



**DEPARTMENT OF BIO AND NANO TECHNOLOGY
GURU JAMBHESHWAR UNIVERSITY OF SCIENCE & TECHNOLOGY
HISAR-125001 (HARYANA)**

ORGANIZES ONE WEEK WORKSHOP-COURSE

ON

**NANOTECHNOLOGY: Nanoparticle Synthesis and Conjugation
Chemistry for Bioapplications**

16th July to 20th July, 2018

BROAD AREA: Nanotechnology/Biochemistry

OVERVIEW

Nanotechnology is a technology that relies in the regime between one to hundred nanometers, viz. billionths of the meter. In this course, students will learn about basic physics for nanomaterial science and wide ranges of chemistry for the bioconjugation of nanoparticle which are being used to develop a breakthrough technology in bioscience area. For example, biosensors for ultrasensitive and multiplexed detection of biomolecules such as DNA or protein target have been developed by use of colloidal AuNPs with DNA or protein modification. In the development of sensitive and useful bioimaging, drug delivery and therapeutic system, understanding of the chemistry for nanoparticle synthesis and its conjugation chemistry as to the applications are essential parts to achieve their intended goals. The course will be planned and offered as per the norms set by Guru Jambheshwar University of Science and Technology.

OBJECTIVES

The primary objectives of the course are as follows:

- i) To provide an introduction to nanotechnology and the role played by basic properties of plasmonic materials and related applications;
- ii) To teach fundamental concepts in nanoparticle synthesis and bioconjugation chemistry for applications;
- iii) To teach the basics of simulation studies, CHEMDRAW, COREL and photoshop tool for scientific paper writing and presentation.

<p>Module A: July 16, 2018 (MONDAY)</p> <p>July 17, 2018 (TUESDAY)</p> <p>Module B: July 18, 2018 (WEDNESDAY)</p> <p>July 19, 2018 (THURSDAY)</p> <p>July 20, 2018 (FRIDAY)</p>	<p>NANOTECHNOLOGY: Nanoparticle Synthesis and Conjugation Chemistry for Bioapplications</p> <p>16th July to 20th July, 2018</p> <p>Nanotechnology and Nanoparticle Synthesis</p> <p>Inauguration: 9:00 AM</p> <p>a. Lecture 1: 9:30 to 11:00 AM Introduction to nanotechnology b. Lecture 2: 11:30 to 1:00 PM Introduction to nanoparticle synthesis c. Tutorial 1: 2:00 to 4:00 PM Simple experiments for solution-based NP synthesis and analysis</p> <p>a. Lecture 3: 9:30 to 11:00 AM Introduction to the synthesis of plasmonic nanoparticle and related nanoscale materials-1 b. Lecture 4: 11:30 to 1:00 PM Introduction to the synthesis of plasmonic nanoparticle and related nanoscale materials-2 c. Tutorial 2: 2:00 to 4:00 PM Simulation of the interaction between light and plasmonic nanoparticle with Comsol physics</p> <p>Conjugation Chemistry for Bioapplications</p> <p>a. Lecture 5: 9:30 to 11:00 AM Introduction to Biosensor b. Lecture 6: 11:30 to 1:00 PM Conjugation chemistry for Biosensors c. Tutorial 3: 2:00 to 4:00 PM How to use CHEMDRAW and COREL for scientific paper</p> <p>a. Lecture 7: 9:30 to 11:00 AM Introduction to Bioimaging b. Lecture 8: 11:30 to 1:00 PM Conjugation chemistry for Bioimaging c. Tutorial 4: 2:00 to 4:00 PM Best practices for data processing and presentation</p> <p>a. Lecture 9: 9:30 to 11:00 AM Introduction to drug delivery system b. Lecture 10: 11:30 to 1:00 PM Conjugation chemistry for drug delivery system c. Tutorial 5: 2:00 to 3:00 PM Exam of participants</p> <p>Number of participants for the course will be limited to fifty only.</p>
<p>You should attend if....</p>	<ul style="list-style-type: none"> • You are executives, engineers and researchers from manufacturing, service and government organizations including R&D laboratories. • You are a student (at all levels including BTech/MSc/MTech/PhD) or faculty from reputed academic institutions and technical institutions.
<p>Registration</p>	<p>The participants are required to get themselves register on GIAN web portal (http://www.gian.iitkgp.ac.in)</p> <p>The course registration fee is separate. The participation fees (Demand draft drawn in favour of Registrar, GJUS&T, Hisar or NEFT/RTGS at PNB A/C No. 4674000100036542 IFSC: PUNB0467400) for taking the course is as follows:</p> <p>Foreign delegates: US \$500</p> <p>Participants from Industry: ₹ 10,000/-</p> <p>Participants from Indian Academic Institutions/ Research Organizations: ₹ 2,500/-</p> <p>Participants from Host-Department: ₹ 1,000/-</p> <p>The above fee includes all instructional materials, computer use for tutorials and assignments, equipment usage charges, and internet facility. However, the participants will be provided with accommodation on payment basis, subject to availability.</p>

Foreign Faculty



Dr. Dong-Kwon Lim is a Professor at the Korea University, Seoul, South Korea. D.K received his Ph. D from Seoul National University, Department of Chemistry (Advisor: Prof. Jwa-Min Nam), and postdoctoral research at MIT, David H. Koch Integrative Cancer Research Center (advisor: Robert Langer) from 2011 to 2013. Before starting his Ph. D at SNU, he worked at CJ pharmaceutical research institute for 10 years.

He started his independent research at Chonbuk National University from 2013. He has worked in synthetic organic chemistry at company to develop generic drug, new drug entity and specialty drugs such as antihypertensive, lipid lowering and anticancer drugs. Some of them were commercialized in Korean market. He is the key author of world leading journals in nanoscience such as Nature Materials, Nature Nanotechnology, Nano Letters and ACS Nano. He has also co-organized and participated in several international conferences in the areas of Materials Science and Nanoscale Science including Korean Chemical Society, Korea polymer science and Nanomedicine in Korea.

Host Faculty



Dr. Sandeep Kumar, Assistant Professor, is a researcher of international recognition at Department of Bio and Nano Technology, Guru Jambheshwar University of Science and Technology, Hisar, Haryana, India. Dr. Sandeep Kumar has received his PhD degree from Panjab University, Chandigarh. His current research interests include synthesis and characterization of nanomaterials, nano-carriers for healthcare applications,

nanomaterials based sensors, biomaterials and nanotoxicity. Dr. Kumar has one patent and published more than 80 research papers in international journals of repute. Dr. Kumar has international and national sponsored research projects from different funding agencies like DST, DBT, DRDO etc. Dr. Kumar visited Hanyang University, Seoul, South Korea as a visiting Professor and also Australia, UK, Scotland, Thailand, United Arab Emirates under different schemes of Govt. of India. Dr. Kumar has recently received Haryana Yuva Vigyan Ratna Award 2015-16.

Course Co-Coordinator



Prof. Neeraj Dilbaghi completed his Masters and Doctorate degree in Microbiology from CCS Haryana Agricultural University, Hisar and is presently working at the Department of Bio and Nano Technology, Guru Jambheshwar university of Science and Technology, Hisar, Haryana, India. Prof. Dilbaghi holds position of Director, UGC- Human Resource

Development Centre, Institutional Coordinator of RUSA & Incharge, Radio-Ecology Centre of GJUS&T, Hisar. He has over 23 years of research and 20 years PG Teaching experience. During his professional career, Dr. Neeraj Dilbaghi has guided nine Ph.D. and over 40 M.Tech. students. Presently, 8 Ph.D. students are pursuing research under his guidance. His current research focuses on microbial biotechnology, bionanotechnology, nanosensors for healthcare and environmental applications, nanomedicine, and toxicological Evaluation of nanomaterials. Prof. Neeraj Dilbaghi has published over 120 research papers in peer reviewed international and national journals of repute with over 1900 citations and H-index of 24. Dr Dilbaghi has received several grants from national and international funding agencies like DST, UGC, BARC-BRNS, LSRB-DRDO etc to manage his research activities.

INTERNATIONAL WORKSHOP

on

“NANOTECHNOLOGY: Nanoparticle Synthesis and Conjugation Chemistry for Bioapplications”

An event under



GIAN
GLOBAL INITIATIVE OF ACADEMIC NETWORKS



16th July to 20th July, 2018



Organized by

**Department of Bio & Nano Technology
Guru Jambheshwar University of Science and
Technology, Hisar**

Course Co-ordinator
Dr. Sandeep Kumar
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E-mail: nanogian2018@gmail.com,
ksandeep36@yahoo.com

List of Participants

S. No.	Name	Qualification	Institute/University
1.	Aditya Lawrence Toppo	Ph.D student	NIT Raipur
2.	Ankita Agarwal	M.Sc. Student	Thapar University, Patiala
3.	Anuradha Saini	Research Scholar	Sant Longowal Institute of Eng. & Tech., Sangrur
4.	Anup Thakur	Assistant Professor	Punjabi University, Patiala
5.	Arushi Gupta	Ph.D Student	CSIO, Chandigarh
6.	Ashok Kumar Pathera	Assistant Professor	Shoolini University, Solan
7.	Bahareh Dabaghiannejad	Ph.D Student	GJUS&T, Hisar
8.	Bunty Sharma	Ph.D Student	Panjab University, Chandigarh
9.	Dinesh	M.Sc. Student	Visvesvaraya National Institute of Technology, Rajasthan
10.	Hari Mohan	Assistant Professor	MDU, Rohtak
11.	Himanshu Rani	Assistant Professor	Sant Longowal Institute of Eng. & Tech., Sangrur
12.	Jyoti Mundlia	Ph.D student	GJUS&T, Hisar
13.	Jyoti Punia	Ph.D. Student	CCS HAU, Hisar
14.	Kalyani Agarwal	Ph.D Scholar	IIT, Ropar
15.	Keshav Shukla	Research scholar	Inverties University, Bareilly
16.	Kritika Saini	Ph.D student	Shoolini University, Himachal Pradesh
17.	Lalita	Research Scholar	Dept. of Botany, MDU Rohtak
18.	Makadiya Akshay R.	Research Scholar	Department of Physics, Saurashtra University, Rajkot
19.	Manju	Ph.D student	Punjabi University, Patiyala
20.	Megha Choudhary	Ph.D. Student	IMTECH, Chandigarh

21.	Megha Jain	Ph.D student	Punjabi University, Patiyala
22.	Mehendi Goyal	JRF	Shoolini University
23.	Mohd Shabbir	Assistant Professor	Sanskriti Iniversity, Mathura
24.	Mohit Kumar	Junior Research Fellow	National Institute of Technology, Raipur
25.	Monika	Ph.D Student	GJUS&T, Hisar
26.	Monika Vats	Assistant Professor	Department of Chemistry, Amity University, Haryana
27.	Moondeep Chauhan	Research Scholar	Panjab University, Chandigarh
28.	Naincy Rani	MSc Student	Chaudhary Charan Singh Haryana Agricultural University, Hisar
29.	Naini Garg	Ph.D Student	CSIO, Chandigarh
30.	Nayana Gupta	Ph.D student	Inverties University, Bareilly
31.	Neha Sikri	Ph.D student	Kurukshetra University, Kurukshetra
32.	Nimish H. Vasoya	Associate Professor	Sanjaybhai Rajguru Science College, Rajkot
33.	Pankaj Khatak	Associate Professor	Department of Mechanical Engineering, GJUS&T, Hisar
34.	Parth Malik	Ph.D Student	Central University of Gujrat, Gandinagar
35.	Payal Malik	Assistant Professor	Sant Longowal Institute of Eng. & Tech., Sangrur
36.	Piyush Pratap Singh	Ph.D Scholar	IIT Ropar
37.	Poonam Sagar	Junior Research Fellow	National Agri-Food Biotechnology Institute, Mohali
38.	Pragya Aggarwal	M.Sc. Student	Chaudhary Charan Singh Haryana Agricultural University, Hisar
39.	Prashant Bhardwaj	M.Tech Student	GJUS&T, Hisar
40.	Pooja Das Bidla	Research Scholar	Dr. Hari Singh Gour Vishwavidyalaya, Sagar, MP
41.	Rachna Gupta	Ph.D	801/1 First Floor Jagruti Park Society, Sector-30, Gandhinagar-382030, Gujarat
42.	Ratnesh Das	Assistant Professor	Dr. Harisingh Gour Central University, Sagar, M.P.

43.	Raval Pooja Yogeshkumar	Research Scholar	Department of Physics, Saurashtra University, Rajkot
44.	Rahul Thory	Assistant Professor	Shoolini University, Solan
45.	Rekha Rao	Assistant Professor	GJUS&T, Hisar
46.	Ritesh Kumar	Ph.D Student	GJUS&T, Hisar
47.	Sarjana Raikwar	Research Scholar	Dr. Hari Singh Gour Vishwavidyalaya, Sagar, MP
48.	Seema Sangwan	Assistant Professor	Chaudhary Charan Singh Haryana Agricultural University, Hisar
49.	Shagun Gupta	Ph.D student	Shoolini University
50.	Shalini Singh	Junior Research Fellow	CSIR-CSIO, Chandigarh
51.	Shilpa Chakra	Assistant Professor	Centre for Nano Science & Technology, Hyderabad
52.	Shimayali Kaushal	Senior Research Fellow	National Agri-Food Biotechnology Institute, Mohali
53.	Sukriti Nehra	Research Scholar	Chaudhary Charan Singh Haryana Agricultural University, Hisar
54.	Sunil Kumar	Senior Research Fellow	GJUS&T, Hisar
55.	Suraj Jayeshbhai Shah	Assistant Professor	Darshan Institute of Engineering & Technology, Rajkot
56.	Susheel Gulati	Ph.D Student	Chaudhary Charan Singh Haryana Agricultural University, Hisar
57.	Sushil Kumar Kashaw	Assistant Professor	Dr. Harisingh Gour Central University, Sagar, M.P.
58.	Sushila Singh	Assistant Professor	Chaudhary Charan Singh Haryana Agricultural University, Hisar
59.	Swati Sharma	Ph.D student	MDU, Rohtak
60.	Urmila Chakraborty	Ph.D student	Panjab University, Chandigarh
61.	Vishal Singh	Senior Resaerch Fellow	National Agri-Food Biotechnology Institute, Mohali
62.	Rajesh Thakur	Assistant Professor	GJUS&T, Hisar
63.	Anurag Sangwan	Assistant Professor	GJUS&T, Hisar
64.	Aarushi Singhla	M.Tech Student	GJUS&T, Hisar

65.	Kanisht Batra	Research Associate	ICAR-NRCE, Hisar
66.	Mikhlesh Kumari	Ph.D Scholar	GJUS&T, Hisar
67.	Neha	Ph.D Scholar	GJUS&T, Hisar
68.	Ruma Rani	Senior Research Fellow	ICAR-NRCE, Hisar
69.	Sakina	Ph.D Scholar	GJUS&T, Hisar
70.	Sandeep Singh	Ph.D Scholar	GJUS&T, Hisar
71.	Shikha Jain	Ph.D Scholar	GJUS&T, Hisar
72.	Sunita Punia	Ph.D Scholar	GJUS&T, Hisar
73.	Surender	Graduation Botony Hons. (Pursuing)	Kirori Mal College, DU
74.	Santosh Bhukal	Assistant Professor	GJUS&T, Hisar
75.	Mona Sharma	Assistant Professor	GJUS&T, Hisar
76.	Ramnish	Assistant Professor	GJUS&T, Hisar
77.	Subhash Chander	Research Scholar	GIUS&T, Hisar
78.	Navjot Mehta	Ph.D Scholar	GJUS&T, Hisar
79.	Pawan Kumar	Junior Research Fellow	GJUS&T, Hisar
80.	Devanshi Popli	Ph.D student	GJUS&T, Hisar
81.	Shiwani Kapoor	Ph.D student	GJUS&T, Hisar
82.	Bharti Sharma	Ph.D student	GJUS&T, Hisar
83.	Sushma Rani	Ph.D student	GJUS&T, Hisar
84.	Monika	Ph.D student	GJUS&T, Hisar
85.	Jyoti	Ph.D student	GJUS&T, Hisar
86.	Vinod Kumar	Ph.D student	GJUS&T, Hisar

87.	Pooja	Ph.D student	GJUS&T, Hisar
88.	Manju Sangwan	Ph.D student	GJUS&T, Hisar









**Global Initiative of Academic Network (GIAN) Programme
GURU JAMBHESHWAR UNIVERSITY OF SCIENCE & TECHNOLOGY, HISAR**

Report on Conduct of GIAN Course

Title of GIAN Course	NANOTECHNOLOGY: Nanoparticle Synthesis and Conjugation Chemistry for Bioapplications	
GIAN Course ID	176016B01	
Period of Course	16 th July, 2018 to 20 th July, 2018	
Name and Department of Faculty from Guru Jambheshwar University of Science and Technology, Hisar		
Course Coordinator		
Name	Dr. Sandeep Kumar	
Department	Department of Bio and Nano Technology, GJUS&T, Hisar	
Co-host Faculty, if any		
Name	Prof. Neeraj Dilbaghi	
Department	Department of Bio and Nano Technology, GJUS&T, Hisar	
Name and Affiliation of International Faculty		
Name	Prof. Dong-Kwon Lim	
Affiliation	Korea University, Seoul, South Korea	
Name and Affiliation of National Faculty, if any		
Name	Dr. Nitin Kumar Singhal	
Affiliation	National Agri-Food Biotechnology Institute, Mohali	
Structure of the Course		
Duration of course (1 week or 2 weeks)	1 week	
Number of credits (1 or 2)	1	
Total number of lectures in the course	25	
Number of lectures by International Faculty	15	
Number of lectures by Host Faculty	--	
Number of hours of laboratory/tutorial sessions	10	
Participants of the course		

Number of student participants	66
Number of participants from Industry/Research Organizations	--
Number of Faculty participants	22
Total Number of participants	88
Number of participants who credited for the course	84
Course Generated Fund	
Sponsorship, if any (in Rs.)	None
Registration Fee Collected	1,89,500/- (in rupees)
Total amount	1,89,500/- (in rupees)
Interaction with International Faculty	
<p>At the outset, The Course Co-coordinator Prof. Neeraj Dilbaghi introduced all participants and familiarized them with the credentials of the principal resource person Dr. Dong-Kwon Lim from Korea University, South Korea. The Chairperson, Department of Bio and Nano Technology, Prof. Vinod Chhokar welcomed the gathering. The Local GIAN coordinator, Prof. Karampal Narwal highlighted the major objectives of the GIAN program. Professor A.K. Pundir, Registrar, GJUS&T and Chief Patron of the Workshop complemented the organizers for their meticulous and superlative efforts. Dr Pundir highlighted the genesis of GIAN program and motivated the young participants to follow the foot prints of the legends and to march ahead for higher echelons in their research objectives for inter-disciplinary and multi-disciplinary research activities at national and international level. The foreign faculty, Dr. Dong-Kwon Lim from South Korea briefed about the major objectives of the course and emphasized on bioapplication of nanotechnology, especially biosensing and drug delivery. He encouraged the participants to grasp the knowledge to be disseminated in this workshop. The course coordinator, Dr. Sandeep Kumar thanked MHRD, Govt of India for the financial support and also participants for displaying the deep enthusiasm for the upcoming course.</p> <p>Professor Lim shared his views about nanotechnology and their applications around us. Further, he interacted with the participants of the workshop to know about their background and moulded his lectures accordingly. There was extreme diversity among participants ranging from graduates to Ph.D. as well as faculty members with different specialization such as chemistry, physics, nano science and technology, pharmaceutical sciences, microbiology, food science and technology, biotechnology, environment science and engineering, electronics and communication engineering, mechanical engineering, etc. He ensured the active participation of participants via questioning/answering to make the session more interesting. Dr. D K Lim put very hard efforts to make the lectures very interactive from the first session itself.</p> <p>Dr. D K Lim described different synthesis routes for nanomaterials such as solvothermal, microwave, hydrothermal, etc. Dr. Lim discussed the synthesis of some common and interesting nanomaterials followed by explanation of different characterization techniques. To trigger the curiosity of the participants, he further discussed some latest research on</p>	

nanomaterials like gold nanorods, graphene, etc. He tried his best to make the learning process easy for participants. He threw some light on limitation of existing synthesis techniques related to cost, temperature, and time, to give the participants an understanding of the phenomenon. To make the sessions more interesting and clear, ten practical experiments were also carried out relating to synthesis of ten different nanomaterials such as synthesis of gold nanoparticles, copper nanoparticles, ZnO nanoparticles via microwave technique, carbon nanotubes via chemical vapour deposition method, gold nanorods, magnetic nanoparticles, polymeric nanoparticles, graphene synthesis, drug-loaded polymeric encapsulation, and copper nanowires via etched-ion track membrane method. The things are made further interesting via exploration of different characterization techniques such as dynamic light scattering for size and zeta potential estimation, UV-vis spectrophotometry for absorbance, FTIR for functional group identification etc. During practical session, the expert team, consisting of Dr. Lim, Prof. Neeraj, Dr. Nitin, Dr. Sandeep, and Dr. Akash Deep, were available to clear doubts of participants. The expert team elaborated every possible reason behind each case and the conceivable solution to each problem. The team made the session interactive by asking participant's opinion and possible solution.

Dr. D K Lim described different synthesis routes for plasmonic nanomaterials followed by tutorial session that included the simulation studies of the interaction between light and plasmonic nanoparticle with Comsol physics. Dr. Lim also introduced the participants with an overview of biosensing and bioimaging techniques and associated working principles. The expert faculty, Dr. Nitin Kumar Singhal introduced the concept of conjugation chemistry for biosensing applications. He discussed the case study about how it can help in specific detection of impurities. In the tutorial sessions, Dr. Lim introduced the participants with the use of ChemDRAW and COREL for scientific paper writing. The sessions were very interesting. The participants were given different problems to solve using ChemDRAW and COREL. Dr. Lim also described the principle of drug delivery system followed by conjugation chemistry for drug delivery. Towards end, Dr. Lim made participants pondering about the future of nanotechnology in different applications such as biosensing, bioimaging, site-specific drug delivery, etc.

Interaction of Host Faculty

There was a very warm interaction of host faculty, Dr. Sandeep Kumar and Prof. Neeraj Dilbaghi with foreign faculty, Dr. Dong-Kwon Lim. Prof. Dilbaghi introduced all participants with the expert faculty. He briefly described the achievements of Dr. D K Lim and their significant contribution in nanotechnology. Dr. Sandeep Kumar thanked all expert international/national faculties for giving their valuable time to this workshop-course. The host faculty also ensured the availability of lecture notes to the participants and timing of all events either related to lectures, lunch, tea break, or tutorial sessions. The host faculty was concerned about the comfort of the participants to ensure their significant contribution for success of the GIAN workshop course. During the sessions, the host faculty also ensured their participation in lectures as well as their tutorial sessions. The host faculty also raised the challenges of nanotechnology in front of the foreign faculty.

Interaction of other Faculty from Guru Jambheshwar University of Science and Technology, Hisar

There was excellent interaction of faculty from GJUS&T with international/national faculty. Prof. Vinod Chokkar (Chairperson) and Prof. Namita Singh from Department of Bio & Nano Technology expressed their curiosity for diverse applications of nanotechnology. Professor Munish Ahuja and Dinesh Dhingra from Pharmaceutical Sciences Department spent significant time with Dr. Lim. Prof. Ashish Agarwal from Physics Department, Prof. Devender Kumar from Department of Chemistry, Dr. Santosh Kaushik and Dr. Rajesh Thakur from Department of Bio and Nano Technology, Dr. Pankaj Khatak from Mechanical Engineering Department, Dr. Ramnish Kumar from Electronics and Communication Engineering, etc. also ensured their presence through scientific discussions during the workshop.

Interaction of faculty/researchers from other institute/organizations

This GIAN workshop witnessed a huge diversity among participants wherein more than 65% participation (11 States) was from other than host institute i.e. GJUS&T, Hisar. The researchers from different institute/organizations including Chaudhary Charan Singh Haryana Agricultural University (CCS HAU) Hisar, National Research Centre on Equines (NRCE) Hisar, Punjabi University, Patiala, CSIR-IMTECH, Chandigarh, Shoolini University Himachal Pradesh, Sanskriti Universities, Mathura, National Institute of Technology, Raipur, Amity University, Haryana, Panjab University, Chandigarh, Thapar University, Patiala, Sant Longowal Institute of Eng. & Tech., Sangrur, Central Scientific Instruments Organisation (CSIO-CSIR), Chandigarh, Visvesvaraya National Institute of Technology, Rajasthan, Maharshi Dayanand University (MDU) Rohtak, Kurukshetra University, Kurukshetra, Central University of Gujarat, Gandhinagar, IIT Ropar, National Agri-Food Biotechnology Institute, Mohali, Dr. Hari Singh Gour Vishwavidyalaya, Sagar, MP, Saurashtra University, Rajkot, Centre for Nano Science & Technology, Hyderabad, Darshan Institute of Engineering & Technology, Rajkot, etc. participated in this GIAN workshop course to learn latest synthesis techniques of nanotechnology and associated conjugation chemistry for numerous bioapplications. Faculty members and researchers from different States/institutes discussed different problems that they were facing in conjugation of bioelement with nanoparticles. They were willing to attend such workshops with Dr. Lim, again in near future also, as reflected in their oral feedback.

Signature of Course Coordinator	
Date of submission of report	