COURSE BROCHURE

GLOBAL INITIATIVE for ACADEMIC NETWORKS

GIAN

An Initiative of, Ministry of Human Resource Development (MHRD),Government of India

INTERNATIONAL WINTER TERM COURSE 2016

(28th Nov. - 2nd Dec. 2016)

ON

Design, Development and Characterization of applied multifunctional nanomaterials

Course Coordinator:

Dr. Dev Kumar Mahato

Department of Physics
National Institute of Technology,
Patna, Bihar, INDIA

ABOUT GIAN

This, Global Initiative for Academic Network **(GIAN)** program, approved by Union Cabinet in Higher Education. This program aimed to get collaborate and tapping the talent pool of Scientist and Entrepreneur Internationally to encourage their engagement with/ within the institutes of higher Education in India so as to augment the country's existing academic resources, accelerate the pace of quality reform, and elevate India's scientific and technological capacity to global excellence. In order to (i) gather the best and fruitful international experience into our systems of education, (ii) enable interaction of students and faculty with the best academic and industry experts from all over the world, (iii) share their experiences and expertise to motivate people to work on Indian problems, there is a need for a Scheme of International Summer and Winter Term.

- **Overview of the Course**

Since nanomaterials have unique properties, novel science and technologies are emerging based on these materials. With the increasing thrust of miniaturization of devices and components role of materials in bulk, thin film and nano scale is increasing at very high pace. In past twenty-five years in spite of tremendous progress, there is a strong need for a systematic understanding of processing, micro and nano morphology and correlation of performance of materials and their components. This course provides an excellent platform to train students for future workforce where multidisciplinary knowledge of Physics, Chemistry, Biochemistry, Biology, Mechanical Engineering, Chemical Engineering and Electrical Engineering fields are required. The parameters controlling nano and micro morphologies are direct responsible for unique properties of nano and designed materials (meta materials). Recent trend is to utilize the bioinspired materials and sensors and their exploitations for large scale applications. For example, properties of nanospheres, nanocubes, nanoshells and nanowires are very different and all provide unique opportunities. A greater understanding is required to develop these materials for various applications. This course will summarize variety of examples of multinary nanomaterials, processing and applications of these materials for energy storage, detectors and sensors, lasers and biotechnology.

- **About the Institute**:

National Institute of Technology Patna is the 18th National Institute of Technology created by the Ministry of H.R.D. Government of India after rechristening the erstwhile Bihar College of Engineering Patna on 28. 01. 2004. NIT Patna marked its humble beginning in 1886 with the establishment of pleaders survey training school which was subsequently promoted of Bihar College of Engineering Patna in 1924. This made this institute the 6th Oldest Engineering Institute of India The graduate level curriculum was later elevated to the post graduate level in 1978. The institute is situated on the south bank of holy river Ganges behind Gandhi Ghat, one of the most important and reverential place of Patna. The Gandhi Ghat is associated with the immersion of ashes of father of the Nation Mahatma Gandhi in the river Ganges.National Institute of Technology Patna has been declared as an Institute of National Importance and has been granted a fully Autonomous Status by MHRD, Government of India. The Institute has also been declared as a Centre of Excellence of impart high level education training, research and development in science, engineering technology and humanities. It is imparting high quality education & values at UG (B.Tech), PG (M.Tech) &Ph .D programmes through its experienced faculty well versed in their respective field of engineering and technology with well-equipped laboratories. At present the Institute has seven disciplines viz. Architecture, Civil Engineering, Compute Science &Engg., Electrical Engg., Electronics & Communication Engg., Information Technology and Mechanical Engg., and well established departments of physics, Mathematics and Humanities and Social Science.

➢ About the Department:

The Department of Physics was established in 1924 and since then it has been functioning as an important part of the institute. The thrust areas in which research work is being pursued in the department are Impedance spectroscopy, Magnetic properties, Fuel Cells and Bio-physics. Faculty members have undertaken projects from various funding agencies like DRDO, CSIR, DST, etc. The Department runs 2-Yr M. Tech., 5-Yr (Int.) M. Sc. and Ph.D. programmes.

➢ Fees Details:

Students/Research Scholars	**Rs.2000/-**	Students/Research Scholars:(Bonafied letter is required from the head of the Department/ Institute)
Faculty/Staff of Academic Institutions :	**Rs.4000/-**	
Industry/Research Personnel:	**Rs.6000/-**	
Participants from abroad:	US $200	

➢ Eligibility:

- Executives, Scientists, engineers and researchers from Industries, educational Institute and R & D laboratories.

- Students at all levels (B.Tech/M.Sc/M.Tech/PhD) or Faculty from reputed academic institutions and technical institutions.

➢ Reaching NIT Patna:

The Institute campus is 8 Km from the Patna junction railway station and 20 Km from the Jai Prakash Narayan International Airport, Patna. The entrance to the institute is from Ashok Rajpath and it is about 3Km from the famous Gandhi Maidan.

➢ Registration Process:

Send the registration form by email/post to the course coordinator along with the payment details/draft by 20th of Novomber, 2016.

➢ The Faculty:

Prof. N. B. Singh is a Fellow of ASM- American Society of Materials International, a Fellow of SPIE-The International Society of Optics, and Photonics, a Fellow of OSA- Optical Society of America and a Fellow of Royal Society of Chemistry (RSC), is internationally recognized for his leadership and research in the area of materials science and engineering more specifically to the area of crystal growth. Dr. Singh joined Westinghouse Electric Corporation (now Northrop Grumman ES) in 1984 as a Senior Engineer after university teaching and research in the Chemistry Department at T. D. Post-Graduate College Jaunpur of Gorakhpur University, India, and Materials Science and Engineering Department at R. P. I. Troy, NY. Before joining the Department of Chemistry and Biochemistry, and Computer Science and Electrical Engineering, Dr. Singh held the position of the "Senior Consulting Engineer" until December 30, 2011, the highest technical position in the Northrop Grumman Electronic Systems. At Northrop Grumman, he led the team for the materials selection, modeling, growth, fabrication of devices, wide bandgap materials SiC, AlN, SiC-AlN alloys for high power RF and high temperature microelectronics, lasers and electro-optical (EO), high power RF and electronics, and materials for radiation detectors. He managed and performed research for the development of bulk and

nano engineered materials, He has transferred several technologies from research to production. Mr. Garry Clark, President, Westinghouse Electric Corporation, had awarded him the corporation's highest award, the "George Westinghouse Signature Award of Excellence" for his leadership and research on UV filters materials and technology transfer for PMAWS. Dr. Singh was honored by the ASM-IIM Lectureship award in 2003 and 2013 and OSA Fellow Lectureship award in 2012. Dr. Singh was identified as a "R&D star" to watch by Industry Magazine in 1995. The American Society of Materials International awarded the "2010 International Engineering Materials Achievement Award" to Dr. Singh for his outstanding researches, on AOTF imagers. He was honored by the "Stookey Award" of the ACeS Glass & Optical Materials Division and the Deutsche Glastechnische Gesellschaft (GOMD-DGG) for the life time innovation, discovery and life time achievements in May 2015.He has published more than 200 journal papers, more than 150 papers in conferences, presented more than 80 invited talks, has 22 issued patents, more than 250 company trade secrets and invention awards. Dr. Singh has been Associate Editor of the journal, Progress in Crystal Growth and Characterization since past twenty years and is in the editorial board of several other journals. He has been editor of several proceedings of the conferences and three books. He has served as a member on the editorial board and as referee for more than 30 journals. Dr. Singh served as an Executive Committee member of the American Association for Crystal Growth for 12 years; founded the Pittsburgh Chapter and the Capital Chapter of Crystal Growers. Dr. Singh is the founder of the Northrop Grumman Materials Corporate Forum which focuses on critical materials technologies and holds yearly conference. He was chairman of the Gordon Conference on "Gravitational Effects on Materials" in 1993. Dr. Singh served the National Academy of Sciences as a panel member on the National Materials Advisory Board (NMAB) for many years. Dr. Singh's interests center on "Development of novel multifunctional materials, devices and subcomponents for military and commercial Applications" which utilize physical vapor deposition, solidification, crystal growth of bulk, thin film and nano crystals, device fabrications and characterization.

- **For more Details Please Contact to:**

Dr. Dev Kumar Mahato
Asst. Prof. Department of Physics
NIT, Patna- 800005
Bihar, INDIA
Ph: - +91-9771024584/9431668774
E-Mail:- devk@nitp.ac.in

- **Web Links :**

1) http:// www.nitp.ac.in

2) www.gian.iitkgp.ac.in

VENUE:

Dept. of Physics, NIT Patna, Ashok Rajpath Patna-800005, Bihar, India,
http:// www.nitp.ac.in

Course Topic: Design, development and characterization of applied multifunctional nanomaterials

Date/time	Topic to Cover
November 28, 2016 Lecture 1 : 9:30 - 10:45 AM Lecture 2: 11:00 - 12:15 AM **Tutorial 1.** 2:00 to 3:00 PM	• Introduction to materials structures • Understanding of materials state • Solving problems
November 29, 2016 Lecture 3 : 9:30 - 10:45 AM Lecture 4: 11:00 - 12:15 AM **Tutorial 2.** 2:00 to 3:00 PM	• Principle of melting and solidification processes • Purification and growth using melt method • Problem solving session
November 30, 2016 Lecture 5 : 9:30 - 10:45 AM Lecture 6: 11:00 - 12:15 AM **Tutorial 3.** 2:00 to 3:00 PM	• Controlling the nanomorphology and performannce • Growth of nanoparticles and performance • Growth of nanowires and performance • Problem solving session
December 1, 2016 Lecture 7 : 9:30 - 10:45 AM Lecture 8: 11:00 - 12:15 AM **Tutorial 4.** 2:00 to 3:00 PM	• Biomaterials Design, growth and characterization • Unusual growth in body, and factors affecting • Problem solving session
December 2, 2016 Lecture 9 : 9:30 - 10:45 AM Lecture 10: 11:00 - 12:15 AM **Tutorial 5.** 2:00 to 3:00 PM	• Applications of Nanomaterials: Example of energy storage • Nanomaterials and applicationd for future chemical, biological and radiation detectors and sensors:

REGISTRATION FORM

Name: ……

Designation: ……

Address
(Office):…….....

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Phone: ……...

E-mail (compulsory): ……

Male/ Female: ……..…

Highest academic qualification: ……...

Accommodation Required (Y/N): ……

Draft/ Online Ref. :

No……..……..……..……...…...…Date….....

Amounting Rs……..drawn on……..….Bank.

Signature of the candidate with date:

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Recommended and forwarded

Date: Signature and Seal of the Head of the Organization.