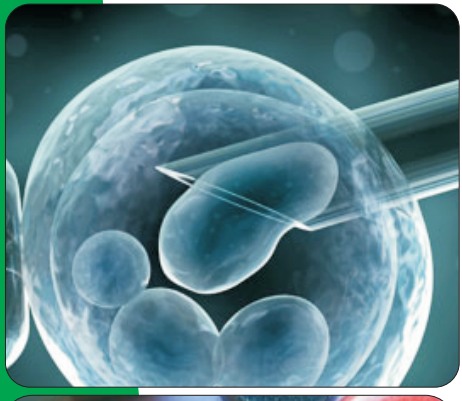
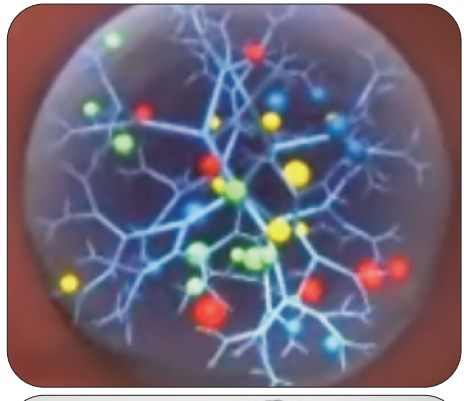
Corporate Brochure

Nanopharmaceuticals & Its Industrial Applications

Nano Science & Technology Consortium

(Consultancy . Research . Outsourcing . Technology)

www.nstc.in/programs

NSTC®

A Nanotechnology platform

NSTC: An Overview

NSTC is a non-governmental 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. NSTC With over 250 corporate and industrial members has positioned itself as a unique and dependable resource for providing quality Nanoscale science and technology knowledge through trainings. NSTC also runs India's only primary journal in the field of Nanotechnology, entitled "NanoTrends".

Program Overview

Nanopharmaceuticals represent an emerging field where the sizes of the drug particle or a therapeutic delivery system work at the nanoscale. In the pharmaceutical industry a long standing issue is the difficulty of delivering the appropriate dose of a particular active agent to specific disease site.

At the dimension of 10^{-9} m (billionth of a meter) the ability to create new and wonderful products and materials gets a tremendous boost, this is because at this scale we have the ability to work at atomic / molecular level and thus able to create things which are remarkably significant to current comparisons.

The Program **Nanopharmaceuticals & Its Industrial Applications** is an advanced program meant to enhance the knowledge base of participants in the emerging area of nanopharmaceuticals. The program comprises of eight

modules. The modules include online tutorials, quizes, assignments and videos. Participants are evaluated through project work and online assignments. The program consists of two online mid-term assignments, a final online examination and project work. The mid-term assignments contribute 20% to the final marking. The final online examination contributes 30%, and the project work makes up 50% of the final marks.

Program Aim

The program aims to give participants a thorough grasp of amazing new applications of Nanotechnology in pharmaceutical industry. It equips the participant to explore further and discover the power of the nanoscale science in the pharmaceutical industries. While the subject matter is covered in great depth, a lot of attention is paid to ensure that the participant understands practical applications of study in the domain of Nanopharmceuticals.

Program Features

The **Nanopharmaceuticals & Its Industrial Applications Program** is a unique program, not just in terms of its subject matter, but also in term of its delivery methodology. The program begins by explaining basic concepts of nanotechnology in pharmaceutical industry. It then examines various other topics such as drug delivery systems, pharmaceutical nanomaterials, nanomedicines, pharmaceutical nanosystems, nanobiomaterials, Nanobiostructures, laboratory procedures and the

various uses of nanotechnology in the drug industries. In order to give a real-world dimension, the various characterization tools used to measure nano properties, fabrication mechanisms used to manufacture pharmaceutical nanomaterials and essential laboratory techniques used in are examined in detail.

The study material (books, CDs), supported by unique course delivery methodology (e-learning, supported by latest modules of Learning Management Systems - LMS) has been designed, ensuring that the participant is trained and certified while continuing with his existing work schedule. 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 Outcome

As on today nanoscale procedures have become prerequisite to pharmaceutical industries. The market for nanopharmaceuticals has grown from $406 million in 2004 to $3 billion in 2009 and will be $16.6 billion in 2014. The increasing demands and applications of pharmaceutical nanotechnology result in securing positions in the pharmaceutical and other health care industries.* This program will help graduates and post graduates to increase their knowledge in nanopharmaceuticals and they will be able to pursue careers in a diverse range of drug industries.

*source: www.infoshop.com

Program Structure

Module 1: Introduction to Nanotechnology

- Nanotechnology-Definitions & Concepts
- Opportunities and Scope
- Brief History of Nanotechnology
- Nanobiology
- Nanochemistry
- Nanotechnology in Therapeutics & Pharmaceuticals

Module 2: Biopharmaceutical Nanotechnology

- Nano Drug Delivery
  - Importance of Nanosize in Drug Delivery
  - Routes of Delivery
  - Targeted Drug Delivery
  - Delivery Profiles
  - Advantages of Nanostructured Delivery Systems
  - Activation and Targeting of Nanotechnology-based Drug Delivery Systems
  - Drug Release Mechanisms
  - Drug Targeting with Nanoparticles
  - Genetic Vaccines
- Quantum Dots for Biomarkers

- Microfludics
  - Microcapillary electrophoresis DNA Chips for Genomics
  - Materials for Microfluidic Devices and Micro/Nano Fabrication Techniques
  - Active Microfluidic Devices
  - Smart Passive Microfluidic Devices
- Nanobiosensors and Biochips
  - Basic Components of Biosensors
  - Fiber-Optic Nanosensor System
  - Antibiotin Sensing using LSPR Spectroscopy
  - LSPR Detection of a Carbohydrate-Binding Protein Interactions
  - Detection of Alzheimer's Disease Markers using the LSPR Nanosensor Chip
  - SWNT Oxidoreductase Enzyme Nanobiosensors
  - SWNT Metalloprotein Nanobiosensors
  - Antibodies as Biosensors
  - Glucose biosensors
  - Biochips
- Diagnosis and Treatment
  - Nanoparticles
  - Cancer Diagnosis and Treatment
- Tissue Engineering and Regenerative Medicine

- Nano-bioelectronic

Module 3: Nanostructures in Pharmaceuticals

- Sculptured Thin Films
- Quantum Heterostructures
- Nanocomposites
- Nanofabrics
- Nanocapsules
- Dendrimers
- Nanoshells
- Nanocages
- Nanoflowers
- Nanofoam
- Nanofibers
- Nanomesh
- Nanotubes
- Fullerenes

Module 4: Applied Nanomaterials in Pharmaceutical Industries

- Nanoparticles
- Nanorobots
- Micelles
- Microemulsions
- Nanoliposomes
- Nanoporous materials
- Nanodiamonds
- Nanopolymers
- Drug Nanocrystals

Module 5: Nanomedicine: Promise of the Future in Disease Management

- Introduction: Clinical Needs for Nanomedicines
- Drug and Vaccine delivery through Nanomedicines
- Regenerative medicines
- Current Era of Nanomedicines
- Nanosurgery

Module 6: Pharmaceutical Nanotechnology

- Nanobiotechnology for Drug Discovery
- Nanoparticles Used in Pharmaceutical
- Prodrug Approach
- Cell-Targeting and Cell-Penetrating Peptides for Delivery of Drug
- Lipid-Based Colloidal Nanodrug-Delivery Systems
- Nanobiotechnology-Based Drug Delivery in Cancer
- Pulmonary Drug Delivery by Nanoparticles
- Physiological, Biochemical and Chemical Barriers Drug Delivery
- Nanobiotechnology-Based Transdermal Drug Delivery
- Controlled Release Dosage Forms
- Tablet Production by Nanosystems
- Challenges to Pharmaceutical Nanotechnology

- Future Aspects of Pharmaceutical Nanotechnology

Module 7: Nanotechnology -Laboratory & Lab Procedure

- 0-D systems: Laboratory Synthesis of Nanoparticles
  - Photolithography
  - Electron Beam Lithography
  - Focused ion beam Lithography
  - X-ray lithography
  - Nanoparticles through Homogeneous Nucleation
  - Laser Ablation Synthesis
  - Chemical reduction method
  - Synthesis of Oxide Nanoparticles
  - Quantum dot
  - Properties of nanoparticles
  - Nanoparticles applications
- 1-D systems: Laboratory Synthesis of Nanowires and Nanorods

Spontaneous growth

  - Vapor (or solution) liquid solid (VLS or SLS) growth

Template-based synthesis

- Electroplating
- Electrophoretic deposition

Electrospinning

❖ 2-D systems: Laboratory Synthesis of Thin Films

Vapor-Liquid-Solid method

- Evaporation
- Molecular Beam Epitaxy (MBE)
- Sputtering
- Chemical Vapor Deposition (CVD)
- Atomic Layer Deposition (ALD)

Liquid-Phase deposition

- Electrochemical deposition
- Chemical Solution Deposition
- Langmuir-Blodgett films
- Self-Assembled Monolayers (SAMs)

❖ Characterization of Nanostructured Materials

Structural Characterization

- X-ray diffraction (XRD)
- Small angle X-ray scattering (SAXS)
- Scanning electron microscopy (SEM)
- Transmission electron microscopy (TEM)
- Atomic force microscopy (AFM)

- Scanning probe microscopy (SPM)
- Gas adsorption

Chemical Characterization

- Optical spectroscopy
- Absorption and transmission spectroscopy
- Photoluminescence (PL)
- Electron spectroscopy
- Ionic spectrometry
- Colorimetry
- Fluorescence
- Mass Spectrometry

Module 8- Nanopharmaceutical Products Overview

- Supplements
- Drugs
- Therapy
- Cosmetics

Delivery Methodology

The training is imparted through Learning Management System (LMS) by which participants are guided on the program ingredients throughout 24x7. Participants can undertake the training sessions at home, office or where internet connection is possible. Secured user id and password are provided to access this system. Facility to share views about the program and project with other

participants is available in the system. Other additional activities which are performed by participants are quizes, submissions of online assignments and course discussion.

Study Material

Study Material is delivered through print books and online. Books and online material are developed by in-house experts.

Growth Aspects

Growing applications of Nanopharmaceuticals in drug and health industries has opened the doors for pharma professionals to enter or grow their career. The expected world market for nanopharmaceuticals will be $16.6 billion in 2014 from $406 million in 2004.

Program Duration

The program duration is flexible from 2 to 6 Months (Only for Corporate)

(It is inclusive of a grace period of three months against a re-registration fee of Rs. 2000 / US$ 75).

Eligibility

- Graduation / Post-graduation / Ph.D in Pharmacy/Biopharmaceuticals/Medicine/Clinical Sciences/Biotechnology/ Chemical Sciences.

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
Registration fee	Rs. 300=00	US$ 50=00
Total Fee	Rs. 10,300=00	US$ 650=00

Fee Includes "Books, CDs, LMS, Certification and Examination Fee".

Special features for Corporate

- Tailor made customized programs for corporates (for a minimum batch of 25)
- Programs well suited for Researchers, Scientists, Production & Technology professional.
- Unique proven methodology which uses the delivery through LMS (Learning Management System) along with printed study materials.
- Flexi learning @ 24X7 approach.
- Excellent assessment tools inbuilt for enhancing the learning outcome.
- Elaborate feedback mechanism and reporting.
- Tracking and grading of the learning, grading & certification (post training).

How to Apply

Nanopharmaceutical & Its Industrial Applications is the right path to enter the new world of Pharmaceutical.

- Aspirants who wish to apply for the program **Nanopharmaceuticals & Its Industrial Applications** can download the application form from our website: www.nstc.in/programs
- One can apply at any time of the year and the registration will be provided with the current or ongoing batch.
- Participant can register in more than one program at a time.
- Duly filled application forms (enclosing a Bank Draft issued in favour of **"Nano Science and Technology Consortium", payable at Delhi/ New Delhi,)** along with copies of certificates and mark sheets of 10+2 / Diploma / Degree or above level and a copy of passport size photograph can be send to:

Nano Science and Technology Consortium
A-105, Third Floor, Sector-63
Noida-201301, U.P, India
Contacts: 0120-4781216/4781217, 09818206463

***Documents Required**

Highest degree certificate and mark sheet will be required for this program.

Certification

The participant is awarded the certificate and statement of marks after the completion of the program. All the participants are instructed to complete the program in the specified time. Failing to meet this timeline requires a re-registration as per the norms specified on NSTC website.

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.

NSTC
A Nanotechnology platform

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

APPLICATION FORM

Nanopharmaceuticals & Its Industrial 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. Organization's Name _____

4 .Postal Address (Capital Letters Only) _____

_____

City: _____ Pin Code: | | | | | | |

State:_____Email:_____

Phone No. with STD Code: _____ Date of Birth DD MM YYYY | | | | | | | | |

Mobile No:_____

5. **Academic Qualification:**

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

6. **Experience:**

Present company (Name & Address)	Designation	Total Experience	Present Responsibility

7. (a) **Nationality**: _____(b) **Country of Residence**: _____

8. General information (✓) mark only relevant column

Sex Male ☐ Female ☐

9. 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)

Please attach relevant documents for support.

10. Documents to be attached with application form:
Total Program Fee draft at the time of submitting application form

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.

Date:

Place: **Signature of Candidate**

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

NSTC's Past 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

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

Tel: 0120- 4781216/217 Mob: 09818206463

Website: www.nstc.in E-mail: info@nstc.in