WM9RH-15 Bioenergy and Hydrogen Engineering

26/27

Department
WMG
Level
Taught Postgraduate Level
Module leader
Jonathan Saul
Credit value
15
Module duration
4 weeks
Assessment
100% coursework
Study location
University of Warwick main campus, Coventry

Description

Introductory description

This module will provide students with the ability to access potential bioenergy resources and examine thermochemical and biochemical conversion methods. The use of biomass as a resource for renewable transport, heat and power will be investigated, and the design, manufacture and operation of small- and large-scale systems will be considered. The module content will incorporate management and optimisation strategies for different system applications and localities. Students will examine bioenergy in the context of current and future energy requirements and global, environmental, political, economic and social concerns.

Module aims

The principal aim of this module is to provide students with sufficient knowledge, understanding and analytical skills to underpin their professional development as they progress towards becoming an expert engineer in one or more of the current core technology disciplines of renewable energy and in this module specifically bioenergy and/or hydrogen engineering. This module will typically focus on the current technologies available but will also explore emerging technologies under development.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Biomass resource characterisation.

Biochemical conversion technologies (anaerobic digestion and fermentation)

Hydrogen conversion technologies

Thermochemical conversion technologies (Incineration, gasification and pyrolysis)

Utilisation of different downstream energy products (Liquid, solid fuels and Hydrogen)

Economic viability of alternative bioenergy and Hydrogen systems

Biomass logistics and supply chain management

Energy policies and social concerns of using biomass and Hydrogen as a source of renewable energy.

Safety and Security of Hydrogen

Learning outcomes

By the end of the module, students should be able to:

- Critically analyse the use of biomass as a resource for renewable energy for applications such as transport, heat and energy.
- Critically analyse the use of Hydrogen as a resource for renewable energy for applications such as transport, heat and energy.
- Recognise the difference between relevant thermochemical and biochemical conversion technologies
- Propose a relevant synthesised solution to an energy challenge providing a relevant application for both biofuels and hydrogen.
- Critically evaluate the economic, social and environmental impacts of using bioenergy and/or hydrogen in comparison to other renewable energy systems.

Indicative reading list

Reading lists can be found in Talis

Specific reading list for the module

Subject specific skills

Interpretation of energy engineering data
Energy performance calculations

Undertake engineering activities associated with bioenergy and hydrogen energy systems, safely and reliability
Renewable energy engineering technology selection
Bioenergy and Hydrogen energy technologies performance and efficiency calculations
Bioenergy and Hydrogen engineering design

Transferable skills

Evaluation and judgement
Communication
Critical thinking
Decision making
Systems thinking
Problem solving
Presentation of highly complex technical data.

Study

Study time

Type	Required
Lectures	15 sessions of 1 hour (10%)
Tutorials	15 sessions of 1 hour (10%)
Online learning (independent)	15 sessions of 1 hour (10%)
Private study	45 hours (30%)
Assessment	60 hours (40%)
Total	150 hours

Private study description

Details of private study and independent learning
Students receive additional readings and workbooks to support their learning in the module. This enables students to build their foundational knowledge or go deeper into the application and evaluation of knowledge presented in the module

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group A

	Weighting	Study time	Eligible for self-certification
Assessment component			
Assessment One - Presentation	30%	18 hours	Yes (extension)
Students undertake a 15 minute presentation on topics related to the relevant learning objectives.			
Reassessment component			
Assessment 1 - Resubmission - Written Report			No
A written report on the relevant learning objectives			
Assessment component			
Assessment Two - Written Report	70%	42 hours	Yes (extension)
A report analysing key elements of the module learning and applying the learning to analysis and critical discussion of a choice of case studies or an industrial scenario.			
Reassessment component			
Assessment Two - Written Report			No
A report analysing key elements of the module learning and applying the learning to analysis and critical discussion of a choice of case studies or an industrial scenario.			

Feedback on assessment

Students will be provided individual and class feedback and feed-forward on their assessments.

Availability

There is currently no information about the courses for which this module is core or optional.