

## **Global Initiative on Academic Network (GIAN)**

Course Title: **NANOTECHNOLOGY – FROM FUNDAMENTALS TO PRACTICE**  
**13-17 June, 2016**

### **Overview**

Nanotechnology is the branch of science & technology that deals with the study and manipulation of matter at length scales of the order of several nanometers (up to 100 nm). Nanotechnology is expected to have great impact on our lives. The global research in Nanotechnology is growing rapidly with worldwide government funded research programs spending several billion dollars per year. Industries across the world are willingly investing on nanotechnology and several nanotechnology-enabled products are already in the market. The advances in this area will result in newer technologies and the global market for nanotechnology is expected to reach \$50 billion in 2017.

Apart from the technological advancements offered, nanoscience and nanotechnology explores fascinating properties of materials at the reduced dimensions, which seem to have no limit. Several newer ideas and concepts are being understood and there is lot more to understand in terms of the fundamental knowledge in this area.

With a clear realization that the future is going in the nano-enabled direction, several institutions worldwide have initiated courses and programs in this area. It is overwhelming to learn the special initiatives from government of India on Nanoscience & Nanotechnology.

In the proposed course on 'Nanotechnology- From Fundamentals to Practice' under GIAN, it is planned to organize a one week course on the basics and application of nanotechnology, wherein internationally acclaimed academicians and world-renowned researchers who have pioneered in this area will deliver lectures and discuss various aspects of the field.

### **Objectives**

The major objectives of the course are as follows:

- To provide a perfect platform for the young researchers from academia and industries to keep them educated about the fundamentals of nanoscience & nanotechnology and the latest developments in this area.
- To provide a practical exposure to nanotechnology-enabled applications revealing the challenges involved.
- To motivate the materials scientists to take up challenging problems in the area of nanotechnology that would have high societal impacts.

### **Course details**

The proposed course will cover several topics including Synthesis, characterization and properties of Nanomaterials, Nanodevices, Nanotools, Energy Applications etc. The course will include special tutorial sessions including lab demonstration covering several topics such as materials synthesis, characterization and device applications. The course will discuss materials with a range of dimensionalities (quantum dots, nanowires/nanotubes, 2 dimensional materials, nanocomposites *etc.*)

### **Teaching Faculty**

**Prof. Pulickel. M. Ajayan** is the founding chair of Materials Science and Nano Engineering Department at Rice University, Houston USA, and one of the leading Materials Scientists in the world. He is a co-inventor of Carbon Nanotubes and a pioneer in the area of Nanotechnology especially in graphene and other 2D materials. To his credit he has more than 625 publications, around 20 books and has an h-index of 120. His current citations exceed 68,000. He holds B.Tech from Institute of Technology, Banaras Hindu University and a Ph.D from Northwestern University, USA. He is a recipient of several awards including the Spiers Memorial Award by the Royal Society of Chemistry (UK), Senior Humboldt Prize, MRS Medal, Scientific American 50 recognition, RPI Senior Research Award, the Burton Award from the Microscopic Society of America and the Hadfield Medal for the outstanding student metallurgist in India. He has been elected as a Fellow of the Royal Society of Chemistry (UK), AAAS, Foreign Fellow of the Mexican Academy of Sciences and National Academy of Sciences (India), and has been elected honorary member of Materials Research Society of India and the Indian

Institute of Metals. He is a regular contributor to reputed journals like Science, Nature, and other journals of international repute. He is an inventor and an innovator and owner of more than 20 patents/technologies. He has twice been featured in the Guinness Book of World Records. He has also been recognized as a distinguished alumnus by his alma mater Banaras Hindu University and the Department of Materials Science at Northwestern University. He has made contributions to commercially viable technologies such as the paper battery, paintable battery and nano-sponges and has been on the advisory boards of some of the nanotechnology startups.

[More about Prof. P. M. Ajayan: <http://ajayan.rice.edu>]

**Who can attend:**

- Students (Masters and Ph.D), postdocs and scientists/faculty members from academic and technical institutions.
- Researchers and engineers from R&D laboratories and industries

**To apply for the course, follow the instructions given here:**

<http://gian.iisertvm.ac.in/nano>

**Registration Fees**

**Participants from abroad:** \$250

**Industry/Research Organization:** INR 20,000

**Academic Institution:** Students: INR 1,000

Scientists/Faculty members: INR 3,000

**Course Co-ordinator**

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