MODULE DESCRIPTION FORM

ME930 Energy Modelling and Monitoring

Module Registrar: Dr P Strachan paul@esru.strath.ac.uk

Taught To (Course): Cohorts for whom class is compulsory and Engineering Faculty MSc students.

Other Lecturers Involved:

Credit Weighting: 10

Semester: 1

Assumed Prerequisites: None

Optional

Academic Level: 5 / PG

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

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Tutorial</th>
<th>Laboratory</th>
<th>Project</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
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<tbody>
<tr>
<td>20</td>
<td>30</td>
<td>30</td>
<td>30</td>
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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:

Heat and mass transfer processes occurring within energy supply and demand systems.

Simulation principles: problem representation, treatment of time and space, numerical methods, validation, use in practice.

Simulation practice: problem description, modelling methodology, results interpretation, case studies

Built environment: energy demand, passive and active energy systems, options for intervention, performance assessment methods.

Renewable energy system modelling, focusing on supply-demand matching.

Strategic level analysis for energy efficient buildings and renewable energy integration; the role of storage with dynamically varying demand and intermittent supply.

Information systems: energy management, monitoring and targeting, classification techniques, trend analysis, smart metering.

Assessment of Learning Outcomes

Criteria

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

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

C1 Submitted technical reports should set out relevant model details and results

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.

C1 Marks for the submitted technical reports focus on interpretation and discussion of simulation results

C2 Evidence of good structure, analysis and presentation in the technical reports
The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

### 12 Principles of Assessment and Feedback

*on Learning & Teaching web pages: [www.strath.ac.uk/learnteach/teaching/staff/assessfeedback/12principles/](http://www.strath.ac.uk/learnteach/teaching/staff/assessfeedback/12principles/)*

The technical reports to be submitted by the students should be structured and written as though for a client who has commissioned the study. An example will be given of a technical report to show what is required in terms of assessment of “good” performance.

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 two assignments, to guide the students for their other assignments.

There will be some (though limited) choice on topics that the students submit.

### Assessment Method(s) Including Percentage Breakdown and Duration of Exams

<table>
<thead>
<tr>
<th>L/Outcomes</th>
<th>Examinations</th>
<th>Courseworks</th>
<th>Projects</th>
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<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Duration</td>
<td>Weighting</td>
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<tr>
<td>L01 and L02</td>
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Indicate which learning outcomes (L01, L02 etc) are to be assessed by exam/coursework/project as required.

### Coursework / Submissions deadlines:

Five technical reports to be submitted. Each should be submitted 2 weeks after that topic has been covered in the computer lab.

### Resit Assessment Procedures:

Submission of further technical reports on modelling of energy and environmental performance prior to the commencement of the August examination diet.

### PLEASE NOTE:

Students need to gain a summative mark of 50% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of coursework.

### Recommended Reading

****Purchase essential; ***Purchase recommended; **Highly recommended reading; *Simply for reference (do NOT purchase)*

3. [http://www.strath.ac.uk/](http://www.strath.ac.uk/esru)

### Additional Student Feedback

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

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Session: 2014/15

The computer labs offer ample time to discuss course material and assignments. Additional feedback would be given in exceptional circumstances at a mutually agreed time and place.

Approved:

**Course Director Signature: P Strachan**

**Date of Last Modifications:** 28 August 2014
**MODULE TIMETABLE**

<table>
<thead>
<tr>
<th>Module Code:</th>
<th>ME930</th>
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<tbody>
<tr>
<td>Module Title:</td>
<td>Energy Modelling and Monitoring</td>
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**Brief Description of Assessment:**
5 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/Class Test(s).

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<th>WK2</th>
<th>WK3</th>
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<th>WK6</th>
<th>WK7</th>
<th>WK8</th>
<th>WK9</th>
<th>WK10</th>
<th>WK11</th>
<th>WK12</th>
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