

# Next Generation Composite Membranes for Hydrogen Energy and Environmental Application

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## Overview

The course "Next Generation Composite Membranes for Hydrogen Energy and Environmental Application" is meticulously designed to equip academicians, industrialists, and researchers with a deep understanding of cutting-edge composite membrane technologies and their pivotal roles in advancing hydrogen energy and addressing environmental challenges. This course provides a thorough exploration of the latest innovations in materials and fabrication methods, aiming to foster the development of high-performance membranes for sustainable solutions.

Participants will begin with an introduction to the fundamental principles of membrane science, focusing on the unique properties and functions of composite membranes. The curriculum will cover the design and synthesis of advanced materials, such as nanomaterials, nanocomposites and hybrid organic-inorganic frameworks, that enhance membrane performance, particularly in hydrogen production, purification, and storage.

Key to the course is the examination of state-of-the-art fabrication techniques, including electrospinning, phase inversion, interfacial polymerization and additive manufacturing, which enable precise control over membrane structure at the micro- and nanoscale. These techniques are essential for optimizing membrane properties to meet the rigorous demands of hydrogen energy applications. The course will delve into the integration of composite membranes within hydrogen energy systems, such as fuel cells and hydrogen production units, emphasizing their role in improving efficiency, durability, and overall system performance. Real-world case studies will be analyzed to demonstrate practical applications and successes in the industry.

Environmental implications and sustainability of membrane technologies form a crucial part of the curriculum. Discussions will focus on developing eco- and environmental-friendly materials, energy-efficient fabrication processes, and strategies for recycling and disposing of membranes, ensuring that technological advancements align with environmental protection goals. By the end of the course, participants will have gained comprehensive knowledge and practical insights into next-generation composite membranes, empowering them to drive innovation and collaboration in the field of hydrogen energy and environmental applications.

<b>Modules</b>	<b>A: Lectures and Tutorials : March 3 – March 8, 2025</b> <b>Number of participants for the course will be limited to hundred on first-come-first-serve basis.</b>										
<b>You Should Attend If...</b>	<ul style="list-style-type: none"> <li>▪ You are a Chemical Engineer or professional from allied (Mechanical, Civil, Chemistry, etc.,) stream or research scientist interested in designing next generation membranes for various applications in energy and environment.</li> <li>▪ You are an industrial professional from any background working in the field of hydrogen energy and/or environmental sector.</li> <li>▪ You are a student or faculty from academic institution interested in learning how to do research on membrane system or subsystem or want to work with hydrogen energy and environmental application sector.</li> </ul>										
<b>Fees</b>	<p>The participation fees for taking the course is as follows:</p> <p><b>Participants from abroad: US \$250</b>  <b>Participants from Industry Organizations: INR 6,000/- + 18% GST</b>  <b>Faculties or Scientists from Academic/ research Institutions: INR 3,000/- + 18% GST</b>  <b>Other participants form research organization: 3,000/- + 18% GST</b>  <b>Students from Academic Institutions other than IIPe: INR 1,000/- + 18% GST</b></p> <p>The above fee includes all instructional materials, computer use for tutorials, laboratory equipment usage charges, free internet facility at course venue. The participants will be provided with accommodation on payment basis for which separate request has to be made to the course co-ordinator.</p> <table border="1" data-bbox="321 982 1209 1633"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">Payment Options</th> </tr> <tr> <th style="background-color: #1a522d; color: white;">Payment Channel</th> <th style="background-color: #1a522d; color: white;">Details</th> </tr> </thead> <tbody> <tr> <td style="background-color: #1a522d; color: white;">Deposit/Transfer via Net Banking</td> <td> <ul style="list-style-type: none"> <li>BANK DETAILS: BANK OF BARODA</li> <li>BRANCH: SIRIPURAM</li> <li>ACCOUNT NAME: IIPe PDE</li> <li>ACCOUNT NO.: 52270100006259</li> <li>IFSC CODE: BARB0SIRIPU</li> </ul> </td> </tr> <tr> <td style="background-color: #800000; color: white;">UPI</td> <td style="text-align: center;">             Indian Institute of Petroleum and Energy         </td> </tr> <tr> <td style="background-color: #1a522d; color: white;">Cheque</td> <td>Organizations can issue a cheque in favour "Indian Institute of Petroleum and Energy" payable at Visakhapatnam</td> </tr> </tbody> </table>	Payment Options		Payment Channel	Details	Deposit/Transfer via Net Banking	<ul style="list-style-type: none"> <li>BANK DETAILS: BANK OF BARODA</li> <li>BRANCH: SIRIPURAM</li> <li>ACCOUNT NAME: IIPe PDE</li> <li>ACCOUNT NO.: 52270100006259</li> <li>IFSC CODE: BARB0SIRIPU</li> </ul>	UPI	 Indian Institute of Petroleum and Energy	Cheque	Organizations can issue a cheque in favour "Indian Institute of Petroleum and Energy" payable at Visakhapatnam
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<b>Registration link</b>	<p>Please register yourself in the course by filling up the following Google form:</p> <div style="text-align: center;">  </div> <p><a href="https://docs.google.com/forms/d/e/1FAIpQLScvAppS63lqQeRuaUA0nMQTjGvxlS1qw_BcE_x8hGD6DFjQEQ/viewform?usp=sf_link">https://docs.google.com/forms/d/e/1FAIpQLScvAppS63lqQeRuaUA0nMQTjGvxlS1qw_BcE_x8hGD6DFjQEQ/viewform?usp=sf_link</a></p>										

## THE FACULTY



**Dr. Vahid Vatanpour** was born in Sarein (Iran) in 1983. He is a Professor of Environmental Engineering from Istanbul Technical University. His research interests are focused on membrane science and technology for water and wastewater treatment, especially fabrication of antifouling polymeric membranes. He has published over 300 papers in refereed journals.



**Dr. Raka Mondal** is an Assistant Professor of Indian Institute of Petroleum and Energy, Visakhapatnam. Her research interest are adsorptive and photocatalytic membranes, fuel cells and electrolyzers using membrane technologies.

## Course Co-ordinator

**Prof. Raka Mondal**

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Register here:

[https://docs.google.com/forms/d/e/1FAIpQLScvAPpS63lqQeRuaUA0nMQTjGvxlS1qw\\_BcE\\_x8hGD6DFjQE/viewform?usp=sf\\_link](https://docs.google.com/forms/d/e/1FAIpQLScvAPpS63lqQeRuaUA0nMQTjGvxlS1qw_BcE_x8hGD6DFjQE/viewform?usp=sf_link)

