



हरियाणा केंद्रीय विश्वविद्यालय, महेन्द्रगढ़  
CENTRAL UNIVERSITY OF HARYANA, MAHENDERGARH  
(NAAC ACCREDITED 'A' GRADE UNIVERSITY)

**INDUSTRIAL BIOTECHNOLOGY**

[Course Code: 174040H05]

September 23-27, 2019

Sponsored by Ministry of Human Resource Development (MHRD)  
under the scheme of Global Initiative of Academic Networks (GIAN)



*Organised by*  
**Department of Biotechnology**  
**School of Interdisciplinary and Applied Life Sciences**

# Industrial Biotechnology

## MHRD Scheme of Global Initiative of Academic Networks (GIAN)

### 1. Overview

Now-a-days, all over the world, we are facing three major challenges viz. climate change, food security and dependence on imported petroleum. Industrial and Agro-Food Biotechnology are key areas on the way these issues are to be addressed. A knowledge-Based Bio-Economy has the potential to revolutionize the way chemicals and energy is currently produced as well as food processing. It is clear that industry is moving towards innovative technologies to improve bio-reaction and bio-separation processes and energy production from biomass. The effective implementation of Industrial Biotechnology will contribute for a sustainable development and the creation of a circular economy. This course aims to take a step forward to unravel the opportunities of this fascinating biotechnology.

This course is organized in one week module that will start with the participants being exposed to the basics of bioreactor design and operation. The topics to be presented and discussed during the programme will deal with recent advances on process development in industrial biotechnology, including a lecture on process development for food industry by-products valorization.

Course participants will learn these topics through lectures and tutorials. Also case studies and assignments will be shared to stimulate research motivation of participants.

### 2. Objectives

The primary objectives of the course are as follows:

- To expose the participants to the fundamental and applied areas of industrial and food biotechnology
- To build the confidence and capability amongst the participants in the application of biotechnological tools and techniques in Industrial and food applications
- To expose the participants to practical problems and their solutions, through case studies and live projects in industrial and food biotechnology
- To enhance the capability of the participants to identify and manage relevant issues in Industrial Biotechnology.

### 3. Teaching Faculty

#### Foreign Faculty

Prof. José António Teixeira  
Centre for Biological Engineering  
Universidade do Minho  
Braga, Portugal

#### Host Faculty

Kashyap Kumar Dubey  
Department of Biotechnology  
Central University of Haryana  
Mahendergarh-123031

#### 4. Course Details

Duration: 5 Days (23-27 September, 2019)

##### Lecture Schedule

September 23, 2019		
Day <b>1</b>	<b>Lecture 1</b> 10.00 a.m.- 11.00 a.m.	Bioreactors design and operation
	<b>Lecture 2</b> 11.30 a.m.- 12.30 p.m.	Mixing and mass transfer in bioreactors
	<b>Tutorials</b> 1.30 p.m. - 2.30 p.m.	Tutorials based on the discussed lectures
September 24, 2019		
Day <b>2</b>	<b>Lecture 3</b> 10.00 a.m.- 11.00 a.m.	Bioethanol production - strain development
	<b>Lecture 4</b> 11.30 a.m.- 12.30 p.m.	Bioethanol production - bioreactor design
	<b>Tutorials</b> 1.30 p.m. - 2.30 p.m.	Tutorials based on the discussed lectures
September 25, 2019		
Day <b>3</b>	<b>Lecture 5</b> 10.00 a.m.- 11.00 a.m.	Biosurfactants - process development
	<b>Lecture 6</b> 11.30 a.m.- 12.30 p.m.	MEOR - microbial enhanced oil recovery
	<b>Tutorials</b> 1.30 p.m. - 2.30 p.m.	Tutorials based on the discussed lectures
September 26, 2019		
Day <b>4</b>	<b>Lecture 7</b> 10.00 a.m.- 11.00 a.m.	Bioprocess intensification
	<b>Lecture 8</b> 11.30 a.m.- 12.30 p.m.	The new oscillatory flow reactors
	<b>Tutorials</b> 1.30 p.m. - 2.30 p.m.	Tutorials based on the discussed lectures
September 27, 2019		
Day <b>5</b>	<b>Lecture 9</b> 10.00 a.m.- 11.00 a.m.	Continuous bioreactors for industrial applications
	<b>Lecture 10</b> 11.30 a.m.- 12.30 p.m.	Food by-products valorization - cheese whey as case study a case study
	<b>Tutorials</b> 1.30 p.m. - 2.30 p.m.	Tutorials based on the discussed lectures

#### 5. Who can attend?

Engineers and researchers from manufacturing, service and government organizations including R&D laboratories. Students at B.Tech/MSc/MTech/PhD levels. Faculty from academic and technical institutions.

##### The participation fees:

- Participants from abroad: **US \$ 150**
- Faculty/Scientists: **INR 2000/-**
- Industry Participants: **INR 4000/-**
- Students: **INR 1000/-** (OBC/UR); **INR 500** (SC/ST); **INR 0/-** (PWD)

The above fee includes all instructional materials, computer use for tutorials, and assignments, laboratory equipment usage charges, 24 hrs free internet facility. The participants will be provided accommodation on payment basis.

## Message from Vice-Chancellor



I am happy to share that Central University of Haryana is a forerunner in organizing the programmes under Global Initiative of Academic Networks (GIAN) scheme of Ministry of Human Resource Development. In last three years, the University organized 13 GIAN programmes to tap the talent pool of international academicians, scientists and entrepreneurs, and to promote the culture of collaborative learning that facilitates sharing of the best practices and ideas. All the programmes witnessed huge participation of the students and scholars from across the country, which speaks volumes of the relevance of the theme and quality of resource persons invited from prestigious institutions of the world. Continuing with the institutional ethos of quality higher education through pedagogical innovations, the Department of Biotechnology of the University is organizing a course titled "Industrial Biotechnology" from September 23-27, 2019 under the MHRD scheme of Global Initiative of Academic Networks (GIAN).

It is enlightening to note that the Course will cover the specific topics of relevance including bioreactors design and operation, mixing and mass transfer in bioreactors, strain development for bioethanol production, process development for biosurfactants, microbial enhanced oil recovery (MEOR), bioprocess intensification, oscillatory flow reactors, continuous bioreactors for industrial applications, and food by-products valorization (cheese whey as a case study). The course contents will enrich the knowledge of the participants about the latest trends in bioprocess development.

Given the quality of the expert leading the course, I have no doubt about the success of the course. I hope that the students and faculty of different universities shall take the fullest advantage of the course.

I would like to extend my compliments to the Department of Biotechnology for carrying forward the agenda of the University to adopt innovative pedagogies for dissemination of knowledge.

I wish the Course Coordinator and his team very best of luck for the organization of this course.

**Prof. R. C. Kuhad**

## Foreign Faculty



**José António Teixeira** is currently Professor ("Professor Catedrático") at Biological Engineering Department, University of Minho (since 2000). He has a degree in Chemical Engineering from University of Porto (1980) and a PhD in Chemical Engineering also from University of Porto (1988). He has been involved in different management activities, being Head of the Department of Biological Engineering, Univ. Minho, 2000 -2012 and Head of Biological Engineering Research Centre, 2012-2015. His main research interests are Industrial Biotechnology (bioprocess development for the transformation of lignocellulosic materials into 2nd generation bioethanol and chemicals; valorisation of agro-industrial residues; bioreactor development including new design bioreactors and continuous processing) and Food Biotechnology (non-conventional food processing; edible films for packaging; process development for production of prebiotics). He was responsible/co-responsible for the Supervision of 31 PhD theses and 20 Post-docs and has been the coordinator of 32 scientific research projects, 7 of which international José Teixeira was awarded the "Stimulus to Excellence", 2006, from FCT, the "Seeds of Science" in "Engineering and Technology", 2011, from "CiênciaHoje" and the "Scientific Merit Award", Universidade do Minho, 2015 He is the co-editor of the books *Reactores Biológicos-Fundamentos Aplicações* (in Portuguese), *Engineering Aspects of Milk and Dairy Products* and *Engineering Aspects of Food Biotechnology* and the author/co-author of over 480 peer-reviewed papers (see <http://orcid.org/0000-0002-4918-3704>). Recently, he got Highly Cited Researcher award for 2018 by Clarivate Analytics (Web of Science).

## Host Faculty



**Dr. Kashyap Kumar Dubey** is working as Associate Professor in the Department of Biotechnology, Central University of Haryana. He has a background in research which combines engineering technologies with biochemical research. His focus has been to develop technologies that are significant for industry. His interest has been to develop industrially significant process for production of colchicine derivative (3-DMC) using microbial system (*Bacillus megaterium* ACBT3). He has developed an industrially significant process for production of colchicine derivative i.e., 3-demethylated colchicine (3-DMC) using microbial system mode. The products from the above process has proven track record and is consumed as an anti-cancer drug with fewer side effects when compared to other available drugs. The molecule i.e. 3-DMC, developed by him is more potent than native molecule (i.e., colchicine) through an efficient microbial system via biocatalysts mechanism which has been considerably contributed by him. The experiments have been successful and well-documented by him in journals of repute. His effort has been to develop low cost technology which would lead to lesser cost. Dr. Dubey has published 45 research articles and five book chapters. He has completed two research projects and four are on going. He has successfully supervised six PhD. students and presently six students are pursuing their research under his supervision.

## About The University

The Central University of Haryana (established vide Central Universities Act 2009) is the only Central University in the state of Haryana to be funded and regulated by University Grants Commission and Ministry of Human Resource Development (MHRD), Government of India. Central University of Haryana is located at Jant-Pali villages of district Mahendergarh in South Haryana. Mahendergarh is now a part of the extended National Capital Region (NCR) and is 125 kilometers away from Delhi. It is well connected to Delhi through railways and road. At present, the University has 33 Departments of Study, organised under 11 Schools of Study, The University is one of the foremost universities in the country to implement Choice Based Credit System (CBCS) at the Post Graduate level. Department of Biotechnology was established under the aegis of School of Interdisciplinary and Applied Life Sciences in the academic year 2015-16. The Department is currently offering M.Sc. and Ph.D. programmes. More details about the University and the Department can be found at: <http://cuh.ac.in>.

## Course Coordinator

**Kashyap Kumar Dubey**  
Associate Professor  
Department of Biotechnology  
Central University of Haryana  
Mahendergarh-123031  
Mob: 9996122280  
E-mail: [kashyapdubey@cuh.ac.in](mailto:kashyapdubey@cuh.ac.in)

## Local Coordinator

**Prof. Satish Kumar**  
Professor & Head  
Department of Biotechnology  
Central University of Haryana  
Mahendergarh-123031  
Mob: 9052456653  
E-mail: [satishk@cuh.ac.in](mailto:satishk@cuh.ac.in)

## How to Participate:

1. Register yourself on GIAN portal of IIT Kharagpur (<http://www.gian.iitkgp.ac.in/>)
2. Choose the course " Industrial Biotechnology " by drop down menu
3. Fill the registration form and pay the course fee by DD/Cheque/RTGS
4. Scan filled registration form and send to Course Coordinator by E-mail.



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**REGISTRATION FORM**

**PERSONAL DETAILS**

Name of the Applicant : \_\_\_\_\_  
 GIAN Application ID : \_\_\_\_\_  
 Date of Birth : \_\_\_\_\_  
 Occupation : \_\_\_\_\_  
 Institution Address : \_\_\_\_\_  
 E-mail : \_\_\_\_\_  
 Mobile Number : \_\_\_\_\_

Paste recent  
 passport size  
 coloured  
 photograph

**REGISTRATION FEE DETAILS**

**By Cheque**

Amount (INR) : \_\_\_\_\_  
 Account Number : \_\_\_\_\_  
 Account Holder's Name : \_\_\_\_\_  
 Cheque No. & Date : \_\_\_\_\_

**By NEFT**

Amount (INR) : \_\_\_\_\_  
 Account Number : \_\_\_\_\_  
 Account Holder's Name : \_\_\_\_\_  
 Transaction ID & Date : \_\_\_\_\_

**By Demand Draft**

Amount: \_\_\_\_\_ DD No. \_\_\_\_\_  
 Bank: \_\_\_\_\_ Date \_\_\_\_\_

**Note:**

- Registration should be made in favour of **GIAN, Central University of Haryana A/c** via **cheque/online transfer mode** only. (**Bank Name & Address:** Punjab National Bank, Jant-Pali, Mahendergarh, Pin-123031; **Account no.** 7824000100009605; **MICR** 123024106; **IFSC** PUNB0782400)
- Proof of Registration fee payment should be sent to Dr. Kashyap Kumar Dubey, Department of Biotechnology, Central University of Haryana, Mahendergarh - 123031
- The scanned copy of filled Registration form duly signed by the applicant along with the proof of fee submission should also be sent by E-mail to Dr. Kashyap Kumar Dubey ([kashyapdubey@cuh.ac.in](mailto:kashyapdubey@cuh.ac.in))
- In case the candidate requires an accommodation a separate E-mail regarding this should be sent to [kashyapdubey@cuh.ac.in](mailto:kashyapdubey@cuh.ac.in) **before August 25, 2019**

**Signature**

**Contact:**

**Dr. Kashyap Kumar Dubey** Course Coordinator; **Email:** [kashyapdubey@cuh.ac.in](mailto:kashyapdubey@cuh.ac.in); **Mob:** 9996122280