Module Title: Energy generation from wind	**Module Code: EV7117** **Level: 7** **Credit: 15** **ECTS credit: 7.5**	**Module Leader**: Alan Owen **Additional tutors:** Ruth Stevenson Frances Hill

Pre-requisite: none	**Pre-cursor:** none
Co-requisite: none	**Excluded combinations :** none

Location of delivery: CAT/By distance learning

The main aims of the module are to enable students to:

Synthesise an informed understanding of the technological, policy, environmental and social benefits and limitations of wind power generation.

Form a critical appreciation of the technological aspects, functioning, resource potential, limitations, maintenance needs, associated carbon emissions, environmental impacts of wind-power.

Comparatively appraise the above in a holistic, objective and self-reflective manner.

Main topics of study

- Technological aspects of wind generation
- Resource assessment using complex and simple methods
- Site development issues both onshore and offshore
- planning impact assessment, and social attitudes
- Wind economics and policy support
- Current market for wind energy, the potential for wind and policy measures to deliver the potential;
- Niches for wind, small schemes onsite generation, and community owned schemes.

  International comparisons

Learning Outcomes for the module

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

Knowledge

1. Demonstrate a critical understanding of the fundamentals of the functioning of the technologies;

2. Form a synthesis of the benefits and limitations of transforming energy provision systems under an adaptation transformation ethos;

Thinking skills

3. Critically appraise the technological capabilities and limitations of the technologies;

4. Critically appraise the wider environmental impacts and carbon implications of installation, use and end of life outcomes of the technologies;

5. Appropriately discern the wider advantages and disadvantages to ecosystems, mitigation planning, landscape impact and societal and behavioural issues when assessing the use of wind electricity generation technology;

Subject-based practical skills

6. Systematically analyse wind energy resource availability in relation to demand trends, and critically appraise the use of these sources of energy locally or at distance through grid networks;

Skills for life and work

7. Communicate effectively (written and oral) to a team, peer or a wider audience.

8. Use data to assess the efficacy of the technologies studied.

Teaching/ learning methods/strategies used to enable the achievement of learning outcomes:

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. Both theoretical and practical aspects are covered. Students have access to Moodle discussion boards and to regular Skype surgeries where they can meet with their peers and a tutor to discuss any academic issue. The summative coursework consists of an academic investigative essay and presentation of this.

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 Internet-based lectures (of the onsite lectures), situation related practical exercises, seminars and tutorials.

All students also have access to Moodle discussion boards and regular Skype surgeries, where they can meet with their peers and a tutor to discuss any academic issue.

Lectures onsite and through DL 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. Technical report (2400 words max)	80%	**1,2,3,4,5,6,8**
2. Presentation (600 words equivalent)	20%	**7**

Reading and resources for the module:

Core

Twidell, J. and Weir, T. (2015) *Renewable Energy Resources.* 3rd edition. Taylor and Francis, Oxford. (and erratum-download)

Liengme, B and Hekman, K, (2015) *A Guide to Microsoft Excel for Scientists and Engineers 2013*, Academic Press

Recommended

Heier, S. (2014) *Grid integration of wind energy: onshore and offshore conversion systems*. 3rd edn. Oxford: Wiley-Blackwell.

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