University of the West of England
BRISTOL

CORPORATE AND ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Basic Data						
Module Title	Energy Technologies for Climate Mitigation					
Module Code	USSJYJ-30-2		Level	2	Version	1
Owning Faculty	Health and Life Sciences		Field	Applied Sciences		
Contributes towards	BSc (Hons) Climate Change and Energy Management					
UWE Credit Rating	30	ECTS Credit Rating	15	Module Type	Standard	
Pre-requisites	None		Co- requisites	None		
Excluded Combinations	None		Module Entry requirements	None		
Valid From	TBA		Valid to	TBA		

CAP Approval Date	

Part 2: Learning and Teaching	
Learning Outcomes	On successful completion of this module students will be able to: 1. Understand the basic principles that govern energy transformations 2. Describe a range of energy technologies 3. Compare renewable and non-renewable energy sources 4. Assess various energy technologies with respect to climate mitigation and life cycle analysis 5. Determine appropriate energy and fuel generation strategies for regional, national and international situations Assessment of the above will be as follows: 1. In examination (component A) 2. In examination (component A) and in both elements of coursework (component B) 3. In examination (component A) and in both elements of coursework (component B) 4. In both elements of coursework (component B) 5. In both elements of coursework (component B)
Syllabus Outline	The module will include an overview of fossil fuels, nuclear energy, renewable energy and renewable fuel sources.

	Fossil fuels will include: oil, gas and coal. Nuclear energy will include both fission and fusion sources. Renewables will include: tidal power, wave energy, geothermal, solar (heat and photovoltaic), wind generation, biomass for combined heat & power, biogas, biofuels and 'blue skies' power systems. The latter will include the 'hydrogen economy' and sub-space systems. The module will include calculation of energy budgets from individual, alternative energy sources and their potential contribution to carbon saving. The module will also include socioeconomic analysis of differing energy and fuel strategies. Aspects of transmission, conversion losses, energy storage and power supply will also be considered.
Contact Hours	The delivery of the module will include lectures, tutorials and workshops with the following contact hours (total 72 hours): 1. Lectures: 24 hours 2. Tutorials: 12 hours 3. Workshops: 36 hours
Teaching and Learning Methods	**A variety of teaching and learning methods will be adopted in the presentation of this module.** 1. Lectures will describe the underpinning principles of energy and fuel systems, thermodynamics and energy technologies (both non-renewable and renewable). 2. Tutorials will supplement the lectures and give support to students in their case studies. 3. Workshops will be undertaken in various forms. They will include: demonstration of a variety of energy generation and utilization systems, energy utilization efficiency measurement, energy data acquisition and appraisal, student group analysis of historical and current UK energy data together with group presentations and formative feedback, and class discussion of future and 'blue sky' energy generation. **Scheduled learning** (72 hours) includes lectures, tutorials and workshops. **Independent learning** (228 hours) includes hours engaged with essential reading, case study preparation, assignment preparation and completion. These constitute an average time as indicated below: • Essential reading (57 hours i.e. 25%) • Case study research and completion (114 hours i.e. 50%) • Final revision and preparation for examinations (57 hours i.e. 25%)
Key Information Sets Information	**Key Information Set - Module data** *Number of credits for this module* 30 Hours to be allocated: 300 Scheduled learning and teaching study hours: 72 Independent study hours: 228 Placement study hours: 0 Allocated Hours: 300

	The table below indicates as a percentage the total assessment of the module which constitutes a: **Written Exam**: Unseen written exam. **Coursework**: Written assignments (two case studies) **Practical Exam**: Not applicable Please note that this is the total of various types of assessment and will not necessarily reflect the component and module weightings in the Assessment section of this module description: Total assessment of the module: Written exam assessment percentage: 50% Coursework assessment percentage: 50% Practical exam assessment percentage: 0% 100%
Reading Strategy	The reading strategy for this module requires students to access a variety of sources. The indicative reading list (see next section) includes texts available in the UWE library, free on-line ('Sustainable Energy: without the hot air' by David MacKay) or at modest cost ('The Revenge of Gaia' by James Lovelock). Students will be expected to access additional information sources for both primary and secondary literature. The UWE library has access to a large number of electronic journals. Students will be given guidance on accessing primary and secondary scientific, economic and social literature sources on-line through search engines such as 'Springer-link' and ScienceDirect as well as abstracting services. Additionally, it is expected that students will access national and international energy utilization and generation data. This is widely available on-line. In particular, students will be given guidance on accessing UK energy data from the Department for Energy and Climate Change (DECC) website which includes: • The current and historical UK energy flow charts • The 2050 pathway analysis • Spreadsheets and on-line models in support of the 2050 pathway analysis • Current, detailed UK energy and fuel usage data.
Indicative Reading List	1. Boyle, G. (2004). *Renewable Energy: power for a sustainable future. 2nd edition.* Oxford. Oxford University Press and The Open University 2. Boyle, G., Everett, B. & Ramage, J. (2004). *Energy Systems and Sustainability: power for a sustainable future.* Oxford. Oxford University Press and The Open University 3. Lovelock, J. (2007). *The Revenge of the Gaia.* London. Penguin Books (available as an on-line edition) 4. MacKay, D. (2009). *Sustainable Energy: without the hot air.* Cambridge. UIT Cambridge (available as a free on-line edition at: www.withouthotair.com) Further guidance to additional reading will be provided in the module.

Part 3: Assessment	
Assessment Strategy	**The basic assessment strategy with respect to learning outcomes is presented earlier in this document (see Part 2).**

	The assessment strategy includes an examination (3 hour) and two written assignments (each 2000 words) based around case studies. The three hour examination is designed to test the student's understanding of the underpinning principles of energy generation and transformation, including thermodynamics, as well as the student's knowledge of energy utilization processes. The case study based written assignments are designed to assess the student's ability to acquire energy utilization data and socioeconomic data, appraise and analyze such data, and to formulate future scenarios for energy usage and generation. The coursework assignments are also designed to assess the student's ability to present such information as written reports. Component A (the three hour examination) represents 50% of the module mark and component B similarly represents 50% of the module mark (with each of the two items of coursework being of equal value. Thus the allocation of marks is as follows: Examination (3 hours): 50% Coursework 1 (2000 words): 25% Coursework 2 (2000 words): 25% There is no specific formative feedback. Workshops may include group analysis and presentations (non-summative) in which case feedback can be given. The tutorials will also provide an opportunity to give feedback to students on their basic understanding of the subject matter and their progress in their coursework.

Identify final assessment component and element	**EX3 Examination (3 hours) as part of component A**	
% weighting between components A and B (Standard modules only)	**A:** **50%**	**B**: **50%**
First Sit		
Component A (controlled conditions) **Description of each element**		**Element weighting** **(as % of component)**
1. EX3 Examination (3 hours)		100%
Component B **Description of each element**		**Element weighting** **(as % of component)**
1. CW1 Case Study (2000 words)		50%
2. CW2 Case Study (2000 words)		50%

Resit (further attendance at taught classes is not required)	
Component A (controlled conditions) **Description of each element**	**Element weighting** **(as % of component)**
1. EX3 Examination (3 hours)	100%

Component B **Description of each element**	**Element weighting** **(as % of component)**
1. CW1 Case Study (2000 words)	50%
2. CW2 Case Study (2000 words)	50%
If a student is permitted an **EXCEPTIONAL RETAKE** of the module the assessment will be that indicated by the Module Description at the time that retake commences.	