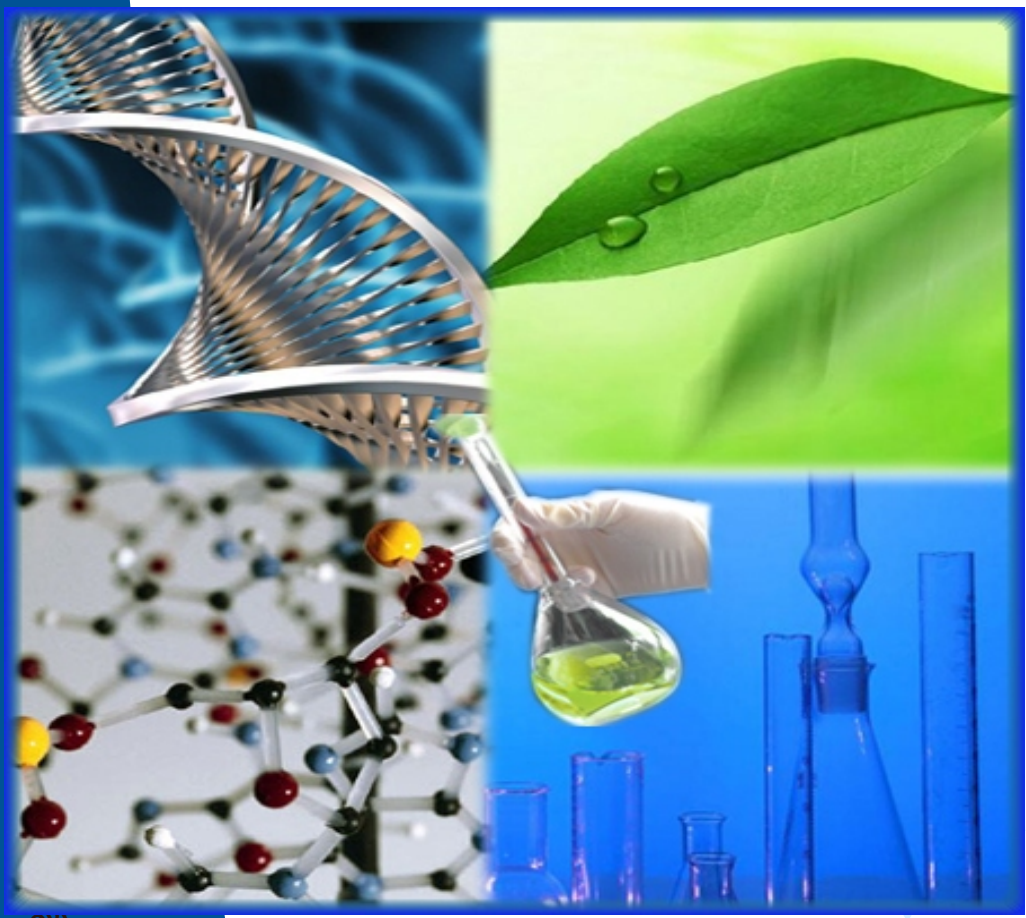
BioNanotechnology & Medical Applications Program



Nano Science & Technology Consortium

(Consultancy . Research . Outsourcing . Technology)

www.nstc.in

NSTC®

A Nanotechnology platform

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, 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 1/6th 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 increased power of these devices owes its origin to miniaturization, which has only been made possible by Nanoscience and Nanotechnology.

What is Bionanotechnology?

Medical research is now focusing increasingly on the micro and nano scale. Concepts such as lab-on-a-chip (microarrays) are now being used the world over to facilitate ultra-sophisticated tests while taking a negligible amount of biological material from the patient. Nanostructures such as quantum dots and dendrimers have started finding extensive applications in curing cancer, and the silver nanoparticle is considered a prime candidate for fighting viruses such as AIDS.

Each of these advances has needed manipulation at the nanoscale. An increasing amount of attention is being paid to development and manipulation of biomaterial at the nano-level, because that is the way nature works. Nature uses miniscule building blocks such as DNA to build huge structures such as the human body. Hence, medical research is now tending toward the view that to correct seemingly incurable defects, a thorough understanding of bionanostructures such as DNA is imperative. The study and manipulation of structures at the nanoscale and their use in medical applications is known as Bionanotechnology.

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

Program Aim

The program aims to give a participant a thorough grasp of this amazing new application area. It equips the participant to explore further and discover the power of the nano-level in offering relief to humankind from so-called incurable maladies. While the subject matter is covered in great depth, a lot of attention is paid to ensure that the participant understands the practical applications of the study material in the domain of nano-scale biotechnology.

Program Features

The Bionanotechnology program is a unique initiative, not

just in terms of its subject matter, but also in term of its delivery methodology. It assumes that the participant has a grounding in life sciences, and then builds up into applications of nanotechnology within the sphere of medical applications.

- The program begins by explaining basic concepts of Nano Physics, Nano Chemistry and Nano Biology. It then examines various other topics such as toxicology, nanobiomaterials, nanobiostructures and the various uses of bionanotechnology in medical applications.
- In order to give a real-world dimension, the various characterization tools used to measure bionano properties, fabrication mechanisms used to manufacture bionanomaterial and some essential laboratory techniques are examined in detail.
- The study material (books, CDs), supported by unique course delivery methodology (e-learning through Learning Management Systems - LMS) has been 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 so demands.
- A number of highly qualified experienced professionals - tapping resources from Indian and overseas institutions of excellence form a rich faculty and knowledge resource for the program.

Program Duration: 6 months. If the participant is unable to complete the program in 6 months, a re-registraion will be required as per norms given on the NSTC website.

Eligibility

A bachelor degree in science/ technology.

Syllabus

Module 1: Nano [Chemistry , Physics , Biology]

Nanochemistry

- Basics of Nanochemistry
- Nanoparticles
- Carbon Nanotubes
- Nanocomposites

Nanophysics

- Basics of Nanophysics
- Nano Electronics
- Nano Robotics
- Nano Magnetism

Nanobiology

- Basics of Nanobiology
- Nanobiology Today
- Nanomedicine
- Biomedical Applications of Nanobiology

Module 2 : Bio- Nano - Concepts & Fundamentals

- Overview of Bio-Nanotechnology
- Nature Inspired Bio Nanotechnology
- Physics of Bio-Nanotechnology
- Self Assembly Nanostructures
- Bio-Nanotechnology & Toxicology

Module 3 : Bio-Nanomaterials- Concepts & Fundamentals

- Dimensions & Structures
- Classifications of Bio Nanomaterials
- Properties & Applications

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

- Preparation methods & tools
- Characterization and Manipulation
- Functional Bionanomaterials
- Nanocomposite Biomaterials

Module 4 : Bio-Nano Medical Technology & Applications

- Imaging & Diagnostics
- Cancer Detection and Cure
- Drug Delivery
- Tissue Regeneration
- Disease Diagnosis and Screening
- Nanomedicines
- Microfluidics
- Nuerobioelectronics
- Bioelectronics
- Quantum Dots for Biomarkers
- Molecular Electronics
- Biosensor and Biochips

Module 5: Methods & Tools for Measuring Bio-Nano Properties

- Structure Resource
- Microscopy Resource
- Spectroscopy Resource

Module 6 : Bio Nanotechnology Laboratory & Lab Procedure

- Safety practices in Bionanotechnology
- 1-D systems. Functionalized nanoparticles for selective recognition of biomolecules
- 2-D systems. Nanoscale model systems for targeted drug delivery

- 3-D systems. Microfludics as a platform for advanced protein separation

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.

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

Admission Procedure

Aspirants who wish to apply for the **Bionanotechnology And Its Medical Applications** program can do so as follows:

1) Fill in the enclosed application form or download the free application form from www.nstc.in/programs.
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:

The Course Coordinotor,
Nano Science and Technology Consortium
A-105, Level III, Sector 63, NOIDA, UP. Tel: 0120 4330376

Fee structure and payment norms

The program fee should be sent along with duly completed application form. The 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. 10,000/-	US$ 600

Scholarships(Fee waiver)

(Certificate required)

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)

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. change in address 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 event 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

NSTC
A Nanotechnology platform

Nano Science and Technology Consortium
A-105, Level III, Sector 63, Noida, UP,
INDIA 201 301

APPLICATION FORM

Bionanotechnology & Medical Applications

Distance Participation Program
With e-Learning Program Management

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:_____

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

5. **Experience:**

Present company (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 cheque**s** 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

Nano Science and Technology Consortium

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