MODULE DESCRIPTION FORM

DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING

ME930 ENERGY MODELLING AND MONITORING

Module Registrar: Dr D Cóstola daniel.costola@strath.ac.uk	**Taught To (Course): Cohorts for whom class is compulsory and Engineering Faculty MSc students.**	
Other Lecturers Involved: none	**Credit Weighting: 10 (ECTS 5)**	**Semester: 1**
Compulsory RESE MSc / Elective class for MAE	**Academic Level: 5**	**Suitable for Exchange: Y**

Required prerequisites

Note: It is the responsibility of ALL students to ensure that they satisfy the prerequisite knowledge for this module BEFORE adding as part of curriculum selection. If unsure, please contact the Module Registrar or discuss with your Programme/Year Adviser of Studies.

None

Module Format and Delivery (HOURS i.e. 1 credit = 10hrs of study):

Lecture	Tutorial	Laboratory	Groupwork	External	Online	Project	Assignments	Private Study	**Total**
20		30					30	20	100

Educational Aim

This module aims to impart an understanding of the theoretical and operational principles underlying simulation modelling of energy supply and demand systems and their environmental impact. The emphasis is on practical computer lab-based modelling exercises.

Learning Outcomes

On completion of the module the student is expected to be able to:

LO1 Generate and adapt computer models, undertake simulations and analyse predicted performance for a range of passive and active energy technologies.

LO2 Write technical reports that demonstrate an understanding of the main factors that influence energy and environmental performance, and the capabilities of the modelling programs used in the module to predict performance.

Syllabus

The module will teach the following:

1. Heat and mass transfer processes occurring within energy supply and demand systems.
2. Simulation principles: problem representation, treatment of time and space, numerical methods, validation, use in practice.
3. Simulation practice: problem description, modelling methodology, results interpretation, case studies
4. Built environment: energy demand, passive and active energy systems, options for intervention, performance assessment methods.
5. Renewable energy system modelling, focusing on supply-demand matching.
6. Information systems: energy management, monitoring and targeting, classification techniques, trend analysis, smart metering.

Assessment of Learning Outcomes

For each of the Module Learning Outcomes the following criteria will be used to make judgements on student learning:

LO1

C1 The ability to produce simulation model capturing relevant features of complex energy systems.

LO2

C1 The ability to discuss results in light of boundary conditions, laws of physics governing the problem, and simulation settings/assumptions.

C2 The ability to produce technical reports with adequate structure, describing relevant model features, and providing clear results and conclusions.

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback
(within Assessment and Feedback Policy at:
*https://www.strath.ac.uk/professionalservices/staff/policies/academic/*http://www.strath.ac.uk/learnteach/informationforstaff/staff/assessfeedback/12principles/ *)*

The two technical reports to be submitted by the students should be structured and written as though for a client who has commissioned the study.

Students are encouraged to collaborate in the computer labs in order to modify and run the computer models associated with the current topic. However, it is emphasised that the reports they submit must be entirely their own work – background research plus results they have personally generated and interpreted.

Detailed feedback is given, particularly on the first assignment, to guide the students for their other assignments.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams *(individual weightings)*

Examination				**Coursework**		**Practical**		**Project**	
Number	Month(s)	Duration	***Weighting***	Number	***Weighting***	Number	***Weighting***	Number	***Weighting***
				2	50% each				
*				*All		*		*	

* ***L/Os:*** *Indicate which Learning Outcomes (L01, L02, etc) are to be assessed by exam/coursework/practical/project as required.*

Coursework / Submissions deadlines (*academic weeks*): Week 6 and 11

Resit Assessment Procedures:
Submission of alternate ^^coursework prior to commencement of the August exam diet.

^^Students must contact the module Registrar as soon as they know that a resit is required for this class.

PLEASE NOTE:
Students must gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-assessed by alternate coursework prior to the August diet. This re-assessment will consist entirely of coursework. No marks from any previous attempts will be transferred to a new resit attempt.

Recommended Reading

*****Purchase recommended **Highly recommended reading *For reference (do NOT purchase)**

- Clarke J A, 'Energy Simulation in Building Design', Butterworth-Heinemann. *
- McMullan R, 'Environmental Science in Building' 8th edition, Palgrave. *

Additional Student Feedback

(Please specify details of when additional feedback will be provided)

Date	Time	Room No
Announced in class,		Check timetable webpages for details.

Session: 2023/24

Approved:

Course Director Signature: Olga Ganilova
Date of Last Modifications: 24/08/23

(Updated Aug 2023)

MODULE TIMETABLE

Module Code:	**ME930**	**Module Title:**	**Energy Modelling and Monitoring**

Brief Description of Assessment:

2 technical reports on a range of energy and environmental topics that are investigated through computer simulation.

Assessment Timing:-

Indicate on the table below the start/submission dates for each assignment/project and the timing of each exam/assessment using the dropdowns provided. Dropdowns can be left blank. Add extra notes below the dropdowns.

Please note: Timings can and will change, this should only be used as a guide.

Semester One	W&D Wk	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9	WK10	WK11	Exam Period
	Course work Set	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Course work Submit	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Course work Submit	Choose an item.

Semester Two	C&D Wk	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9	WK10	WK11	Exam Period
	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item. Choose an item.	Choose an item.