CAREER DEVELOPMENT CENTRE

DIT UNIVERSITY
IMAGINE ASPIRE ACHIEVE

Date: 12th January 2020

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

Attention: M.Pharm- II Semester (Session-EVEN-2019-20)

Above mentioned students are hereby informed that as per the approved value added training for the academic year 2019-20, Career Development Centre offers the below mentioned technical training in the Even Semester (2019-20). Details as follows:

Training	Semester	Program	Duration	Date of Commencing
Nano Technology and Nano Sensors **(VAT-73)**	II	M. Pharma	36	5th February 2020

NOTE: 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.

Gaurav Singh
Head- CDC
Career Development Centre
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

Registrar
DIT University, Dehradun

DIT UNIVERSITY
IMAGINE ASPIRE ACHIEVE

VAT 73- Nano Technology and Nano Sensors

Venue: Charak Building | **Duration:** 36 Hrs (5th February 2020 – 25th April 2020)

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.

Registrar
DIT University, Dehradun

DIT UNIVERSITY
IMAGINE ASPIRE ACHIEVE

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 (Brust 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.).

R[illegible]ar
DIT University, Dehradun

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.

***

Registrar
DIT University, Dehradun

Annexure - II

Value added course Details (Academic Year: 2019-20)

VAT Course Name: Nano Technology and Nano Sensors

VAT Code: VAT 73

Duration in Hours: 36

Number of Students Enrolled: 15

Number of Students Completed: 15

Grades:	G= GOOD ; S = Satifactory ; P = Poor ; W = Withdraw			
Student ID	**Student Name**	**Program/Course**	**Year**	**Passing Grade**
195740010	PRAKASH KUMAR	MPharm	1st Year	G
195740006	SHIPRA RANA	MPharm	1st Year	S
195740003	ANKUR PACHAURI	MPharm	1st Year	S
195740009	ANJALI SHARMA	MPharm	1st Year	S
195740008	JYOTI KUMARI	MPharm	1st Year	G
195740011	SUMAN SAH KANU	MPharm	1st Year	S
195740002	PRIYANKA SANWAL	MPharm	1st Year	S
195740014	NABIN CHAUDHARY	MPharm	1st Year	S
195740013	DEWPUJAN CHAUDHARY THARU	MPharm	1st Year	S
195740004	ARUSHI .	MPharm	1st Year	G
195740001	FAIZA HIMASA IDRIS	MPharm	1st Year	S
195740005	MANSI VARSHNEY	MPharm	1st Year	S
195740015	HIMANI SAINI	MPharm	1st Year	S
195740012	BISHAL KUMAR SAH	MPharm	1st Year	G
195740007	ASHISH KUKRETI	MPharm	1st Year	S

Head-CDC
Career Development Cell
DIT University, Dehradun

Registrar
DIT University, Dehradun