UNIVERSITY OF ABERDEEN

SCHOOL OF ENGINEERING

COURSE INFORMATION

SESSION 2012/13

EG5066 - Energy Technologies: Current Issues and Future Directions

CREDIT POINTS

15

COURSE COORDINATOR

Professor Paul Mitchell email c.p.mitchell@abdn.ac.uk

AIMS

To gain an understanding of the current and future energy industries, the drivers for change, future energy supply-demand relations and the technical challenges in meeting the demand in a low carbon economy.

DESCRIPTION

This course examines the energy industries including resources, supply-demand relationships, technologies, economic & environmental issues and challenges facing the industries. Drivers for change and a potential low carbon future will be considered in terms of the energy landscape in 2050.

Main Learning Outcomes

By the end of the course students should have:

A: General knowledge and understanding of:

- The different sources of energy and their utilization by sector
- Energy supply-demand relations by source and with respect to energy security
- The drivers impacting on energy policy and explain the drive towards a low carbon economy
- The technical challenges facing the energy industries
- The new and emerging energy technologies

B: Gained intellectual skill so that they are able to:

- Discuss and explain the sources of energy and the energy industries
- Describe and discuss the challenges facing the energy industries and their potential solutions
- Discuss and describe a future energy landscape

C: Gained practical skills so that they are able to:

- Evaluate different sources of energy
- Quantify the energy potential (heat, power and transport) from different sources of energy

D: Gained or improved transferable skills so that they are able to:

- Communicate in writing to technical experts and the wider public
- Demonstrate advanced reasoning skills
- Present complex information in an intelligible fashion

SYLLABUS

- Overview of the energy industries and their deployment
- Economic, environmental and legislative drivers impacting on the energy industries
- Oil & gas: reserves, production, consumption, technologies & challenges
- Coal: reserves, production, consumption, technologies & challenges
- Nuclear: reserves, production, consumption, technologies & challenges
- Hydro: reserves, production, consumption, technologies & challenges
- Renewables: potential resources, technologies & challenges
- Supply-demand relations
- Energy security
- The future energy landscape

TIMETABLE

24 one hour lectures and 12 one hour tutorials

ASSESSMENT

Two hour written examination (60%)

Continuous assessment (40%) based on an individual written submission (20%) and a group project presentation (20%)

FORMAT OF EXAMINATION

Candidates attempt 3 questions from 4. All questions carry equal marks.

Notes: (i) Candidates will not be required to use calculators

PLEASE NOTE THE FOLLOWING

(i) You **must not** have in your possession at the examination any material other than that expressly permitted by the examiner. Where this is permitted, such material **must not** be amended, annotated or modified in any way

(ii) During the course of the examination you must not have in your possession or attempt to access any material that could be determined as giving you and advantage in the examination

(iii) You **must not** attempt to communicate with any candidate during the examination, either orally or by passing written material, or by showing material to another candidate, nor must you attempt to view other candidate's work

Failure to comply with any of the above will be regarded as cheating and may lead to disciplinary action as indicated in the Academic Quality Handbook (http://www.abdn.ac.uk/registry/quality/).

RECOMMENDED BOOKS

B Everett, G Boyle, S Peake & J Ramage (2012). Energy systems and sustainability – 2nd edition. Oxford University Press.

D JC MacKay (2009). Sustainable energy – without hot air. UIT Cambridge. Available free at http://www.withouthotair.com/

Christian Ngo & Joseph Natowitz (2009). Our Energy Future – resources, alternatives and the environment. Wiley.