![University of the West of England, BRISTOL logo]

**CORPORATE AND ACADEMIC SERVICES**

**MODULE SPECIFICATION**

| Part 1:  Basic Data | | | | | | |
|---|---|---|---|---|---|---|
| Module Title | Resource Security and Sustainability | | | | | |
| Module Code | USSKBE-30-3 | | Level | 3 | Version | 1 |
| Owning Faculty | Health and Life Sciences | | Field | | Applied Sciences | |
| Contributes towards | BSc (Hons) Environmental Science | | | | | |
| 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 | September 2014 | | Valid to | September 2020 | | |

CAP date: 28 March 2014

| Part 2:  Learning and Teaching | |
|---|---|
| Learning Outcomes | On successful completion of this module students will be able to:<br><br>1. Critically discuss sustainable development and sustainability, and how these concepts are implicit to improving environmental quality and managing resources<br>2. Review the processes for the sustainable production of resources and utilization of feedstocks<br>3. Evaluate the role of legislation, economic and social considerations in managing pollution and in the sustainable production of resources<br>4. Apply the use of simulation models for population dynamics and resource utilization<br>5. Critically review the application of biotechnological processes in the enhancement of the recovery of mineral resources<br>6. Critically evaluate physical, chemical and biological techniques for the remediation of contaminated land, marine and groundwater supplies<br>7. Evaluate the use of agricultural land for food and non-food applications<br><br>Assessment of the above will be as follows:<br><br>1. In examination (component A)<br>2. In examination (component A) and in coursework (component B)<br>3. In examination (component A) and in coursework (component B)<br>4. In coursework (component B)<br>5. In examination (component A)<br>6. In examination (component A)<br>7. In examination (component A) and in coursework (component B) |
| Syllabus Outline | **Brief indication of topics and issues covered in chronological order:**<br><br>• Overview of sustainability and sustainability indicators. |

| | |
|---|---|
| | • Resource utilization: land, water and air. Mineral resources, recovery and use. |
| | • The production and use of plastics; resource implications; disposal and pollution issues. |
| | • Population dynamics and the demand for resources. The 'Three Earths' concept of resource demand and usage. |
| | • Agriculture and crop production; the demands for feeding a growing world population; the availability and use of water for agricultural land irrigation. The application of GM technology in agricultural production; comparison of European and worldwide application of GM technology; public perception. Sustainable food and feed production. |
| | • The use of agricultural land for non-food use; the production of bioplastics; application of agricultural land for biomass and energy/fuel production. |
| | • Potable water supply and sewage treatment; the application of novel technologies to meet the needs of a growing worldwide population. Novel integrated systems for wastewater treatment and potable water supply. |
| | • Environmental quality standards; national and international standards. Advanced aspects of integrated pollution, prevention and control (IPPC). Novel aspects for pollution monitoring. |
| | • Contaminated land and groundwater remediation; the application of physical, chemical and biological processes. Bioremediation (microbially-mediated and phytoremediation); the treatment of oil spillages at sea and on land. |
| | • The application of biological systems in the enhancement of resource recovery: Microbial Enhanced Oil Recovery (MEOR), ore-leaching processes for the recovery of copper, uranium and other metals. |
| Contact Hours | The delivery of the module will include lectures, tutorials and workshops with the following contact hours (total 72 hours):<br><br>1. Lectures:  24 hours<br>2. Tutorials:  12 hours<br>3. Workshops:  36 hours |
| Teaching and Learning Methods | **A variety of teaching and learning methods will be adopted in the presentation of this module.**<br><br>1. Lectures will describe the concept of sustainability and relate this to current and future resource demand taking in to account the current predictions in world population dynamics.<br>2. Tutorials will supplement the lectures and give support to students in their case study and modelling coursework.<br>3. Workshop sessions will be based around the use of population dynamics and resource utilization modelling.<br><br>**Scheduled learning** (114 hours) includes lectures, tutorials and workshops.<br><br>**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:.<br><br>• Essential reading (57 hours i.e. 25%)<br>• Case study research and completion; modelling research and completion (114 hours i.e. 50%)<br>• 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 | Scheduled learning and teaching study hours | Independent study hours | Placement study hours | Allocated Hours | |
|---|---|---|---|---|---|
| 300 | 72 | 228 | 0 | 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 (case study and modelling report)
**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 | 60% |
| Coursework assessment percentage | 40% |
| Practical exam assessment percentage | 0% |
| | 100% |

| Reading Strategy | Due to the diverse range of subject areas covered in this module there is no single text that is appropriate. The texts listed in the indicative reading list represent a range of topical and general interest sources that support the teaching and delivery of this module, and which are relatively inexpensive to buy either as hard-copies or as electronic versions.

It is *expected* that the principal source of information in support of this module will be from primary and secondary scientific, economic and social literature supported by data and policy documentation from national and international organizations.

UWE has extensive access to electronic journals and students will be given guidance on how to search and access these for primary and secondary literature. Additionally, students will be given guidance on accessing data and appropriate policy documentation from national and international organizations. |
|---|---|

| Indicative Reading List | 1. Dorling, D. (2013). *Population 10 Billion.* London. Constable |
|---|---|
| | 2. Emmott, S. (2013). *10 Billion.* London. Penguin |
| | 3. Harding, S. (2009). *Animate Earth: Science, Intuition and Gaia 2nd edition.* Totnes. Green Books |
| | 4. Jackson, T. (2011). *Prosperity Without Growth: Economics for a Finite Planet.* London. Earthscan |
| | 5. Lovelock, J. (2007). *The Revenge of Gaia.* London. Penguin |
| | 6. Porritt, J. (2013). *The World We Made.* London. Phaidon |

| | 7. Schumacher, E.F. (1993). *Small is Beautiful.* London. Vintage |
|---|---|
| | Students will be given full support in accessing information from the primary and secondary scientific, economic and social literature as well as national and international data sources. |

| 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 2500 words) based around 1) a case study and 2) the workshops. |
| | The three hour examination is designed to test the student's understanding of sustainability and the impact that a growing World population has on demand for resources.  It will assess the student's ability to critically analyze the options that exist to meet such demands and devise an appropriate strategy for future development. |
| | The written assignments are designed to assess the student's ability to acquire and analyze data on population growth, resource demand and sustainability.  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 60% of the module mark and component B (coursework) represents 40% 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):        60% |
| | Coursework 1 (2500 words):  20% |
| | Coursework 2 (2500 words):  20% |

| Identify final assessment component and element | EX3 Examination (3 hours) as part of component A | |
|---|---|---|
| | **A:** | **B**: |
| **% weighting between components A and B** (Standard modules only) | **60%** | **40%** |

**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 (2500 words) | 50% |
| 2. CW2 Workshop Report (2500 words) | 50% |

**Resit (further attendance at taught classes is not required)**

| Component A  (controlled conditions) Description of each element | Element weighting (as % of component) |
|---|---|

| | Element weighting |
|---|---|
| 1. EX3  Examination (3 hours) | 100% |
| | |

| **Component B**<br>**Description of each element** | **Element weighting**<br>**(as % of component)** |
|---|---|
| 1. CW1 Case Study (2500 words) | 50% |
| 2. CW2 Case Study (2500 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.