



Jabalpur Engineering College, Jabalpur



5 Days GIAN Course On
“NANOMATERIALS: BY DESIGN FOR ENERGY APPLICATIONS”
(February 22, 2022-February 26, 2022)
(Online Mode)

Overview:

Nanostructure materials are gaining importance for energy generation and storage, thus offering new possibilities with desired, ‘engineered’ properties for energy-related applications. As the size of the materials comes in the regime of nanoscale, photon emission, electron transport, and phonon scattering processes change drastically compared to the bulk material. The proposed course will provide the overall view to beginners on how to model the property of nanomaterials and correlate it with experiments for energy-related applications, including energy and fuel generation (photovoltaic’s, thermoelectric, catalysis) and energy storage (fuel cells, batteries, and supercapacitors).

Objective:

The primary objectives of the course are as follows:

1. To provide a fundamental understanding of the quantum behaviour of nanomaterials.
2. To describe synthesis and characterization methods for nanomaterials.
3. To discuss applications of nanomaterials in energy-related areas.
4. To develop high-quality course material for students, researchers, and teachers that will induce motivation toward research related to nanomaterials for energy-related applications.

Event Type:

This is an international event. Lectures will be offered in the online mode only. The number of participants for the course will be limited to fifty.

Who can attend:

- Executives, engineers, and researchers from manufacturing, service, and government organizations, including Research and Development laboratories.
- Students at all levels (B. Tech. / M. Sc. /M. Tech./ M. Phil / Ph. D.) or Faculty from reputed academic institutions and technical institutions.

Module:

Lecture		Topics to be covered
Day 1 : Nanomaterials: Synthesis and Characterization	Lecture I: 1hr	Synthesis and characterization.
	Lecture II: 1hr	
	Tutorial 1: 1hr	Analysis of XRD-I
Day 2 : Nanomaterials: Applications for Electrochemical batteries, Photovoltaic cells, and Hydrogen storage	Lecture III: 1hr	Discussion of requirements for Electrochemical batteries. Photovoltaic cells, hydrogen storage devices.
	Lecture IV: 1hr	
	Lecture V: 1hr	
	Tutorial 2: 1hr	Analysis of XRD-II
Day 3 : Nanomaterials: Physics at the Nanoscale (Quantum Mechanics)	Lecture VI: 1hr	Quantum mechanics and Materials properties
	Lecture VII: 1hr	
	Tutorial 3: 1hr	Optical analysis of Nanomaterials.
Day 4 : Nanomaterials: Prediction of Properties for Energy Applications	Lecture VIII: 1hr	Theoretical tools to design Nanomaterials
	Lecture IX: 1hr	
	Lecture X: 1hr	
	Tutorial 4: 1hr	Supercapacitors, Electrochemical characterization
Day 5 : Nanomaterials: Next-generation devices related to Energy Applications	Lecture XI: 1hr	Future – next-generation devices
	Lecture XII: 1hr	

Procedure to apply for the course:

The applicants must get themselves registered on the GIAN web portal (<http://www.gian.iitkgp.ac.in>) to apply for any number of GIAN courses as and when necessary. Participants then need to select the “Nanomaterial: By design for energy applications” course from the list at course registration. Subsequent registration for this course will have to be done with Jabalpur Engineering College, Jabalpur, by submitting the registration form as attached with the brochure to the course coordinator. Their need to enclose the receipt of the transition details along with the registration form.

The course registration fee must be paid through NEFT at State Bank of India, GEC Branch, Jabalpur, A/c **No.10049870101**, IFSC: SBIN0004801 for taking the course is as follows:

Participants from abroad: US \$250

Indian Industry/ Research Organizations/Faculty: Rs.1,000/-

Indian Academic Institutions (Students): Rs. 500/-

Student and Faculty from host institution: Nil

Important Dates:

Registration in GIAN Portal and Receipt of Course registration form to course Coordinator:

January 31, 2022. Intimation to the shortlisted participants: **February 10, 2022**

Global Initiative on Academic Network (GIAN)
Jabalpur Engineering College Jabalpur
Gian Course On
NANOMATERIALS: BY DESIGN FOR ENERGY APPLICATIONS
February 22 to February 26, 2022

(Online Mode)

REGISTRATION FORM

(To be submitted by the candidates to the course coordinator after one-time registration in the GIAN portal by January 31, 2022)

1. Name (Block Letters): M/F:
2. Registration ID generated by GIAN Portal:
3. Participant Type: I. Student:
Course (B.E/ B. Tech. /M.C.A/ M. Tech. / M. Sc. /M.Phil. /Ph.D.):
Branch & Semester:
Student ID Number:
Institute:
II. Faculty:
Designation:
Department:
Organization:
III. Industry:
Designation/Professional Title:
Organization:
4. Address:
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Tel.: Mobile:
E-mail:

The Registration fee of Rupeeshas been paid via NEFT.
The transfer detail as Ack. No.date.....

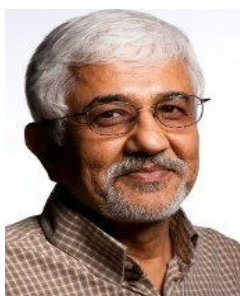
Date:

Signature

Forwarded:

Head of the Institution (With Seal)

Foreign Expert:



Ravindra Pandey is Professor and Chair of Physics at the Michigan Technological University, Houghton, MI. Pandey received his education at Hari Singh Gaur University, Sagar,

National Physical Laboratory, Delhi, Atomic Energy Research Laboratory, Harwell, UK, and University of Manitoba, Winnipeg, Canada. He has participated in multi-disciplinary efforts (theoretical and experimental) to build the programs in novel nanostructures and application of chalcopyrite semiconductors as the next generation optoelectronic materials with the industrial and national laboratories. He is the author of more than 150 publications and has co-organized and participated in several international conferences in Materials Physics and Nanoscale Science. Pandey is a Fellow of the American Physical Society.

Course coordinators :



Dr. Bhavana Singh is working as Assistant Professor in the Department of Applied Physics, JEC, Jabalpur, M.P. India. Her research interests include synthesis

and characterization of semiconducting nano-oxide thin films and chalcogenide nanoparticles. She has published more than 20 research papers in international journals of repute.

Dr. Durgesh Nandini Nagwanshi is working as assistant Professor in Department of Applied Physics, JEC, Jabalpur. Her reserch interest includes Nanosciences & Polymers. She has more than 10 publications in journals.



Course- Coordinators:

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Principal:



Dr. A.K Sharma

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Local Coordinator (GIAN):



Dr. Mamta Lambert

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