[161024B02] Natural smart materials for biomedical applications
(November 7th – 11th, 2016 at Dr B R Ambedkar NIT, Jalandhar)
Global Initiative of Academic Networks

Overview

Smart materials consist of three dimensional network that can uptake and retain a large amount of aqueous fluids even under pressure in comparison to traditional absorbents like sponge and cotton. Because of such unique properties, they have been exploited in various fields including tissue engineering, sustained drug delivery, pharmaceuticals, agriculture, horticulture, waste-water treatment and biomedicals. Moreover, these materials are sensitive towards pH, temperature, electric stimuli, magnetic field etc. Therefore, such materials are also known as smart materials. These materials can respond to the surrounding environment very smartly and have got a lot of biomedical and pharmaceutical applications. These materials are biocompatible and are of great significance in biomedicals especially in tissue engineering. Natural polymer backbone based smart materials have an edge over synthetic materials due to their low cost production, biodegradability, non-toxicity, equilibrium swelling and eco-friendliness.
The present proposal deals with organizing of a short term course on such smart materials which are of great pharmaceutical and biomedical significance so that the present generation Scientists could be given better exposure about the smart materials and their role in the development of such advance materials.

Objectives

The objective and Scope of the present course will be as follows:

1. To understand the basic fundamentals of smart materials and their biomedical applications.
2. To give exposure to the participants about different types of smart materials, their properties, structures and applications.
3. To assist in understanding the subject with ease by presenting the contents in a simplified and logical sequence at a level appropriate for students/teachers/researchers.
4. To highlight the important concepts covered in the contents of the course.
5. To prepare the participants to take up independent assignments in carrying out the independent research for the development of smart materials.

Course Details

Monday (7th Nov)	
10:30-11:30 a.m.	Smart materials - an Introduction
1:00-2:00 p.m.	Smart materials - advancements in Science and Technology
3:00 – 4:00 p.m.	Biocompatible polymers - their role in human body
Tuesday (8th Nov)	
10:30-11:30 a.m.	Role of polymers in Biomedical
1:00-2:00 p.m	Applications of Polymers in Pharmaceuticals
2:30-3:30 p.m	Advance Polymer Technology and Tissue Engineering
Wednesday (9th Nov)	
10:30-11:30 a.m	Development of poly(lactic acid) based scaffold
1:00-2:00 p.m	Role of biocomposite scaffolds - blood vessel regeneration
2:30-3:30 p.m	Radiation grafting - Development of polyester scaffolds

Thursday (10th Nov)	
10:30-11:30 a.m	Role of plasma grafting in the development of antimicrobial polypropylene sutures
1:00-2:00 p.m	Nano-materials - Bioactive properties and molecular signalling
2:30-3:30 p.m	Nano Biocomposites and their applications
Friday (11th Nov)	
10:30-11:30 a.m	Synthesis of bioceramic nanostructures using smart material matrices
1:00-2:00 p.m	Radiation induced synthesis of bionanomaterials
2:30-3:30 p.m	Nanomedicines – preparation and delivery

Teaching Faculty

Professor Ajay Mishra (*mishrak@unisa.ac.za)* is a Professor of Nanotechnology and Water Sustainability Unit, University of South Africa, Florida Campus, South Africa & Adjunct Professor, Jiangsu University, China. He is working on synthesis of multifunctional nano-materials, nano-composites, biopolymer and/or petrochemical based biodegradable polymers and polymers based materials/composites for various applications with special attention to drug delivery. He has got many awards like Mahatma Gandhi Pravasi Samman 2014 at House of Lords UK, Special recognition at Materials Science conference at San Antonio, USA, Hind Ratan Award 2014 at New Delhi, India, AML Medal 2011 at New Delhi, India, IAAM Scientist Award at Jianan, China, Acharya Vinova International (AVI) Award 2009 at India, Nominated for the UJ's Most Promising Young Researcher Award (UJ) for the year 2010-2011, Nominated for NSTF-BHP Billiton Award 2012/13.

He has published around 100 journal articles, 12 books, 40 book chapters and delivered many invited/key note and plenary lectures beside attending and delivering expert talk in national/international conferences/research institutions.

Dr. Bhuvanesh Gupta (*bgupta@textile.iitd.ernet.in*) is the Professor of Polymers and Textiles at Indian Institute of Technology, New Delhi, India. Dr. Gupta did his PhD from IIT Delhi and spent two years as post-doc in Paris. Subsequently, worked for almost eight years in France, Sweden and Switzerland under different capacities in several laboratories. Dr. Gupta initiated research career in the field of polymer functionalization, biomaterials and tissue engineering. This work is being carried out in collaboration with University of Uppsala, Sweden and INSERM Paris, France. At the national level, the research collaborations are with AIIMS New Delhi, PGI Chandigarh, Panjab University Chandigarh, Jamia Hamdard University, NEHU, Shillong and Sikkim Manipal University, Gangtok. He is the winner of many International and National awards. Dr. Gupta has about 150 publications in International journals and more than 250 conference presentations in India and abroad along with 24 patents to his credit. Dr. Gupta has authored eight books published by International publishers and has been invited by several laboratories across Europe for delivering talks. 10 PhDs have been awarded their degrees and 6 PhD students along with several graduate students are still working on different areas of biomedical technology in the group of Dr. Gupta.

Who should attend:-

Polymer based smart materials is an interdisciplinary field, therefore, the course will be

beneficial for both the Scientists and Technologists. It will assist in disseminating the knowledge and know-how related to various aspects of materials with special reference to their biomedical applications. The following persons can attend this programme:

- Scientists and technologists from academic Institutions
- Research Students or master degree students from academic institutions

Registration Fees

Students:	Rs. 1000/-
Industry/Research Organizations:	Rs. 2500/-
Academic Institutions :	Rs. 2000/-
Participants from abroad:	USD 100

The above fee includes all instructional materials, computer use for tutorials, free internet facility and snacks between the sessions. The accommodation will be provided on payment basis subject to availability on request otherwise participants will have to make their own hotel arrangements.

PROPOSED BUDGET

Sr. No.	Description of budget head	Approximate Amount (Rs.)
1.	Air Fare for Two Experts	2,00,000/-
2.	Honorarium and DA to Two Experts	2,00,000/-
3.	Lecture Notes/video learning material preparation	50,000/-
4.	Contingency	50,000/-
5.	Video recording expenses	25,000/-
6.	Miscellaneous expenditure	25,000/-
7.	Host Faculty Honorarium	30,000/-
8.	Coordinator Honorarium	20,000/-
	GRAND TOTAL	**6,00,000/-**

Course Coordinator(s):

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