EV7138 Module Specification

Module Title: **Sustainable Electricity**	**Module Code: EV7138** **Level: 7** **Credit: 15** **ECTS credit: 7.5**	**Module Leader**: Alan Owen **Additional tutors:** **Frances Hill**
Pre-requisite: none	**Pre-cursor: none`**	
Co-requisite: none	**Excluded combinations: none**	**Suitable for incoming study abroad?** N
Location of delivery: CAT and online – blended delivery		

Summary of module for applicants:

The main aims of the module are for students to critically consider the role of electricity provision and distribution in meeting energy needs at a range of spatial scales. This will include:

Analysis of the advantages and limitations of existing electrical provision systems in a local, national and global context

Sustainable electricity provision systems functions and limitations and relevance to local, national and global energy provision

Form a critical appreciation of, and interconnections between, electrical energy provision, demand management and storage requirements

Analysis and scenario development of future electrical energy provision and demand in short, medium and long-term contexts

Main topics of study:

- Existing electricity provision systems functions, benefits, and limitations
- Working understanding of key technologies (wind, PV, hydro etc)
- Electrical energy storage systems
- Needs, challenges and constraints of grid connection
- Futuring of electrical energy provision and demand in selected nations

This module will be able to demonstrate at least one of the following examples/ exposures

Live, applied project ☐
Company/engagement visits ☒
Company/industry sector endorsement/badging/sponsorship/award ☐

Learning Outcomes for the module

Where a LO meets one of the UEL core competencies, please put a code next to the LO that links to the competence.

- *Digital Proficiency - Code = (DP)*
- *Industry Connections - Code = (IC)*
- *Social & Emotional Intelligence - Code = (SEI)*
- *Physical Intelligence - Code = (PI)*
- *Cultural Intelligence - Code = (CI)*
- *Community Connections & UEL Give Back - Code = (CC)*
- *Cognitive Intelligence – Code = (COI)*

- *Enterprise and Entrepreneurship (EE)*

At the end of this module, students will be able to:

Knowledge

1. Demonstrate a critical understanding of the principles of electricity supply and demand management (COI) (IC)
2. Form a synthesis of the benefits and limitations of transforming electrical energy provision systems; (COI)

Thinking skills

3. Critically appraise the technological challenges of future electrical energy provision and demand management (COI)
4. Critically appraise the wider resource impacts and emissions implications of installation, use and end of life outcome of electrical energy provision and demand management (COI) (CI)

Subject-based practical skills

5. Systematically analyse and synthesise the relationships between electrical energy provision and demand, in the context of future benefits and impacts (COI)

Skills for life and work

6. Communicate effectively (written and oral) to a team, peer or a wider audience. (DP), (SEI)
7. Use data to explore an electrical energy futuring argument (DP) (CI)

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:
For students studying onsite and by distance learning:

The factual content of the module is taught through lectures, seminars, practical workshops, presentations, demonstrations and tutorials, and throughout this process an active exchange of views and opinions is encouraged. Students have access to MS Teams where they can access recorded and written support material, meet with their peers and a tutor to discuss any academic issue. Both theoretical and practical aspects are covered both onsite and through interactive sessions on Teams.

There is a formative learning element to the module to allow the students to receive critical feedback on their work without the pressure of marked assessment.

For distance learning (DL) students, learning will be supported through streamed and recorded Internet-based lectures (of the onsite lectures), situation related practical exercises, seminars and tutorials.

Lectures onsite and through MS Teams highlight key concepts, models and frameworks, and integrate additional resources (such as journal articles). They encourage deep learning through the use of self-assessment questions which encourage students to engage with the topic, to help students understand new topics and skills.

Assessment methods which enable students to demonstrate the learning outcomes for the module:	**Weighting:**	**Learning Outcomes demonstrated:**
1. Report (2400 words)	80%	1,2,3,4,5,7
2. Presentation (600 words equivalent)	20%	6

Reading and resources for the module:
These must be up to date and presented in correct Harvard format unless a Professional Body specifically requires a different format

Core

- Deutsche Gesellschaft für Sonnenenergie (2013) *Planning and installing photovoltaic systems: a*

guide forinstallers, architects and engineers. 3rd edn. Abingdon: Routledge.)

- Harvey, A. (2002) *Micro-Hydro design manual*. ITDG Publishing, London. ISBN: 185331034
- Liengme, B (2019) *A Guide to Microsoft Excel for Scientists and Engineers*, Academic Press,
- Twidell, J. and Weir, T. (2021) *Renewable Energy Resources. 4th* ed. Routledge

Recommended

- BRE, EA Technology, Halcrow Group and Sun Dog Energy (2006) *Photovoltaics in buildings: Guide to the installation of PV systems*. Available at: http://www.bre.co.uk/filelibrary/pdf/rpts/Guide_to_the_installation_of_PV_systems_2nd_Edition.pdf (Accessed: 14th Dec 2021).
- International Energy Agency (2011) *Life cycle inventories and life cycle assessments of photovoltaic systems*. Available at: www.iea-pvps.org/index.php?id=3&eID=dam_frontend_push&docID=2395
- Heier, S. (2014) *Grid integration of wind energy: onshore and offshore conversion systems*. 3rd ed. Oxford:Wiley-Blackwell.
- Lynn, P.A. (2013) *Electricity from Wave and Tide: An Introduction to Marine Energy*. Wiley. ISBN: 978-1-118-34091-2
- Samadi-Boroujeni, H (Ed.) (2012) *Hydropower - Practice and Application.* Intech. ISBN 978-953-51-0164-2, 332 pages,Publisher: InTech, DOI: 10.5772/1798
- Sorensen B 2017 *Renewable Energy: Physics, Engineering, Environmental Impacts, Economics and Planning* https://www.sciencedirect.com/book/9780128045671/renewable-energy

Further relevant journals, websites and other relevant resources will be provided within reading materials that are made available for the module.

Provide evidence of how this module will be able to demonstrate at least one of the following examples/ exposures

Live, applied project *N/A*

Company/engagement visits
Visit to Rheidol Hydro power station
Practitioners brought in as external lecturers
Engineer from local community wind farm as external lecturer and guide on tour of wind turbines within 2km

Company/industry sector endorsement/badging/sponsorship/award *N/A*

Indicative learning and teaching time (10 hrs per credit):	**Activity**
1. Student/tutor interaction:	Lectures, seminars, tutorials, presentations, practicals / demonstrations **30 hours**
2. Student self learning and research time:	Seminar reading and preparation, assignment preparation, background reading, and research activities. **120 hours**
Total hours (1 and 2):	**150 hours**

For office use only. (Not required for Programme Handbook)

Assessment Pattern for Unistats KIS (Key Information Sets)	**Weighting:**
Coursework *(written assignment, dissertation, portfolio, project output)*	
Practical Exam *(oral assessment, presentation, practical skills assessment)*	
Written Exam	

HECoS Code:	
UEL Department:	