



<b>Title:</b>	Energy Systems Modelling <b>APPROVED</b>
<b>Long Title:</b>	Sustainable Energy Systems Modelling
<b>Module Code:</b>	INTR8018
<b>Credits:</b>	5
<b>NFQ Level:</b>	Advanced
<b>Field of Study:</b>	Interdisciplinary Engineering
<b>Valid From:</b>	Semester 1 - 2010/11 ( September 2010 )
<b>Module Delivered in</b>	<a href="#">1 programme(s)</a>
<b>Module Coordinator:</b>	MATTHEW COTTERELL
<b>Module Author:</b>	
<b>Module Description:</b>	This module studies energy modelling for sustainable energy options, economic assessment methods of energy systems and Retscreen and Trnsys modelling packages.
<b>Learning Outcomes</b>	
<i>On successful completion of this module the learner will be able to:</i>	
LO1	Evaluate the stages involved in the modelling of an energy system.
LO2	Undertake a design study using an available energy modelling software package.
LO3	Prepare and deliver an oral and visual presentation on the results of a modelling simulation.
LO4	Determine the most suitable option for an energy option case study by utilising appropriate software.
<b>Pre-requisite learning</b>	
<b>Module Recommendations</b>	
<i>This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named CIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).</i>	
No recommendations listed	
<b>Incompatible Modules</b>	
<i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.</i>	
No incompatible modules listed	
<b>Co-requisite Modules</b>	
No Co-requisite modules listed	
<b>Requirements</b>	
<i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.</i>	
No requirements listed	
<b>Co-requisites</b>	
No Co Requisites listed	

**Module Content & Assessment**

**Indicative Content**

**Modelling Methods:**

RETScreen software backed up with hand calculations. Other software packages as needed by students to finalise their project.

**Performance Indicators:**

Heating, cooling and power requirements.

**Energy Systems Modelled:**

Energy conservation measures, solar, wind, CHP, geothermal, other.

**Model Outputs:**

Energy modelling and emission analysis (tCO<sub>2</sub>, GHG) for base case/proposed case project analysis.

**Economic Analysis:**

Case flow, payback time and IRR for base case/proposed case project studies.

**Sensitivity Analysis:**

Risk analysis and effect of economic factors on base case/proposed case project studies.

**Assessment Breakdown**

%

Course Work

100.00%

**Course Work**

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Project	Stage 1 - Initial Project Selection & Scope	1,2,4	10.0	Week 4
Short Answer Questions	Examination on Lecture Material	1,4	30.0	Week 8
Project	Stage 2 - Poster Presentation (one per group)	1,2,3,4	10.0	Week 12
Project	Stage 3 - Final Written Report Based on Research Layout (one per group)	2,4	30.0	Sem End
Project	Stage 4 - Final Step-by Step Details of Simulations/Hand Calculations (one submission per student)	2,4	20.0	Sem End

No End of Module Formal Examination

**Reassessment Requirement**

**Repeat examination**

Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.

**The institute reserves the right to alter the nature and timings of assessment**

**Module Workload**

<b>Workload: Full Time</b>				
<i>Workload Type</i>	<i>Workload Description</i>	<i>Hours</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Theory, discussion & Tutorials	2.0	Every Week	2.00
Lab	Computer Laboratory	2.0	Every Week	2.00
Independent & Directed Learning (Non-contact)	Self Study	3.0	Every Week	3.00
Total Hours				7.00
Total Weekly Learner Workload				7.00
Total Weekly Contact Hours				4.00

**This module has no Part Time workload.**

Module Resources
<i>This module does not have any book resources</i>
<i>This module does not have any article/paper resources</i>
<i>Other Resources</i>
<ul style="list-style-type: none"> <li>• <b>website: retscreen</b><b>retscreen packages</b> <a href="http://www.retscreen.net/">http://www.retscreen.net/</a></li> <li>• <b>website &amp; software: The Transient Energy System Simulation Tool</b><b>trnsys</b> <a href="http://www.trnsys.com/">http://www.trnsys.com/</a></li> </ul>

Module Delivered in			
Programme Code	Programme	Semester	Delivery
CR_CARCT_9	<a href="#">Master of Science in Architectural Technical Design</a>	1	Elective