

ENER08008 Energy Management (Part-time)

Full Title	Energy Management (Part-time)		
Status	Uploaded to Banner	Start Term	2020
NFQ Level	08	ECTS Credits	05
Module Code	ENER08008	Duration	18 weeks - (18 Weeks)
Grading Mode	Numeric	Department	Mechanical & Industrial Eng
Module Author	Tom Roche		
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Module Description

The aim of this highly practical module is multi dimensional as follows; Firstly, students learn how to position their role as energy managers (often a role delivered as part of a facility management function) within the context of National and EU Energy Policy, legislation and Standards as they apply to a broad range of industry sectors, including manufacturing, commercial and public sector organisations.

Secondly, students will not only be able to implement the stand-alone energy management standard but also be able to leverage the commonality of the ISO 50001 energy management standard with other international management standards, namely the ISO 9001 quality management standard and the ISO 140001 environmental management standard, to implement an integrated ISO management system right across a broad range of industry sectors.

Students will be able to use formal Energy Monitoring and Targeting tools to identify, verify and prioritise significant energy using resources (e.g. buildings heating/cooling systems or production equipment) and then to use their technical and practical skills to systematically reduce the energy consumption profile within any organisation while taking sustainability into consideration.

Students will be able to make recommendations to management using formal and recognised cost and benefit analysis tools that maximum cost savings and investment ratios for any organisation.

Finally, students will develop professional reporting and presentation skills as a result of the project work associated with the module.

Learning Outcomes

On completion of this module the learner will/should be able to:

1. Assess the impact of burning fossil fuels on climate, and discuss the relevant International agreements on climate change and Ireland's position in regard to these agreements.
2. Review and Interpret EU and Irish policy with regard to energy and its use, the mechanisms to address this policy such as legislation, regulation, standards and incentives.
3. Analyse the energy consumption profile of energy consuming resources in organisations from a broad range of industry sectors using established energy monitoring and targeting methodologies tools and techniques to form credible data for the energy management system.
4. Contribute to the setup of an accredited energy management system within an organisation using the ISO 50001 framework including how to generate organisational commitment and policy, team formation and continuous improvement using the PDCA cycle.
5. Investigate and recommend systematic improvements to achieve optimal financial solutions using established cost benefit analysis tools and techniques while considering sustainability.
6. Prepare professional reports and presentations as required for the implementation of the energy management system.

Indicative Syllabus

Review international agreements on climate change with particular attention to the Kyoto and Paris Agreements (COP21). Students should be able to analyse Ireland's position with regard to these agreements.

Students should learn how to use recognised monitoring and targeting methodologies to interpret energy consumption profiles of organisations from a broad range of sectors. Students should be able to interpret data acquired for example using tools such as trend analysis, CUSUM and degree days. Using this data students should be able to identify significant energy using resources so that strategies can be selected to minimise energy consumption and to increase sustainability.

Students should have fluency in the application of financial analysis tools and techniques to provide informed financially viable advice on energy reduction investments to their employer.

Students should study a range of EMS approaches with particular attention given to the ISO 50001 international energy management standard. Students should know how the standard is structured, for example the formation of policy, the formation of teams and how to implement the PCDA cycle to continuously improve the energy consumption profile of an organisation.

Students must learn how the standard is implemented in organisations with a view to graduates of the module being able to participate in and direct teams to implement the standards for their employer.

Students should be encouraged to leverage their knowledge of project management to control the implementation of the standard. Attention should be given to reporting and presentation skills.

Teaching and Learning Strategy

The module consists of 1 Hour online Lecture and 2hr face to face workshops for 18 weeks

Teams of three will be formed to deliver two projects with 2 hours per week for 18 weeks with direction from the online lecture.

The teaching and learning approach may include: activity-based learning (including practice); cooperative learning group work); ICT-based (e.g. Moodle); independent learning (including independent study, research and report writing)

Learners on the programme can be supported with blended online educational resources and support.

Assessment Strategy

The assessment of the module will consist of three components as follows:

1. 30% for each of two projects with marks apportioned to a project report and a presentation in class. The marks for any one project will consist of 80% for the written report and 20% for the project presentation. Students will learn how to carry out research to generate information by analysing the objectives of their project, to generate knowledge by synthesising information acquired and finally to evaluate the work by drawing conclusions based on a reflection and critique of the knowledge gained from their work. In addition to the technical content of their reports students will also learn how to work in teams, how to generate professional reports and presentations.
2. 10% for a continuous assessment in week 12 (in class).
3. 2 hour final exam consisting of 3 compulsory questions representing 30% of the overall marks.

The large proportion of the project in the assessment strategy represent not only the work and time content but also encouraging the learner to work in a team as well as independently to carry out research on a particular topic, actively analyse the technical content of the relevant work and to evaluate and critique the knowledge gained in the context of the environment where the technicalities are applied. There is a large focus on presentations and reporting in the projects as this is a key requirement as a professional practitioner in the graduates employment. This is the appropriate independent learning expectations from students in stage 4 of a level eight programme.

Repeat Assessment Strategies

Students will be required to repeat final examinations as normal under established Institute repeat procedures.

Failure of the CA components of the module will require students to be examined on the relevant learning outcomes using a separate CA report and assessments.

Indicative Coursework and Continuous Assessment:		70 %		
Form	Title	Percent	Week (Indicative)	Learning Outcomes
Group Project	Project on, EU and National Energy Policy, Legislation, Regulations and Standards for different Industry Sectors	30 %	TBA	1,2,6
Group Project	Project entailing the implementation of an Energy Management System (ISO 50001) in a range of Industry Sectors	30 %	TBA	3,4,5,6
In class exam	Mid Term Exam	10 %	TBA	1,2,3,4,5
End of Semester / Year Formal Exam:		30 %		

Form	Title	Percent	Week (Indicative)	Learning Outcomes
Closed Book Exam	Exam	30 %	End of Semester	1,2,3,4,5

Blended Delivery Mode Average Weekly Workload:			3.00 Hours		
Type	Description	Location	Hours	Frequency	Weekly Avg
Practical	Laboratory	Engineering Laboratory	2	Weekly	2.00
Online Learning	Online	Not Specified	1	Weekly	1.00

Required Reading Book List

Capehart, B L., (2016). *GUIDE TO ENERGY MANAGEMENT*. 8th Edition. CRC Press.

, I., (2019). *ISO 50001*. 1st Edition. ISO.

, B., (2019). *Energy: Management, Supply and Conservation Management, Supply and Conservation*. 2nd Edition. Taylor & Francis as of 2012.

Srensen, B., (2017). *Renewable Energy 5th Edition Physics, Engineering, Environmental Impacts, Economics and Planning*. 5th Edition. Elsevier Press.

Literary Resources

Energy Management Standard ISO 150001 2011

Energy : management, supply and conservation / Dr. Clive Beggs , Imprint Oxford : Butterworth-Heinemann, [2002]

Renewable energy : its physics, engineering, use, environmental aspects, economy and planning aspects / Bent Sørensen Imprint San Diego ; London : Academic, [2000]

Renewable energy / edited by Godfrey Boyle, Imprint Oxford : Oxford University in association with Open University, [2004]

Building energy management systems : applications to low-energy HVAC and natural ventilation control / G. J. Levermore Imprint London : E & F N Spon, 2000

Energy Management Standard IS393

Journal Resources

The Paris Agreement: A New Beginning, Journal for European Environmental & Planning Law 13 (2016) 3-29, Charlotte Streck, Paul Keenlyside, Moritz von Unger.

Online Resources

<https://www.sgs.com/~media/Global/Documents/White%20Papers/sgs-energy-management-whitepaper-en-11.ashx>

<https://www.dccae.gov.ie>

<https://www.britannica.com/event/Kyoto-Protocol>

<https://www.carbontrust.com/our-clients/?show=case-studies>

<https://www.bsigroup.com/globalassets/localfiles/en-gb/iso-50001/resources/iso-50001-implementation-guide-web.pdf>

<https://www.carbontrust.com/our-clients/?show=case-studies>

Other Resources

Statement of Strategy 2019 - 2020, Department of Communication, Climate Change Action and Environment (Keep upto date at <https://www.dccae.gov.ie>)

National Energy Efficiency Action Plan 2014, Department of Communication, Climate Change Action and Environment, (Keep upto date at <https://www.dccae.gov.ie>)

Part L Irish Building Regulations

Ireland's Transition to a Low Carbon Energy Future 2015-2030, Department of Communication, Climate Change Action and

Environment, (Keep Upto date at <https://www.dccae.gov.ie>)

Irish National Energy Act 2016

UNDERSTANDING THE REQUIREMENTS OF THE ENERGY MANAGEMENT SYSTEM CERTIFICATION A discussion about the challenges, impacts and opportunities for energy efficiency, July 2011, Eric Huang.

Ireland's Greenhouse Gas Emission Projections 2012-2030, Environmental Protection Agency, April 25th 2013.

Energy Monitoring and Targeting in Large Companies, Good Practice Guide 112, Department of Environment and the Regions, UK. (see Carbon Trust Website).

GUIDE TO ENERGY MANAGEMENT, 8th Edition [B. L Capehart](#)

Additional Information

Moodle Main Lecture Notes

Moodle Energy Monitoring and Targeting Lecture Notes

Moodle Economic Analysis of Energy Management Lecture Notes

Moodle Lighting and Energy Management Lecture Notes

Energy Management Case Studies folder on Moodle, (Updated).

Programme Membership

GA_EINDG_H08 202000 Bachelor of Engineering (Honours) in Industrial Engineering