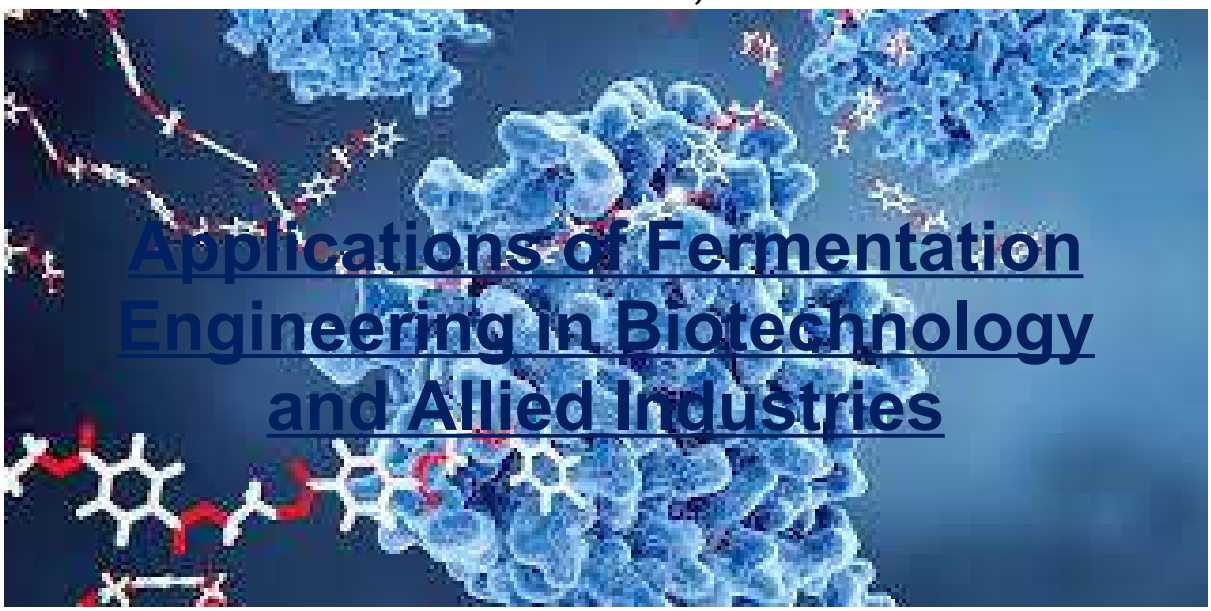
INTEGRAL UNIVERSITY
LUCKNOW - INDIA

NAAC A+
ACCREDITED UNIVERSITY

FACULTY OF ENGINEERING & IT

DEPARTMENT OF BIOENGINEERING

INTEGRAL UNIVERSITY, LUCKNOW



VALUE ADDED COURSE

BEV-25-03

March 24, 2025 to April 26, 2025

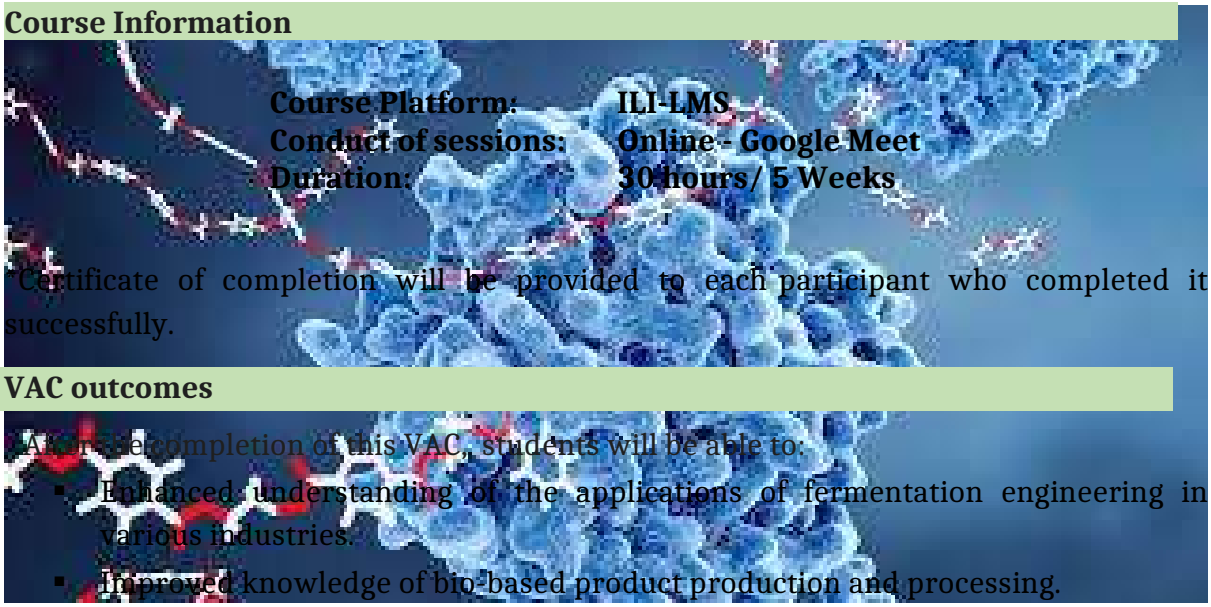
Dear All,

We are glad to announce that the Department of Bioengineering, Faculty of Engineering, Integral University, Lucknow is going to start a Value Added Course (VAC) on '**Applications of Fermentation Engineering in Biotechnology and Allied Industries'.**

Course Objectives

This course aims to provide students with a comprehensive understanding of the applications of fermentation engineering in various industries, including biotechnology, pharmaceuticals, food, and biofuels. By offering this value-added course, students can gain a deeper understanding of the applications of fermentation engineering and its potential to drive innovation and sustainability in various industries.

Course Information



Course Platform: **ILI-LMS**
Conduct of sessions: **Online - Google Meet**
Duration: **30 hours/ 5 Weeks**

Certificate of completion will be provided to each participant who completed it successfully.

VAC outcomes

After the completion of this VAC, students will be able to:

- Enhanced understanding of the applications of fermentation engineering in various industries.
- Improved knowledge of bio-based product production and processing.
- Familiarity with the role of fermentation engineering in food processing and preservation.
- Understanding of the economic and sustainability aspects of fermentation-based processes.
- Preparation for careers in biotechnology, pharmaceutical, food, and biofuel industries.

Schedule

Commencement of Registration: August 4, 2025

Commencement of the Course: August 11, 2025

End of the Course: September 13, 2025

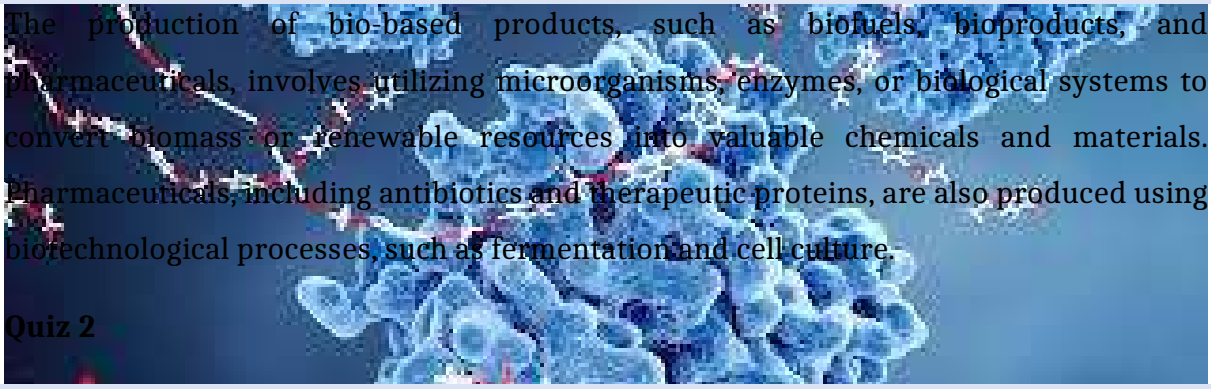
Course Curriculum

Module 1: Understand the applications of fermentation engineering in biotechnology and allied industries (5 hrs + 1 Hr Quiz)

Introduction to applications of fermentation engineering, emerging trends and future directions in fermentation engineering. Applications that utilize microorganisms to produce valuable products, improving human health, sustainability, and the economy. Power of microorganisms utilizing fermentation engineering that drives innovation and growth in various industries, from biotechnology and pharmaceuticals to food and energy.

Quiz 1

Module 2: Learn about the production of bio-based products, such as biofuels, bioproducts, and pharmaceuticals (5 hrs + 1 hr Quiz)



The production of bio-based products, such as biofuels, bioproducts, and pharmaceuticals, involves utilizing microorganisms, enzymes, or biological systems to convert biomass or renewable resources into valuable chemicals and materials. Pharmaceuticals, including antibiotics and therapeutic proteins, are also produced using biotechnological processes, such as fermentation and cell culture.

Quiz 2

Module 3: Study the role of fermentation engineering in food processing and preservation (5 hrs + 1 hr Quiz)

Role of food processing and preservation by utilizing microorganisms to transform raw materials into safe, nutritious, and flavourful products. Fermentation processes yogurt, cheese, sauerkraut, and soy sauce, with enhanced texture, flavour, and shelf life. Fermented foods that contain beneficial probiotics that promotes gut health and overall well-being.

Quiz 3

Module 4: Explore the applications of fermentation engineering in environmental biotechnology and bioremediation (5 hrs + 1 Hr Quiz)

Fermentation engineering for biological wastewater treatment, where microorganisms are employed to remove nutrients, such as nitrogen and phosphorus, and organic pollutants from wastewater, improving water quality and reducing environmental

impact. Fermentation-based bioremediation strategies to clean up contaminated soil, sediment, and groundwater, providing a cost-effective and sustainable solution for environmental remediation.

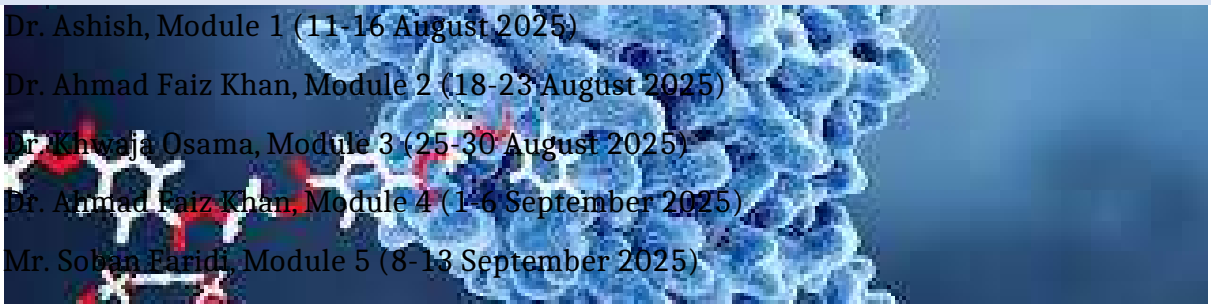
Quiz 4

Module 5: Understand the economic and sustainability aspects of fermentation-based processes (5 hrs + 1 Hr Quiz)

Fermentation-based processes that offer significant economic and sustainability benefits, including reduced production costs, lower environmental impact, and increased resource efficiency. Utilization of renewable biomass or waste materials as feedstocks to minimize greenhouse gas emissions. Fermentation-based production that generate valuable co-products, such as animal feed or bioactive compounds, for further enhancing economic viability.

Quiz 5

Module Coordinators, Department of Bioengineering



Dr. Ashish, Module 1 (11-16 August 2025)

Dr. Ahmad Faiz Khan, Module 2 (18-23 August 2025)

Dr. Khwaja Osama, Module 3 (25-30 August 2025)

Dr. Ahmad Faiz Khan, Module 4 (1-6 September 2025)

Mr. Soban Faridi, Module 5 (8-13 September 2025)

*__Timing's:__ Monday to Friday, 4-5 PM

Saturday (for Quiz), 2-3 PM