

Module Title: Ecosystem services: <i>Land use, water and waste management</i>	Module Code: EV7103 Level: 7 Credit:15 ECTS credit: 7.5	Module Leader: TBC Additional tutors: Bryce Gilroy-Scott Frances Hill Jane Fisher Louise Halestrap Ruth Stevenson Tim Coleridge Alan Owen Siobhan Maderson
Pre-requisite: none	Pre-cursor: none	
Co-requisite: none	Excluded combinations : none	
Location of delivery: CAT and by DL		
The main aims of the module are to enable the student to: Gain an appreciation of the key roles played by species, populations and healthy ecosystems in provision of essential tangible and intangible services to human society, as well as the need to ensure ecological integrity on appropriate scales. Understand the environmental impacts of sourcing, management and disposal of material and water resources, the case for minimisation, wise use and reuse where appropriate in order to function within resource, ecological and societal constraints, and the lessons to be learned from nature in resource design and processing. Comprehend the varied impacts of land use on environmental quality, biodiversity and ecosystem service provision, including industrial, domestic and agricultural wastes and their management. Recognise the inherent lack of sustainability in modern, centralised food production and the necessity for ecologically-designed agriculture. Understand the overriding roles of climate change and industrial expansion in imposing progressive change in ecosystem and resource management, and the imperative for sustainable adaptation.		
Main topics of study: <ul style="list-style-type: none"> • Ecosystem services • Land use and sustainable agriculture • Contaminated land • Water security • Sustainable waste and sanitation management • Floodplain strategies and Sustainable Drainage Systems (SuDS) • Resource production • Food security • Biomimetics • All within the context of sustainability and adaptation planning 		
Learning Outcomes for the module At the end of this module, students will be able to: Knowledge 1. Demonstrate complex understanding of the ecological and biodiversity foundations of ecosystem functioning and the necessity for ecosystem integrity for provision of services		

to society;

2. Demonstrate a thorough understanding of the increasing problems caused by direct and indirect societal impacts on ecosystems and biodiversity for the continued provision of ecosystem services;
3. Develop critical arguments to analyse the ecological and ecosystem service provision implications of current and future policy for the built environment for the benefit of current and future populations;
4. Appraise critically the potential impacts of climate change and biodiversity losses on both current and future ecosystem service provision within an adaptation transformation context.

Thinking skills

5. Demonstrate the ability to place arguments in context using the primary and secondary literature alongside practical examples where appropriate;
6. Demonstrate the capacity to evaluate existing knowledge and offer effective or innovative solutions to problems of sustainability and adaptation using knowledge of ecological functioning;
7. Demonstrate judicious use of evidence gained from the peer-reviewed literature and other sources to present unbiased and objective analyses in written work and presentations;
8. Analyse and reflect critically upon the primary and secondary literature and other evidence including advertising materials, artistic and visual representations, legislation, regulations and guidelines associated with adaptation in the built environment as it relates to sustainability, the semi-natural environment and 'green infrastructure';
9. Position within a broad environmental sustainability context, with clarity, relevance and insight, the published and proposed adaptation responses and initiatives of others.

Subject-based practical skills

10. Demonstrate critical and contextual ability in environmental decision-making for low energy sanitation;
11. Demonstrate an advanced understanding of ecosystem service provision in the built and broader environments.

Skills for life and work (general skills)

12. Produce clear, fluent, and coherent essays
13. Present knowledge clearly, fluently and coherently to groups;
14. Demonstrate proficiency in computer and IT skills in collecting, displaying and presenting information to professional and lay audiences;
15. Design, execute, analyse and present independent research in a professional style and standard;
16. Manage time and workload to meet deadlines without compromise to standards;
17. Show the ability to work in a team, identifying individual and collective goals and responsibilities and performing in a manner appropriate to these roles, recognizing and respecting the views and opinions of other team members, and evaluating their own and others' performance in a constructive manner.

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

On-site students will be supported through lectures, seminars and tutorials within the subject areas and in study skills. On-site students will also gain hands-on experience through practical tuition facilitated by specialist practitioners;

There is 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:
<p>For on-site and DL students:</p> <ol style="list-style-type: none"> 1. Essay (2,400 word max.) 2. Individual Presentation 10 min (600 word equivalent) 	<p>80%</p> <p>20%</p>	<p>1-12, 14, 15, 16, 17.</p> <p>13, 14, 15.</p>

Reading and resources for the module:

Core

Wilkinson D.M. (2007) *Fundamental Processes in Ecology. An Earth Systems Approach*. Oxford University Press, Oxford.

Recommended

Colinvaux P. (1978). *Why Big Fierce Animals Are Rare. An Ecologists Perspective*. Princeton University Press, Princeton.

Leopold, A. (1949). *A Sand County Almanac, and Sketches Here and There*. Republished by OUP in 1968.

Moss, B. (2012) *Liberation Ecology: the Reconciliation of Natural and Human Cultures*, 'Excellence in Ecology' series, book 24, Inter-Research, Oldendorf/Luhe.

Grant N., Moodie M. & Weedon, C. (2012), *Choosing Ecological Sewage Treatment*. CAT Publications, Machynlleth.

Harper P. and Halestrap L. (1999) *Lifting the Lid. An Ecological Approach to Toilet Systems*. CAT Publications, Machynlleth. Reference to relevant journals, websites and other relevant resources will be provided within written materials of the module.

(*) Available as an e-book

Indicative learning and teaching time (10 hrs per credit):	Activity
1. Student/tutor interaction	Activity and hours (lectures, seminars, tutorials, project supervision, demonstrations, practical classes and workshops) Contact learning: 37.5hr

2. Student learning time:	Activity (e.g. seminar reading and preparation/assignment preparation/background reading/ on-line activities/group work/portfolio/diary preparation, unsupervised studio work etc): Self directed learning: 112.5hr
Total hours (1 and 2):	150hr