Training Course on Biofuels and Renewable Fuels Production from Hydrocarbon Feedstocks

Professional Development Training Course Outline

Category	Oil and Gas	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The global energy sector is undergoing a dynamic transformation, driven by urgent environmental concerns and the need to reduce carbon emissions. As fossil fuel reserves deplete and sustainability becomes a priority, biofuels and renewable fuels have emerged as critical alternatives in achieving energy security, reducing greenhouse gas emissions, and promoting circular economy practices. Training Course on Biofuels & Renewable Fuels Production from Hydrocarbon Feedstocks is designed to equip participants with the essential knowledge, cutting-edge technologies, and practical skills required to produce renewable fuels from hydrocarbon feedstocks, including waste materials, biomass, and fossil-based intermediates.

The course integrates advanced principles of bio-refining, thermochemical conversion, feedstock pretreatment, and fuel upgrading. Participants will gain insights into the latest innovations in green energy, biochemical processing, and policy frameworks driving the renewable energy market. Through case studies, real-world simulations, and expert-led sessions, attendees will explore the economic and environmental impacts of renewable fuel production, and learn to implement sustainable energy solutions that align with net-zero carbon goals.

Programme Curriculum

Training Course on Biofuels & Renewable Fuels Production from Hydrocarbon Feedstocks

Introduction

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Course Objectives

1. Understand the fundamentals of biofuel and renewable fuel technologies.
2. Analyze various hydrocarbon feedstocks and their conversion pathways.
3. Apply biochemical and thermochemical conversion techniques.
4. Explore pyrolysis, gasification, and catalytic upgrading methods.
5. Evaluate the life cycle analysis (LCA) of renewable fuel production.
6. Investigate supply chain logistics and feedstock variability.
7. Learn about process optimization and reactor design.
8. Identify key environmental and regulatory frameworks.
9. Examine the economic feasibility and market trends.
10. Understand the role of AI and digitalization in fuel production.
11. Address challenges in scale-up and commercialization.
12. Review global case studies and best practices.
13. Design a basic end-to-end renewable fuel production model.

Target Audience

1. Chemical Engineers
2. Environmental Scientists
3. Renewable Energy Consultants
4. Plant Managers & Operators
5. Research & Development Professionals
6. Government & Policy Regulators
7. Sustainability Officers
8. Graduate Students in Energy-related Fields

Course Duration: 10 days

Course Modules

Module 1: Introduction to Biofuels & Renewable Fuels

- Definition, classification & importance
- History and evolution of renewable fuels
- Key terminologies and global market outlook
- Types of hydrocarbon feedstocks
- Current challenges in fuel sustainability
- **Case Study**: Global renewable fuel consumption trends

Module 2: Hydrocarbon Feedstocks – Characterization & Selection

- Feedstock categories: biomass, algae, waste oils
- Quality parameters and pre-treatment needs
- Feedstock availability and logistics
- Cost analysis and economic viability
- Impact on final fuel yield and emissions
- **Case Study**: Feedstock selection in India’s ethanol program

Module 3: Thermochemical Conversion Techniques

- Principles of pyrolysis and gasification
- Reactor designs and thermodynamic conditions
- Gas cleanup and syngas upgrading
- Hydrogen-rich gas production
- Comparison of thermal vs. catalytic routes
- **Case Study**: Thermochemical plant in Sweden

Module 4: Biochemical Conversion & Fermentation

- Microbial pathways for fuel production
- Role of enzymes and biocatalysts
- Bioreactor configuration and control
- Optimization of fermentation conditions
- CO? utilization and valorization
- **Case Study**: Ethanol from sugarcane in Brazil

Module 5: Catalytic Fuel Upgrading

- Catalytic hydrotreating and cracking
- Role of zeolites and nanocatalysts
- Upgrading bio-oils to drop-in fuels
- Catalyst deactivation and regeneration
- Process integration strategies
- **Case Study**: Catalytic hydroprocessing in U.S. refineries

Module 6: Algae-Based Fuel Systems

- Algae cultivation systems and types
- Lipid extraction and conversion
- Photobioreactor design principles
- Nutrient recycling and CO? capture
- Economic analysis of algae biofuels
- **Case Study**: Algae biofuel pilot in Australia

Module 7: Process Integration & Optimization

- Energy integration across systems
- Heat exchangers and pinch analysis
- Simulation software and tools
- Minimizing process emissions
- Mass balance and energy calculations
- **Case Study**: Process optimization in Finnish bio-refinery

Module 8: Lifecycle Analysis (LCA)

- Understanding LCA frameworks
- GHG emissions from cradle to grave
- Tools for LCA: SimaPro, GREET
- Comparison with fossil fuels
- Social and environmental impact analysis
- **Case Study**: EU RED II compliance for biofuels

Module 9: Waste-to-Fuel Innovations

- Municipal solid waste (MSW) conversion

- Plastics-to-fuel technologies
- Agricultural waste valorization
- Circular economy approaches
- Advanced sorting and preprocessing
- **Case Study**: Waste-to-diesel project in Canada

Module 10: Fuel Standards and Certification

- ASTM and EN fuel specifications
- Quality control techniques
- Certification bodies and documentation
- Testing procedures for biofuels
- Export-import regulatory considerations
- **Case Study**: Renewable diesel compliance in California LCFS

Module 11: Energy Storage & Distribution

- Storage requirements for renewable fuels
- Safety and handling guidelines
- Infrastructure challenges
- Blending with conventional fuels
- Innovations in decentralized storage
- **Case Study**: Renewable fuel logistics in Germany

Module 12: AI and Digitalization in Biofuel Production

- Smart sensors and real-time monitoring
- Predictive maintenance in biorefineries
- Data-driven process optimization
- AI in feedstock supply chain management
- Digital twins for fuel production
- **Case Study**: IoT in bio-refining in Singapore

Module 13: Policy, Regulation, and Incentives

- International and national biofuel mandates
- Carbon credits and renewable ID numbers (RINs)
- Subsidies and fiscal incentives
- Sustainability certification requirements
- Policy case studies from key markets
- **Case Study**: U.S. Renewable Fuel Standard (RFS2)

Module 14: Economic Viability & Investment Strategies

- Cost-benefit analysis
- CAPEX vs. OPEX considerations
- Investment trends and ROI
- Public-private partnerships
- Risk management in project development
- **Case Study**: Billion-dollar investment in renewable jet fuel

Module 15: Final Capstone & Industrial Case Review

- Development of mini-projects
- Evaluation of commercial plants
- Lessons learned from failures

- Stakeholder engagement strategy
- Presentation of participant projects
- **Case Study**: Biofuel production scaling in the Netherlands

Training Methodology

- Expert-led live training sessions with industry specialists
- Hands-on case studies and simulation-based learning
- Group activities for real-time decision-making
- Visual presentations, flow diagrams, and animations
- Access to reference materials, software tools, and datasets
- Assessment quizzes and certification on course completion

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

Ready to enroll or request a customized program? Book online or contact us:

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