MODULE DESCRIPTION FORM

16469    LOW ENERGY BUILDING DESIGN

Module Registrar: Dr N J Kelly  
nick@esru.strath.ac.uk

Taught To (Course): Cohorts for whom class is compulsory

Other Lecturers Involved: Dr P A Strachan, Prof J A Clarke Dr P Tuohy Dr J M Kim

Credit Weighting: 20 (ECTS 10)

Assumed Prerequisites: none

Compulsory/ optional/ elective class

Academic Level: 4

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>Groupwork</th>
<th>External</th>
<th>Online</th>
<th>Project</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
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Educational Aim

This module aims to develop skills in relation to the design of energy systems, to acquire an appreciation of the multi-factorial nature of the engineering design process, and to develop skills in group working.

Learning Outcomes

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

LO1 have a thorough understanding of the principles of low energy building design

LO2 as part of a group undertake the design and technical appraisal of a low-energy building and its associated energy systems

LO3 clearly and succinctly communicate the outcomes of their design work both orally and in written form

Syllabus

The first semester consists of a series of lectures to introduce the students to the principles of low energy building design. Topics covered include:

- conventional energy use in buildings;
- system control;
- energy demand reduction;
- conventional, low-carbon and renewable energy systems for buildings; and
- zero-energy building concepts.

Additionally, students are introduced to the mechanisms used to evaluate low-energy building design options including simulation and multi-criteria assessment.

Students will be given 4 group-based assignments, each based on a topic covered in the 1st semester.

In the second semester students will undertake a comprehensive energy systems design project typically involving a building serviced by traditional plant and renewable energy components. Investigations cover different system configurations and control strategies with design evolution on the basis of formal appraisals covering a range of relevant cost and performance criteria (such as energy use, environmental impact and the quality of indoor environments). The output from the second semester will be a web site documenting the design project.

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 to assess the students understanding of low energy design principles 4 assignments will be set in the 1st semester. These will be assessed based on
C1 a well-structured and argued submission
C2 use of supporting material
C3 evidence of additional study beyond material delivered in class

LO2 to assess the student’s ability to develop a technical design of a low energy building, student’s will undertake a 2nd semester design exercise and develop a website, which will report the development and performance of their design. This will be assessed based on:
C1 the quality and viability of the final design
C2 how well the students have used technical data to support their design work
C3 evidence of significant additional work outwith the scheduled design periods
C4 evidence of effective group working

LO3 to assess the ability to communicate design work and outcomes, student’s will be subjected to 4 design critiques during the second semester (accounting for 30% of the total mark). These will be assessed based on:
C1 the technical quality of the work presented
C2 the overall quality of the presentation (content, timing, clarity)
C3 ability of the students to answer questions on their work

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/informationforstaff/staff/assessfeedback/12principles/)

Assessment of student performance within the module will be based on a combination of written assignments, project web sites and project critique sessions. The written assignments will be used to gauge the student’s understanding of the principles of low-energy building design and the associated energy supply and demand systems. The function of the critiques is primarily to assess the student’s ability to clearly communicate the outcomes of their design work. Finally, the design project web site will be used to gauge the level of success achieved in developing and appraising their low-energy building design.

Multiple feedback mechanisms will be employed. These are as follows.

- Essay-based assignments will be returned to students with comments on performance with clear guidance given in class to what constitutes an acceptable level of performance in the written assignments.
- In the 2nd semester design class students will meet on a weekly basis with class tutors to be given oral feedback and guidance on their design work.
- In the 4 2nd semester critique sessions students will be given oral feedback on both their design work and also on the quality of their presentations.

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

<table>
<thead>
<tr>
<th>Examinations</th>
<th>Courseworks</th>
<th>Projects</th>
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<tbody>
<tr>
<td>Number</td>
<td>Month(s)</td>
<td>Duration</td>
</tr>
<tr>
<td>4</td>
<td>30%</td>
<td>1</td>
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<tr>
<td>Project mark breaks down into: 4 Critiques Website</td>
<td>30%</td>
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<tr>
<td>LO1</td>
<td>LO1, LO2, LO3</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:
1st semester coursework to be submitted by weeks S1 weeks 5 8 11 S2 week 1
2nd semester submission date is to be negotiated with class

Resit Assessment Procedures: Resubmission of failed assignments prior to the commencement of the August examination diet.

PLEASE NOTE:
Students need to gain a summative mark of 40% 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

none

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

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<tr>
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<th>Time</th>
<th>Room No</th>
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<td>By arrangement</td>
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Session: 2014/15

Approved:

Course Director Signature: [Signature]

Date of Last Modifications: 28/08/2014
MODULE TIMETABLE

Module Code: 16469  
Module Title: LOW ENERGY BUILDING DESIGN

Brief Description of Assessment:
This will be through 4 semester1 written assignments (30%), 4 critique sessions (30%) and a semester2 project web site (40%)

Assessment Timing:-
Indicate on the table below the start/submission dates for each assignment/project and the timing of each exam/assessment(s).

<table>
<thead>
<tr>
<th>Semester One</th>
<th>WK1</th>
<th>WK2</th>
<th>WK3</th>
<th>WK4</th>
<th>WK5</th>
<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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<th>WK3</th>
<th>WK4</th>
<th>WK5</th>
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<th>WK7</th>
<th>WK8</th>
<th>WK9</th>
<th>WK10</th>
<th>WK11</th>
<th>WK12</th>
<th>Exam Period</th>
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<tbody>
<tr>
<td></td>
<td>Assign4 hand-in</td>
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<td>Crit 1</td>
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<td>Crit 4</td>
<td>Web site hand-in</td>
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