offering post-graduate programmes in Nanotechnology, and a large number of Technical Universities offering Nanoscience as a part of their syllabi.

## Nanotech Teachers Training - Why specialize in a new area?

Teaching is an attractive option even for freshers today. Newcomers entering the teaching profession face competition from existing teachers, and those who are experienced face the danger of becoming obsolete. Institutions now expect their teachers to upgrade their skills to cater to emerging trends, else the danger of being replaced is real.

Nanotechnology is set to storm the Indian technological stage. Universities have already started introducing Nanoscience at various levels. Institutions dedicated to Nanotechnology have also started mushrooming around the country. **The need for teachers in Nanotechnology is great, but the number of available teachers is very low - a golden opportunity for those teachers who want to further their career prospects.**

### Program Aim

Nanotechnology Teacher Training Program aims to give participants a broad view of Nanotechnology and its prospects, so that the teacher can in turn give a comprehensive view of this technology to students. Covering the entire gamut from the historical aspects to present and future perspectives of Nanotechnology, the programme covers the syllabi of various state technical universities such as the UP Technical University, the Uttarakhand University, Chattisgarh Swami Vivekananda Technical University, the Rajasthan Technical University and the Punjab Technical University etc.

### Program Features

The NTTP course is a unique initiative that customizes its features to suit the busy schedules of college professors, and yet provides a wide coverage of the subject so that teachers are well equipped to answer questions regarding peripheral areas related to the Nanoscience/Nanotechnology streams. Some of the course features are:

- The NTTP course has been designed to meet all the requirements of the Nanoscience/Nanotechnology syllabi of various Indian universities. The course also ensures that it maintains a focused approach, is rich from theoretical and project/practical point of view, and is interesting to study.

*“More than 2000 nano-qualified teachers will be required all over India by 2011.”*

- The Nanotechnology Teachers Training Program enables existing science teachers to transform themselves into Nanotechnology trained resource persons.
- The study material (books, CD's), supported by unique course delivery methodology (e-learning, supported by latest modules of Learning Management Systems - LMS) is designed, ensuring that the participant is trained and certified while continuing with existing duties. However, NSTC has facilities to extend its coverage of training to outdoor events/activities, if the institution demand so.
- Excellent teaching faculty - highly qualified experienced professionals - tapping inhouse and outside resources, from Indian and overseas institutions of excellence form a rich faculty and knowledge resource for the program.

## Program Duration

The programme may be completed in two modes.

1. **Fast Track** : 3 Months
2. **Normal Track** : 6 Months

The syllabus in both the modes is the same. The difference is in the rate at which the syllabus is covered.

## Eligibility

Association with teaching profession with a minimum bachelor degree in science/ technology.

## Syllabus

### Module 1: Fundamentals of Nanotechnology

- Historical Aspects of Nanotechnology
- What are Nano & Nanometer
- Nanoscience & Nanotechnology- Definitions & Components
- Modern Aspects of Nanotechnology
- How will Nanotechnology Affect Us

### Module 2. Nanotechnology in Various Sectors

- Nanotechnology in Agriculture/Food

- Nanotechnology in Electronics
- Nanotechnology in Textile
- Nanotechnology in Construction
- Nanotechnology in Energy
- Additional Applications of Nanotechnology in Medicine & Pharmaceuticals
- Nanotechnology in Automobiles
- Nanotechnology in Environment
- Nanotechnology in Sports
- Nanotechnology in Chemicals and Paints

### **Module3: Introduction to Nanoscale [ Physics- Chemistry- Biotechnology ]**

#### ***Introduction to Nanoscale Physics***

#### **Physics of Solid State :**

- Lattice Structure
- Energy Band Theory
- Transport Theory
- Dielectric & Magnetic properties of materials
- Foundations of Nanomaterials
- Types of various Nanostructures materials
- Properties of Nanostructures materials

#### **Basic Quantum Mechanics**

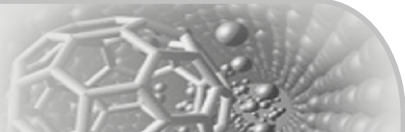
#### **Quantum Nanostructure**

#### ***Introduction to Nanoscale Chemistry***

- Building Blocks of Nanotechnology
- Chemical Properties

#### ***Introduction to Nanoscale Biotechnology***

*“Nanotech is set to become a \$ 1 trillion industry by 2015” - US Govt.*



- Introduction to cell structure and the machinery of the cell
- Computational Nanobiotechnology
- Applications of Nanobiotechnology

#### **Module 4: Nanomaterials -Concepts & Fundamentals**

- Introduction to Nanomaterials
- Classification of Nanomaterials
- Properties of Nanomaterials
- Applications of Nanomaterials
- Health Hazards of Nanomaterials

#### **Module 5: Carbon Based Nanomaterials & Properties of Individual Nanoparticles**

- Carbon Molecule
- Fullerenes: Discovery of C<sub>60</sub>, Structure of C<sub>60</sub>, Buckyball
- Nanodevices
- Overview of Properties
- Metal Nanoparticles
- Semiconducting Nanoparticles
- Rare Gas & Molecular Clusters

#### **Module 6: Fabrication Techniques of Nanomaterials**

##### **Types of Top- Down Fabrication Methods:**

- Top Down Mechanical Energy Fabrication Methods
- Top- Down Thermal Fabrication Methods
- Top Down High Energy and Particle Fabrication
- Top Down Lithographic Fabrication Methods

##### **Types of Bottom Up Fabrication Methods:**

- Bottom Up Gas Phase Fabrication Methods
- Nonbiological Bottom Up Liquid Phase Fabrication Methods

- Bottom Up Lithographic Fabrication Methods

### **Module 7: Characterization Techniques of Nanomaterials**

- Structure Determination Techniques
- Microscopy Techniques
- Spectroscopic Techniques
- Gel Electrophoresis
- Thermal Analysis
- Nanomanipulation and Nanolithography
- Nano Computation
- Molecular Nanomechanics

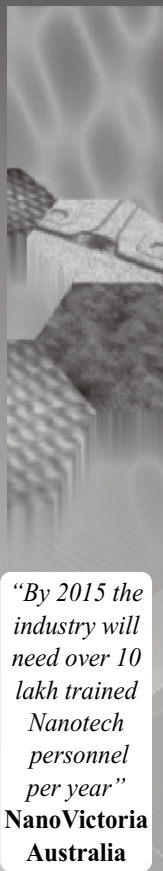
### **Program implementation methodology**

- 1) Join the program by submitting the application form along with the necessary fee.
- 2) Receive study kit (books), at your postal address.
- 3) Study the kit in the comfort of your home/institution without the need to be physically present at the NSTC.
- 4) Participate on web portal activities (<http://nstc.celnet.in>), and participate in Internet based classes and assessment.
- 5) Receive the marksheet & certificate from "Nano Science and Technology Consortium" after submission of the compulsory mid-term assignments, project work and final online examination.
- 6) Receive post-programme support from "Nano Science & Technology Consortium".

### **Admission Procedure**

Aspirants who wish to apply for the Nanotechnology Teachers Training Program can do so as follows:

- 1) Fill in the enclosed application or download the free application form from [www.nstc.in/programs](http://www.nstc.in/programs).



*"By 2015 the industry will need over 10 lakh trained Nanotech personnel per year"*

**NanoVictoria  
Australia**

- 2) Calculate the final payable fee as [**Total Course Fee - Scholarship Fee Waiver (If applicable - Details given below)**] + **300/- as registration charges**, and make a DD/at par cheque.
- 3) Send the completed application form, DD/Cheque, a copy of the certificate/ mark sheet of the highest Degree/ Diploma and one copy of passport size photograph to:

**Nano Science and Technology Consortium**

**A-105, Level III, Sector 63, NOIDA, UP.**

**Tel: 0120 - 4781200**

### Fee structure and payment norms

The program fee should be sent along with duly completed application form. The applicable fee should be paid through a Demand Draft/ at par Cheque, issued in favor of "**Nano Science and Technology Consortium**", payable at "**Delhi/ New Delhi**".

Fee Details	Indian Students	Overseas Students
Program Fee*	Rs. 15,000/-	US\$ 800

\*Fees for Fast track and Normal track are the same

### Scholarships(Fee waiver)

1. Women Candidates - 10% fee waiver
2. Group Scholarships - (a) three and above - 20% (b) five and above - 30 % (c) ten and above - 40% (Single DD Payment)
3. Academic Scholarships - based on marks in last board/university exam passed, as given below.

Scholarship	Eligibility
10% fee waiver	60% - 70% marks in last board/univ. certification
15% fee waiver	71% - 80% marks in last board/univ. certification
20% fee waiver	81% - 90% marks in last board/univ. certification
25% fee waiver	More than 90% marks in last board/univ. certification

(Check scholarship conditions on [www.nstc.in/programs](http://www.nstc.in/programs))

### **Dispatch of Study material and certificates**

The above program fee is inclusive of the charges towards the dispatch of kit (study material), marksheet and certificate, registration and examination. However, in case of return of these documents owing to incorrectness/ insufficiency in the address or change of postal address, provided by the participant, the second time dispatch of the aforesaid material is charged as per the norms given on the NSTC website.

### **Award of Marksheet & Certificate**

A participant is awarded the marksheet and certificate after the submission of his/ her compulsory mid-term assignments, final project work and online examination. The time duration required to complete the program is six months. Students are instructed to complete the assignments and online examination and ensure submission of the project work to NSTC within a stipulated time period of 6 months. Failing to meet this timeline requires a re-registration as per the norms specified on the NSTC website

### **Policy Regarding Change in Registration Information**

Any change in information provided to NSTC at the time of registration e.g. address or any other information will only be considered through written communication by post. No other mode of communication will be accepted.

### **Note**

NSTC reserves the right to change the commencement/ conclusion dates of the program, with or without notice to the participants. NSTC strives to make the kit (study material) available to the participants in time, however, in the exceptional events of any delay from NSTC's side (not the delay on account of postal/ courier agencies), in providing the study material, the participant will be compensated with an extended timeline accordingly.

The Director NSTC is the final authority in all matters pertaining to this program.

*“Indian  
Nanotech  
initiatives  
are producing  
products for  
worldwide  
applications”*

**Dr. APJ Abdul  
Kalam**



A Nanotechnology platform

# Nano Science and Technology Consortium

A-105, Level III, Sector 63, Noida, UP,

INDIA 201 301

Mobile No. 9818206463

## APPLICATION FORM

### Nanotechnology Teacher's Training Program

Three Months ( ) Six Months ( ) Distance Participation Program

With e-Learning Program Management

[please tick mark for the selection of program duration]

Form No: .....

Affix your latest  
passport size  
photograph duly  
signed by you

(for office use only)

Enrolment No.

1. Name (Mr./Ms.) \_\_\_\_\_  
First Middle Last

2. Father's Name \_\_\_\_\_

3. Postal Address (Capital Letters Only) \_\_\_\_\_

City: \_\_\_\_\_ Pin Code:

State: \_\_\_\_\_ Email: \_\_\_\_\_

Phone No. with STD Code: \_\_\_\_\_ Date of Birth   
DD MM YYYY

Mobile No: \_\_\_\_\_

#### 4. Academic Qualification:

Examination	Board/University	Year of Passing	% of Marks
Intermediate			
Graduation			
Post Graduation			
Any other			

**5. Teaching Experience:**

Present Institution/ University (Name & Address )	Designation	Total Experience	Present Responsibility

6. (a) **Nationality:** \_\_\_\_\_ (b) **Country of Residence:** \_\_\_\_\_

7. General information ( ✓ ) mark only relevant column

**Sex**

Male

Female

8. Crossed Demand Draft/Cheque No. \_\_\_\_\_ date \_\_\_\_\_

Drawn on \_\_\_\_\_ for Rs./ \$ \_\_\_\_\_

(Bank draft must be drawn in favour of "Nano Science and Technology Consortium". Payable at **Delhi** or **New Delhi**. Candidates are advised to write their name and address at the back of demand draft/ Cheque)

9. Scholarship (tick any one) Applicants must ensure that they have read scholarship terms & conditions given online at <http://www.nstc.in> before sending the application form and fee.

Female candidate

Academic Scholarship

Group Discount (Minimum 3 applicants with single DD are eligible)

Please attach relevant documents for support.

11. Documents to be attached with application form:

i) Total Program Fee draft at the time of submitting application form

ii) Photocopies of certificate & marksheet of the latest Degree / Diploma, Documents in support of scholarship

iii) Passport size photograph

**Note:** NSTC accepts payable at par cheques only, other cheques are not acceptable.

**Important Information**

The program in which you are seeking participation, is NSTC's independent knowledge enhancement training program. The program neither promises any job guarantee nor provides any specific eligibility to pursue higher studies. In case of any dispute, it would have to be resolved through arbitration, under Arbitration and Conciliation Act 1996, by the sole arbitrator appointed by the NSTC, Noida. The jurisdiction of the same will be the Court of the District Gautam Buddha Nagar, Noida, India only.

**Declaration by the Applicant**

I hereby declare that I have read and understood the details of the program for which I seek admission. I have read scholarship & program terms & conditions given online and agree to the same. I have provided the necessary information in this regard. In the event that any information is found incorrect or misleading, my candidature shall be liable to cancellation by NSTC at any time and I shall not be entitled to refund of any fee paid by me to NSTC. I fully understand and agree that fee once paid is not refundable in any circumstances and is also not transferable.

**Date:**

**Place:**

**Signature of Candidate**

**Over 2,000 participants have already completed NSTC's  
Nanotechnology programs**

### **NSTC's Program Participant Affiliations**

- ▶ Accenture
- ▶ AIIMS
- ▶ Alagappa University
- ▶ Aligarh Muslim University
- ▶ Amrita Institute of Medical Sciences
- ▶ Anna University
- ▶ Apollo Hospital
- ▶ Ashok Leyland
- ▶ BARC
- ▶ Bharat Earth Movers Ltd.
- ▶ Bharat Electronics
- ▶ BHEL
- ▶ Biocon Ltd.
- ▶ BSNL
- ▶ Central Forensic Science Laboratory
- ▶ Cognizant Technologies
- ▶ Covansys
- ▶ Deloitte Consulting
- ▶ Department of Atomic Energy
- ▶ Dr. Reddys Lab
- ▶ DRDO
- ▶ Excel Hitech India Enterprises
- ▶ Grasim Industries Ltd.
- ▶ HCL Technologies Ltd.
- ▶ Hewlett Packard
- ▶ Hindustan Lever
- ▶ Hindustan Petroleum
- ▶ Honeywell Technology Solutions
- ▶ IIT Delhi
- ▶ IIT Guwahati
- ▶ Indian Agriculture Research Institute
- ▶ Indian Air Force
- ▶ Indian Army
- ▶ Indian Institute of Science
- ▶ Indian Navy
- ▶ Indian Oil Corporation Ltd.
- ▶ Infosys Technologies Ltd.
- ▶ ISRO
- ▶ Johnson & Johnson
- ▶ Larsen & Toubro
- ▶ Mahindra & Mahindra Ltd.
- ▶ Manipal Institute of Technology
- ▶ MRF Ltd
- ▶ NALCO Ltd.
- ▶ National Aerospace Laboratories
- ▶ National Metallurgical Laboratory
- ▶ National Physical Laboratory
- ▶ ONGC Ltd.
- ▶ Pfizer Ltd.
- ▶ Polaris Software Labs Ltd.
- ▶ Reliance Energy Ltd.
- ▶ Robert Bosch India
- ▶ SAIL
- ▶ SAP Labs
- ▶ Siemens
- ▶ SRL Ranbaxy Ltd.
- ▶ Sterlite
- ▶ Satyam Computers
- ▶ Syntel Inc. India Ltd.
- ▶ Tata Consultancy Services Ltd.
- ▶ TATA Research Development and Design Centre
- ▶ Tata Steel
- ▶ TB Research Centre, ICME
- ▶ Tech Mahindra Ltd.
- ▶ Unichem Labs Ltd.
- ▶ Vellore Institute of Technology
- ▶ Vikram Sarabhai Space Center
- ▶ Wipro Technologies

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### **Nano Science and Technology Consortium**

A-105, Level III, Sector-63, Noida, UP (INDIA), 201301

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Mob: 09818206463

Website: [www.nstc.in](http://www.nstc.in)

E-mail: [info@nstc.in](mailto:info@nstc.in)