

# Membrane Processes for Water, Food and Biotech Applications

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## Overview

This one-week full immersion course will provide the participants an introductory but sound knowledge about the fundamentals of membrane processing and the use of this technology in relevant economic and social areas. A particular emphasis will be given to applications in water and wastewater treatment namely using pressure-driven processes (micro-, ultra-, nanofiltration, and reverse osmosis) and membrane bioreactors. The use of membrane processes will be also addressed in the context of the food industry and the biorefinery / circular economy approach, where several pressure-driven, activity-driven and electrically driven processes will be presented and discussed. A particular attention will be also given to emerging membrane contactor processes. Bioseparations and Biomedical applications will be also addressed, emphasizing the role of membrane materials, which offer unique opportunities in these areas, due to the possibility of using materials that are biocompatible.

During the whole course it will be paid a particular attention to issues of process integration, energy efficiency and management of raw materials and resources. Green metrics will be presented and discussed in this context. Course participants will learn these topics through lectures and tutorials. Also case studies / problem solving will be discussed in tutorial sessions, as well as project assignments which will be developed and presented by the participants in a final written report and presentation.

<b>You Should Attend If...</b>	Engineers and researchers from manufacturing, service and government organizations including R&D laboratories. Students at MSc/MTech/PhD levels. Faculty from academic and technical institutions.
<b>Fees</b>	The participation fees for taking the course is as follows: <b>Participants from abroad : US \$150</b> <b>Industry Participants: INR 4000/-</b> <b>Faculty: INR 2000/-</b> <b>Students: INR 1000/-(OBC/UR); INR 500 (SC/ST); INR 0/- (PWD)</b> The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.

# Course Details

Course Structure  
(29<sup>th</sup> October to 2  
Nov., 2017)

## Day 1

**Lecture 01** (09:00am-10:30am): Fundamentals of Membrane Processes: Materials

**Lecture 02** (11:00am-12:30pm): Fundamentals of Membrane Processes: Transport in Porous Membranes

**Tutorial 01** (13:30pm-15:30pm): How to elaborate a scientific project. Distribution of assignments among students

## Day 2

**Lecture 03** (09:00am-10:30am): Fundamentals of Membrane Processes: Transport in Dense Membranes

**Lecture 04** (11:00am-12:30pm): Fundamentals of Membrane Processes: Membrane Characterization and Process Monitoring

**Tutorial 02** (13:30pm-15:30pm): Problem solving dealing with transport in porous membranes. Discussion and Distribution of assignments among students

## Day 3

**Lecture 05** (09:00am-10:30am) Membrane Processes in Water and Wastewater Treatment

**Lecture 06** (11:00am-12:30pm) Membrane Bioreactors

**Tutorial 03** (13:30pm-15:30pm): Follow-up of participants' scientific project. Discussion and Distribution of assignments among students

## Day 4

**Lecture 07** (09:00am-10:30am) Membrane Contactors

**Lecture 08** (11:00am-12:30pm) Membrane Processes in the Food Industry and Biorefinery

**Tutorial 04** (13:30pm-15:30pm): Problem solving dealing with transport in dense membranes and membrane contactors. Discussion of all assignments.

## Day 5

**Lecture 09** (09:00am-10:30am) Membranes in Bioseparation

**Lecture 10** (11:00am-12:30pm) Membranes in Biomedical Applications

**Tutorial 05** (13:30pm-15:30pm): Participants' presentation and discussion of scientific projects developed by themselves

## The Faculty



**João G. Crespo** is full Professor of Chemical Engineering at the Faculty of Sciences and Technology, Universidade Nova de Lisboa, Portugal, where he is Vice-Rector for Research and Innovation and former Coordinator of NOVA Doctoral School. He has also been the Vice-President of Fundação para a Ciência e a Tecnologia (Portuguese National Science Foundation) and former Academic Dean of the Faculty of Sciences and Technology at NOVA. His area of research is membrane technology and its application in various areas. He is member of the editorial board of international journals of high repute. Besides, he is also the editor of 2 books and has authored 17 book chapters and 205. He is also the founder of the spin-off company “Zeyton Nutraceuticals”.



**Dr. Kashyap Kumar Dubey** is working as Associate Professor and Head in Department of Biotechnology, Central University of Haryana. His interest lies in combining engineering technologies with biochemical research, which are industry oriented. He has developed an industrially significant process for production of colchicine derivative i.e., 3-demethylated colchicine (3-DMC) using microbial system mode, which is a proven anti-cancer molecule. Dr. Dubey is currently handling 2 research projects with International collaboration. He has published 45 research articles, 5 book chapters and 2 projects has been completed 2 is in progress; 4 Ph.D. completed and 3 is in progress. Besides Dr. Dubey is also serving as editor and reviewer of various National and International Journals.



**Dr. Rishi Gupta, PhD** is working as an Assistant Professor in Department of Biotechnology, Central University of Haryana, Mahendergarh, Haryana, India. He has good experience on lignocellulose biotechnology especially for the development of biofuels. He has published 34 research papers, reviews and book chapters in the area of lignocellulose Biotechnology. His scientific work has received more than 1000 citations.

## Course Coordinator

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## Course Co-coordinator

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## Local Coordinator

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