COURSE SPECIFICATION DOCUMENT

Academic School/Department: General Education

Programme: Combined Studies

***FHEQ* Level:** 3

Course Title: Energy: A Global Perspective

Course Code: ENV 3120

Course Leader: Dr. Wayne J. Clark

Student Engagement Hours: 120

Lectures: 44
Seminar / Tutorials: 1
Independent / Guided Learning : 75

Semester: Fall, Spring or Summer

Credits: 12 UK CATS credits
6 ECTS credits
3 US credits

Course Description:
A basic introduction to the major themes of modern and historical energy use, this course covers the basic science of energy use and technology and the history and science of humankind's spiraling and sometimes insidious drive for new forms of energy. From pre- history through to the industrial revolution and beyond this course takes a historical, environmental and comparative approach to the development of animate power, windmills, watermills and traditional uses of biomass, through to the industrial revolution and the modern use of fossil fuels, including electricity generation. Investigations of more modern energy use such as nuclear fission and fusion, along with renewable technologies such as wind turbines, hydroelectrics, solar, geothermal, biomass and fuel cells allow the course to explore the possibility of managing energy sources for the benefit of all.

Prerequisites: None

Aims and Objectives:

This course aims to expose students to an understanding of the natural and physical world around us through a basic grounding in the science associated with energy use and development. This will then allow an examination of the history and evolution of human attempts to harness energy, from pre-history to nuclear and modern renewables, with an emphasis on the environmental implications of energy use and development coupled with evaluating the strengths and weaknesses of the technologies. The aim is not only to introduce the basic science of energy use but also to raise student awareness of the past, present and potential detrimental effects of energy use in developed, developing and under- developed countries, to make students aware of the possibilities and drawbacks of the development of future energy sources and to be aware of the basic political, economic and social pressures behind competing claims of conventional or alternative technologies and their development.
The course will provide students with the information and skills needed to be able to discuss the scientific, historic, economic, social, and political implications of energy use from a scientifically informed position.

Programme Outcomes:
3A(i,); 3B(i); 3C(i); 3D(i)

A detailed list of the programme outcomes is found in the Programme Specification. This is maintained by Registry and located at:
https://www.richmond.ac.uk/programme-and-course-specifications/

Learning Outcomes:

1. Students should be thoroughly familiar with the science of energy, units of energy and power and be able to manipulate simple calculations involving energy use, power, and energy conversion.
2. Students should be familiar with the historical use of energy throughout the world from ancient times through the Industrial Revolution, including different cultural approaches. Students should also be familiar with the science and use of fossil fuels and be able to discuss simple environmental, social, political and economic implications.
3. Students should be able to apply sections 1 and 2 to the production of electricity in fossil fuel power stations and be able to understand the basic science behind electricity. In addition the sciences of nuclear fission and nuclear fusion should be understood and again applied to the production of electricity and be able to discuss simple environmental, social, political and economic implications.
4. Students should be able to understand the basic science behind the various methods of producing renewable energy and simple environmental, social, political and economic implications.
5. As a summary to the whole course students should show a basic ability to discuss current energy and environmental issues while supporting themselves with scientific fact. An important part of this are the 3 Seminar Readings/Small Group Discussions. The aim of the 3 readings in this section is to enable students to be able to discuss Energy Issues from a scientifically informed position. An end result is that students should be able to show critical thinking skills when discussing energyissues.

Indicative Content:

- Basic units and labels for energy and power
- Basic science and calculations for energy and power, including the laws of thermodynamics
- The history of energy use from a scientific, global and cultural perspective: pre- history, animate power, windmills, watermills, biomass, basic environmental implications
- The Industrial Revolution, steam engines and fossil fuels, and the link to the beginnings industry and the mass production of goods
- Fossil fuel extraction and use (including the internal combustion engine and the automobile industry), basic environmental considerations
- Electricity generation through the use of fossil fuels, basic environmental considerations
- The basic science and environmental implications of electricity generation from nuclear fission and fusion
- The basic science and environmental implications of electricity generation from modern renewables: wind turbines/farms, hydroelectric (dams, pump storage, tidal, wave), solar (passive/active systems, solar farms, photoelectrics), geothermal, biofuels, fuel cells
- Basic environmental, social, economic and political implications of energy use and development

Assessment:
This course conforms to the University Assessment Norms approved by Academic Board.

Teaching Methodology:
a) Formal lectures with PowerPoint and handouts.
b) DVDs.
c) Class discussion.
d) Reading assignments.
e) Small seminar groups/small group discussion

Bibliography:

See syllabus for complete list of recommended reading.

IndicativeText(s):

Hinrichs, Roger A., Kleinbach M., "Energy, Its Use and the Environment", 5th Ed., 2013, Brooks/Cole.

Please Note: The core and the reference texts will be reviewed at the time of designing the semester syllabus

Change Log for this CSD:

Major or Minor Change ?	Nature of Change	Date Approved & Approval Body (School or LTPC)	Change Actioned by Academic Registry