

CAREER DEVELOPMENT CENTRE



Date: 28th December 2021.

Subject: Value Added Trainings School of Pharmaceutical and Population Health Informatics

Attention: M.Pharm- II Semester / B.Pharm- VIIIth Semester (Session-EVEN-2021-22)

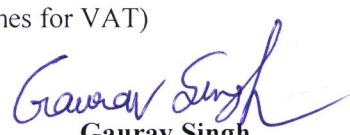
Above mentioned students are hereby informed that as per the approved value added trainings for the academic year 2021-22, Career Development Centre offers the below mentioned technical training in the Even Semester (2021-22). Details as follows:

Training	Semester	Program	Duration	Date of Commencing
Nano Technology and Nano Sensors (VAT-73)	II	M.Pharm	36	7 th February 2022

NOTE:

1. The Department concerned shall notify the details about timings and venue of the training sessions. In case of any query please contact the Career Development Centre, DIT University.
2. For Office of HoD- Ref to Letter No. Ref No: DITU/CDC/2019/AN-14 (Guidelines for VAT)


Dr. Havagiray Chitme
HoD- SoPPII
Head
Faculty of Pharmacy
DIT University, Dehradun


Gaurav Singh
Head- CDC
Career Development Cell
DIT University, Dehradun

To:

- All Deans / Directors
 - HoDs
 - CDC
- } With the request to bring the above to the notice of the students

Copy for information to:

- Hon'ble Chairman
- Hon'ble Chancellor
- Hon'ble Vice Chancellor
- Hon'ble Pro Vice Chancellor
- ICT Manager – to upload on website


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VAT 73- Nano Technology and Nano Sensors

Venue: Vedanta 305 | **Duration:** 36 Hrs (7th February 2022 – 02nd May 2022)

Nanotechnology and Nanosensors are broad, interdisciplinary areas that encompass (bio)chemistry, physics, biology, materials science, electrical engineering and more. The present training provided a survey on some of the fundamental principles behind nanotechnology and nanomaterials and their vital role in novel sensing properties and applications. It was conducted by the **School of Pharmaceutical and Population Health Informatics**, the coordinator for the training was **Dr. Bhavna** (Assistant Professor, SoPPHI- DIT University and **M.Pharm (IInd Semester)** were offered this value added training.

OBJECTIVE:

The course main objective is to enhance critical, creative, and innovative thinking. The course encourages multicultural group work, constructing international 'thinking tanks' for the creation of new ideas. Throughout the course, you will be asked to reflect upon your learning, think "out of the box", and suggest creative ideas.

The course is set to encourage the understanding of:

1. The importance of nanoscale materials for sensing applications.
2. Approaches used for characterizing sensors based nanomaterials.
3. Approaches used for tailoring nanomaterials for a specific sensing application.
4. Metallic and semiconductor nanoparticles.
5. Organic and inorganic nanotubes and nanowires.
6. Optical, mechanical and chemical sensors based on nanomaterials.
7. Hybrid nanomaterial-based sensors.



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TRAINING OUTLINE:

Module 1: Introduction to Nanotechnology: Definition of nanotechnology; main features of nanomaterials; types of nanostructures (0D, 1D, and 2D structures); nanocomposites; and main chemical/physical/electrical/optical properties of nanomaterials.

Module 2: Introduction to Nanotechnology - continue: Methods for characterizing the nanomaterials: Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), and spectroscopy- and spectrometry-based surface analysis techniques. Fabrication of sensors by bottom-up and top-down approaches; self-assembly of nanostructures; and examples for nanotechnology application

Module 3: Introduction to Sensors' Science and Technology: Definition of sensors; main elements of sensors; similarities between living organisms and artificial sensors; working mechanism of physical sensation (seeing, hearing, and feeling) and chemical sensation (smelling and tasting); the parameters used for characterizing the performance of sensors: accuracy, precision, sensitivity, detection limit, dynamic range, selectivity, linearity, resolution, response time, hysteresis, and life cycle.

Module 4: Metal nanoparticle-based Sensors: Definition of nanoparticle; features of nanoparticles; and production of nanoparticles by physical approach (laser ablation) and chemical approaches (Burst method, seed-mediated growth, etc.).

Module 5: Quantum Dot Sensors: Definition of quantum dot; fabrication techniques of quantum dots; Macroscopic and microscopic photoluminescence measurements; applications of quantum dots as multimodal contrast agents in bioimaging; and application of quantum dots as biosensors.

Module 6: Nanowire-based Sensors: Definition of nanowires; features of nanowires; fabrication of individual nanowire by top-down approaches and bottom-up approaches; and fabrication of nanowire arrays (fluidic channel, blown bubble film, contact printing, spray coating, etc.).



Module 7: Carbon Nanotubes-based Sensors: Definition of carbon nanotube; features of carbon nanotubes; synthesis of carbon nanotubes; fabrication and working principles of sensors based on individual carbon nanotube; fabrication and working principles of sensors based on random array of carbon nanotubes.

Module 8: Sensors Based on Nanostructures of Metal Oxide: Synthesis of metal oxide structures by dry and wet methods; types of metal oxide gas sensors (0D, 1D, and 2D); defect chemistry of the metal oxide sensors; sensing mechanism of metal-oxide gas sensors; and porous metal-oxide structures for improved sensing applications.

Module 9: Mass-Sensitive Nanosensors: Working principle of sensors based on polymeric nanostructures; sensing mechanism and applications of nanomaterial-based of chemiresistors and field effect transistors of (semi-)conductive polymers, w/o inorganic materials.

Module 10: Arrays of Nanomaterial-based Sensors: A representative example for the imitation of human senses by means of nanotechnology and nanosensors: electronic skin based on nanotechnology.

Minimum Eligibility Criteria:

Nanotechnology and Nano sensors are broad, interdisciplinary areas that encompass (bio) chemistry, physics, biology, materials science, electrical engineering and more.

Training Outcomes:

By the end of the course, students will understand the fabrication, characterization, and manipulation of nanomaterials, Nano sensors, and how they can be exploited for new applications. Also, students will apply their knowledge of nanotechnology and Nano sensors to a topic of personal interest in this course.



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Annexure - II

Value added course Details (Academic Year: 2021-22)

VAT Course Name: Nano Technology and Nano Sensors

VAT Code: VAT 73

Duration in Hours: 36

Number of Students Enrolled:14

Number of Students Completed: 14

Grades:

G= GOOD ; S = Satisfactory ; P = Poor ; W = Withdraw

Student ID	Student Name	Program/Course	Year	Passing Grade
215740001	KUMARI RASHMI SINGH	Master of Pharmacy	1st Year	S
215740002	KHUSBOO BANSAL	Master of Pharmacy	1st Year	S
215740003	KM NANDINI GOYAL	Master of Pharmacy	1st Year	G
215740004	NITIN KUMAR	Master of Pharmacy	1st Year	S
215740005	GUNJAN TYAGI	Master of Pharmacy	1st Year	S
215740006	VAISHALI GAUTAM	Master of Pharmacy	1st Year	G
215740007	SUNNY KUMAR SARRAF	Master of Pharmacy	1st Year	G
215740008	DIWYA KUMAR LAL	Master of Pharmacy	1st Year	S
215740009	AMAN CHAUDHARY	Master of Pharmacy	1st Year	S
215740010	ARPIT PANWAR	Master of Pharmacy	1st Year	S
215740011	POORVI VARSHNEY	Master of Pharmacy	1st Year	S
215740013	ASHUTOSH SINGH RAWAT	Master of Pharmacy	1st Year	S
215740014	SIDDHANT SINGH	Master of Pharmacy	1st Year	S
215740015	VIJAY KUMAR	Master of Pharmacy	1st Year	G

Submitted
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Career Development Cell
DIT University, Dehradun



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