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

ORGANIZES TWO WEEK WORKSHOP-COURSE

ON

APPLICATION OF THERMODYNAMIC PREDICTION FOR DEVELOPMENT OF MICROBIAL BIOTECHNOLOGICAL APPROACHES

12th November to 21st November, 2018

BROAD AREA: **Environmental Biotechnology/ Industrial Microbiology/ Solid Waste Management**

OVERVIEW:

Catastrophic deterioration of the environment has become a worldwide phenomenon. The vast majority of environmental technologies are empirical and specialize in dealing with only certain type of waste and organic compounds. As a result huge amounts of highly toxic liquid and solid wastes accumulate in the environment. Which is bound to cause global environmental catastrophe. Quick and effective solution to this problem requires concept allowing theoretical assessment and realization of neutralization of all types of relevant waste.

Environmental biotechnologies, which exploit ability of living organisms, in general, and microorganisms, in particular, to function as self-replicating biocatalysts, have been shown to be more effective compared to their physical and chemical analogues. Present workshop is focuses on the thermodynamic rationale of the optimal way of neutralization of any xenobiotic by controlling microbial metabolism. The process of neutralization of any organic waste requires identification of thermodynamic conditions necessary for their destruction along with selection of microorganisms, effective in carrying out the process.

The application of developed concept enables solving of several problems like, cleaning the environment from toxic wastes, obtaining commercially valuable products, biofuels, metal concentrates, clean water. The course of lectures will facilitate learning of basics of thermodynamic allows learning the basics of thermodynamic predictions of microbial interaction with toxic compounds for the development of new environmental bio-technologies.

OBJECTIVES:

The primary objectives of the course are as follows:

i) To introduce the concept of prediction of microbial interaction with the xenobiotics.
ii) To introduce current and emerging technologies in the field of environmental Biotechnology.
iii) To demonstrate how thermodynamic calculations can be used to create microbial biotechnology with special reference to environment.
iv) How the thermodynamic calculations can be used to predict the stability of organic and inorganic xenobiotics in the physical and chemical coordinates like pH and Eh.
v) Thermodynamic rational of optimal metabolic pathways for neutralization of xenobiotics by using microorganisms.
vi) Practical application of the concept of disposal of xenobiotics and production of commercially valuable products.

Application of Thermodynamic Prediction For Development of Microbial Biotechnological Approaches **12th November to 21st November, 2018**	
November 12, 2018 (MONDAY)	1. **Inauguration: 9:00 AM** 2. **Lecture 1 (9:30 to 10:30 AM):** Novel biotechnologies: commercially valuable products obtaining from ecologically hazardous waste (Part 1) 3. **Lecture 2 (11:00 to 12:00 Noon):** Novel biotechnologies: commercially valuable products obtaining from ecologically hazardous waste (Part 2) 4. **Lecture 3 (2:00 to 4:00 PM):** Strategic problems of environmental biotechnologies and methods of their solution
November 13, 2018 (TUESDAY)	1. **Lecture 4 (9:30 to 10:30 AM):** Thermodynamic prediction of microbial interaction with metals. General terms 2. **Lecture 5 (11:00 to 12:00 Noon):** Reducing transformation of metals. General regularities 3. **Tutorial 1 (2:00 to 4:00 PM):** Problem solving
November 14, 2018 (WEDNESDAY)	1. **Lecture 6 (9:30 to 10:30 AM):** Prediction of microbial interaction with metals due to stereochemical analogy. General terms 2. **Lecture 7 (11:00 to 12:00 Noon):** Examples of prediction of microbial interaction with metals due to stereochemical analogy. 3. **Tutorial 2 (2:00 to 4:00 PM):** Problem solving
November 15, 2018 (THURSDAY)	1. **Lecture 8 (9:30 to 10:30 AM):** Prediction and experimental confirmation of microbial interaction with toxic metals-oxidizers. General terms 2. **Lecture 9 (11:00 to 12:00 Noon):** Examples of prediction and experimental confirmation of microbial interaction with toxic metals-oxidizers 3. **Tutorial 3(2:00 to 4:00 PM):** Problem solving
November 16, 2018 (FRIDAY)	1. **First Examination for Participants: (9:30 to 10:30 AM)** 2. **Lecture 10 (11:00 to 12:00 Noon):** Prediction and experimental confirmation of microbial interaction with radionuclides. General terms 3. **Lecture 11 (2:00 to 3:00 PM):** Prediction of microbial interaction with synthetic organic compounds (1-chloro-4-nitrobenzene, phenol, dyes). General terms 4. **Lecture 12 (3:30 to 5:00 PM):** Examples of prediction and experimental confirmation of microbial interaction with synthetic organic compounds (1-chloro-4-nitrobenzene, phenol, dyes).
November 17, 2018 (SATURDAY)	1. **Lecture 13 (9:30 to 10:30 AM):** Biological basis of hydrogen fermentation 2. **Lecture 14 (11:00 to 12:00 Noon):** Biological basis of methane fermentation 3. **Tutorial 4 (2:00 to 4:00 PM):** Problem solving
November 18, 2018 (SUNDAY)	1. **Lecture 15 (to 9:30 to 10:30 AM):** Thermodynamic prediction for development biotechnologies for energy obtaining during organic waste fermentation (Part 1) 2. **Lecture 16 (11:00 to 12:00 Noon):** Thermodynamic prediction for development biotechnologies for energy obtaining during organic waste fermentation (Part 2) 3. **Tutorial 5 (2:00 to 4:00 PM):** Problem solving
November 19, 2018 (MONDAY)	1. **Lecture 17 (9:30-10-30 AM):** Combined biotechnologies on the basis of thermodynamic prediction 2. **Lecture 18 (11:00 to 12:00 Noon):** Summary. The prospects of industrial implementation of environmental and energetic biotechnologies in India (Part 1) 3. **Tutorial 6(2:00 to 4:00 PM):** Problem solving
November 20, 2018 (TUESDAY)	1. **Lecture 19 (9:30 to 10:30 AM):** Summary. The prospects of industrial implementation of environmental and energetic biotechnologies in India (Part 2) 2. **Lecture 20 (11:00 to 12:00 Noon):** Using of the modern biotechnological approaches as a tool for plants bio fortification. 3. **Tutorial 7 (2:00 to 4:00 PM):** Problem solving
November 21, 2018 (WEDNESDAY)	1. **Second examination of the participants: 9:30 to 10:30 AM** 2. **Closing and group Discussions 10: 30 to 12:20**
You should attend if….	▪ You are an executive and researcher from manufacturing, service and government organizations including R&D laboratories in the area of any field of Life sciences/Environmental Sciences/ Basic sciences/ Chemistry/Biotechnology/ Engineering. ▪ You are a student (at all levels including BSc/B.Tech/MSc/M.Tech./PhD) or faculty from reputed academic institutions and technical institutions. **Number of participents will be limited to 50 only.**
Registration	The participants are required to get themselves register on GIAN web portal (http://www.gian.iitkgp.ac.in) 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: Participants from abroad : US $400 Indian Industry: Rs. 6,000/- Indian Academic Institutions/ Research Organizations : 4,000/- Participants from host Department: 3,000/- 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.

A Brief Profile of The Invited Experts:

Professor Oleksandr B. Tashyrev earned his Ph.D. in Microbiology from Academy of Sciences USSR, Institute of Microbiology, Moscow. He joined as a Senior Scientist at Referent, Presidium of the National Academy of Sciences of USSR till 1991. He joined as a Senior Scientist in the Department of general and soil microbiology in the year 1991 at Zabolotny Institute of Microbiology and Virology of the National Academy of Sciences. Now he is working as Department Chair, Department of Biology of Extremophilic Microorganisms, Zabolotny Institute of Microbiology and Virology of the National Academy of Sciences of Ukraine. He has the vast experience of more than 30 years in the field of microbiology, especially extremophiles microorganisms and their interaction with metals, toxic metals-oxidizers and synthetic organic compounds, hydrogen and methane fermentation by using organic waste etc.

Area(s) of expertise: Microbial processes of industrial/municipal wastewater treatment, biogas production, dark fermentation biohydrogen production, food waste recycling. He has authored many books and published more than 100 research articles in premier peer-reviewed journals such as Biotechnol. Acta, Ecol. Eng. Environ. Protect., Mikrobiol., World J. Microbiol. Biotechnol., Mikrobiologiya.

Dr Vira M. Hovorukha had done her Ph.D in Microbiology from Zabolotny Institute of Microbiology and Virology of the National Academy of Sciences of Ukraine. Now she is working as Scientist and Deputy Chair in the same Department. She has a vast experience in the field of Thermodynamic modelling of microbial interactions with iron-containing compounds; Fe(III)-reducing microorganisms from extremophilic environments; regulation of microbial metabolism, hydrogen dark fermentation. She has published many research papers in various journals such as Biotechnol. Acta, Ecol. Eng. Environ. Protect, Int. J. Bio automation, Microbial. etc.

Host Faculty

Course Coordinator

Prof. Namita Singh completed her Masters and Doctorate degree in Microbial Biotechnology from Institute of Microbial Biotechnology, Barkatullah University, Bhopal (India) in collaboration with Ben- Gurian University, Israel. She is presently working as Professor at the Department of Bio and Nano Technology, Guru Jambheshwar university of Science and Technology, Hisar, Haryana, India. She has over 22 years of research and 17 years of PG Teaching experience. Prof. Namita Singh has guided 15 Ph.D., 96 M.Sc., 4 M.Tech. and 2 M.Phil. Students till so far. Presently, 6 Ph.D. scholars and 9 M.Sc. students are pursuing research under her guidance. She had received various prestigious fellowships such as UNESCO-American Society For Microbiology, PDF by Jacob Bluestein Institute for Deserts Ben-Gurion University of Negev sde Boker Campus, ISRAEL. Prof. Namita Singh had received EP Odum Gold Medal from International Society for ecological communication in June 2009. Prof. Namita Singh is a widely travelled person. She had done several international academic visits in various countries such as Israel, Japan, Germany, Canada, England, Dubai, Ukraine & Ethiopia. Dr. Namita is also the member of various National and International scientific societies of repute. She had coordinated over 30 national/ international conference/ workshop/ seminars/ training programs. Dr. Namita Singh has published 40 national and 60 international publications, 1 book, 3 manual, 123 sequence published on NCBI & 1 Patent. Prof. Namita is the Deputy Coordinator of SAP DRS I & II at Department of Bio and Nano Technology, GJUS&T, Hisar. Prof. Namita Singh has completed eighteen national projects successfully and currently working on 03 national and 01 international Project. Dr. Namita has received several grants from national and international funding agencies like DST, UGC, DBT, HSCST, MOEF Haryana etc. to support her research activities.

Area(s) of expertise: Microbial Biotechnology, Fermentation Technology, Environmental Biotechnology, Algal Biotechnology, Enzyme Technology, Solid Waste Management

Course Co-Coordinator

Dr. Rajesh Kumar Lohchab is a faculty member in the Department of Environmental Science and Engineering, Guru Jambheshwar University of Science and Technology, Hisar, Haryana, India has completed major research projects from AICTE of Rs 24,70,000/- and from UGC Rs 10,69,800/- He has successfully completed Short Course on Biological Processes from Cranfield University, Cranfield, UK in 2006. He has published more than 35 research papers in refereed national and international journals of repute along with 29 research papers presentations and invited talks in National and International Conference/ Symposium/ Workshop/ Training Programs. Best Journals of Publications are Cleaner Production- Impact Factor 5.715, Waste management- Impact Factor 4.03, Environmental Science and Pollution Research- Impact Factor- 2.741 etc. He has also published 4 books and one module "hydropower generation" in e-PG pathshala, UGC.

INTERNATIONAL WORKSHOP

On

Application of Thermodynamic Prediction for Development of Microbial Biotechnological Approaches

12th November to 21st November, 2018

An event under

Organized by

Department of Bio & Nano Technology

Guru Jambheshwar University of Science and Technology, Hisar

Course Coordinator

Prof. Namita Singh

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GIAN

Global Initiative of Academic Network (GIAN) Programme
Gjuni Guru Jambheshwar University of Sc. & Tech.

Report on Conduct of GIAN Course

Course Title	Application of thermodynamic prediction for development of microbial biotechnological approaches
GIAN Course ID	176016C01
Period of Course	From 2018-11-12 To 2018-11-21
Name and Department of Faculty from IIT Kharagpur Course Coordinator	
Name	Dr. Namita Singh
Department	Department of Bio and Nano technology
Co-host Faculty, if any	
Name	Dr. Rajesh Lohchab
Department	Environmental Sciences and Eng
Name and Affiliation of International Faculty	
Name	OleksanB. Tashyrev
Department	Zabolotny Institute of Microbiology and Virology, National Acadamy of Sci. of Ukraine Skype Oleksandr Tashyrev YouTube tash2232
Name and Affiliation of national Faculty	
Name	PROF NAMITA SINGH
Department	GURU JAMBHESHWAR UNIVERSITY OF SCIENCE AND TECHNOLOGY, HISAR
Structure of the Course	
Duration of Course(1 Week or 2 Weeks)	2
Number of credits	2
Total number of lectures in the course	40
Number of lectures by International Faculty	35
Number of lectures by Host Faculty	05
Number of hours of laboratory/tutorial sessions	17
Participants of the Course	
Number of Student participnats	22
Number of participnats from Industry/Research	02
Number of faculty participnats	18
Total Number of Participants	42

Number of participnats who credited for the course	
Course Generated Fund	
Sponsorship. if any (in Rs)	00
Registration Fee Collected	118500
Total Amount	118500
Interaction with International Faculty	
Interaction of Host Faculty	YES, GOOD INTERACTION WITH DEPARTMENTAL FACULTY MEMBERS
Interaction of other faculty from Gjuni	YES, GOOD INTERACTION WITH DEANS AND DIRECTORS OF THE UNIVERSITY
Interaction of faculty /researchers from other institutes/organizations	YES, GOOD INTERACTION WITH NEARBY RESEARCH INSTITUTIONS
Signature of Course Coordinator	
Date of submission of report	