



भारतीय पेट्रोलियम और ऊर्जा संस्थान

राष्ट्रीय महत्त्व का संस्थान, पेट्रोलियम और प्राकृतिक गैस मंत्रालय, भारत सरकार के अधीन

INDIAN INSTITUTE OF PETROLEUM AND ENERGY

An Institute of National Importance, Ministry of Petroleum & Natural Gas, GOI

Visakhapatnam - 530003



Certificate Course on “Waste to Wealth: Technologies for a Circular Economy”

COURSE OVERVIEW AND OBJECTIVE

Course explores the innovative methods to convert waste into valuable resources, supporting sustainability and resource efficiency. It covers biochemical, thermochemical, and physicochemical processes to produce bioenergy, biochar, and bioplastics, emphasizing circular economy principles. It is associated with the theme of the United Nations Sustainable Development Goals (SDGs) to achieve the circular economy by integrating waste management and energy production. It aims to provide a common platform for industry professionals, researchers, faculty, and policymakers to foster waste valorization technologies, circular economy integration, and develop innovative solutions.

LEARNIG OUTCOMES

- Understand the principles of waste valorization and circular economy.
- Identify and evaluate waste-to-value technologies.
- Design systems for producing bioenergy and value-added products from waste.
- Apply knowledge through real-world case studies and industry practices.

COURSE CONTENT AND SCHEDULE

Topic	Time (h)
Overview of waste types and their sources, global scenario of waste, characterization techniques for waste	02
Overview of waste valorization technologies and biofuels, combustion/incineration technology, reaction and stoichiometry	02
Biorefinery vs refinery: Biorefinery concept for a circular bioeconomy	02
Pyrolysis principles, pyrolysis reaction & mechanisms, pyrolysis types, controlling mechanisms during pyrolysis	02
Gasification, gasification reaction & mechanisms, gasifiers types, energy estimation in gasification	02
Introduction to algae-based biofuels, mechanism of microalgae growth, cultivation of microalgae, harvesting and processing	02
Fundamental of anaerobic digestion, fermentation processes, hydrothermal liquefaction, and process parameters optimization	02
Case studies on waste-to-energy plants, challenges faced during operation, environmental challenges and mitigation	02

Course Duration: 08 weeks

Timings: 2 hours- Every Saturday (5.00-7.00 P.M.)

Delivery mode: Online

Eligibility criteria:

- Executives, engineers, and researchers from manufacturing, service, and government organizations, including R&D laboratories.
- Student (BTech/MSc/MTech/PhD), PDF, and Faculty

COURSE COORDINATOR



Dr. Ravi Kumar Sonwani

Asst. Professor

Department of Chemical Engineering,
IIPE, Visakhapatnam, India

FOREIGN EXPERTS



Dr. Reeta Rani Singhania

Proj. Asso. Professor

College of Hydrosphere Science, NKUST, Taiwan
(Ranked top 2% Scientists in the word)



Dr. Anil Patel

Proj. Asso. Professor

College of Hydrosphere Science, NKUST, Taiwan
(Ranked top 2% Scientists in the word)

COMMENCEMENT OF APPLICATION FORM SUBMISSION
DATE: 18th JANUARY, 2025

LAST DATE OF THE APPLICATION SUBMISSION
DATE: 15th FEBRUARY, 2025

COMMENCEMENT OF THE CLASSES
DATE: 22nd FEBRUARY, 2025

REGISTRATION

(Follow the instructions for Registration,
Fee structure, and Payment)



E-Certificate will be awarded to the eligible participants.



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