## MODULE DESCRIPTION FORM

### ME105 MECHANICAL ENGINEERING DESIGN

| Module Registrar: Dr Andrew McLaren  
<table>
<thead>
<tr>
<th><a href="mailto:andrew.mclaren@strath.ac.uk">andrew.mclaren@strath.ac.uk</a></th>
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<tbody>
<tr>
<td>Taught To (Course): Cohorts for whom class is compulsory</td>
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<tr>
<td>Other Lecturers Involved: Dr B Keating, Mr F Gaddis (DMEM)</td>
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<tr>
<td>Credit Weighting: 20</td>
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<td>Semester: 1 and 2</td>
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<tr>
<td>Assumed Prerequisites: none</td>
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<tr>
<td>Compulsory class</td>
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<td>Academic Level: 1</td>
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### 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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<tr>
<td>72</td>
<td>8</td>
<td>80</td>
<td>40</td>
<td>200</td>
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### Educational Aim

The aim of this class is to place the essential elements of design at the heart of courses for Mechanical Engineering students. It shows how the disparate elements of engineering science may be brought together and used to create a safe, durable and cost-effective solution to a perceived engineering need.

### Learning Outcomes

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

- **LO1** Apply aspects of engineering science to the description of the function of an engineering component.
- **LO2** Appreciate the importance of materials technology and selection as a fundamental aspect of the learning experience.
- **LO3** Understand the importance of team working and cooperative learning.
- **LO4** Have a basic appreciation of formal design methods, and the use of sketching and drawing as an essential component of communication.

### Syllabus

The module will teach the following:

- **a)** Mechanical dissection of an engineering artefact is used to illustrate and understand the fundamental elements of the design process.
- **b)** An introduction to formal design methods, sketching and drawing.
- **c)** Integration of engineering science elements within a framework of design; build and test projects.

### Assessment of Learning Outcomes

#### Criteria

**LO1**

- **C1** Students should be able to include relevant aspects of mechanics, dynamics, fluids etc in a description of an engineering component.
- **C2** Students should be able to use appropriate equations to calculate quantities relevant to the design of the component.
- **C3** Students should use appropriate approximations and estimates.
LO2
C1 Students should describe the structure and processing of the materials observed
C2 Students should relate structure and processing to materials properties including cost
C3 Students should relate structure, processing and properties to the service conditions of the component.

LO3
C1 Students should complete tasks as a team of 4
C2 Students should cooperate to produce joint outputs that combine the efforts of each team member

LO4
C1 Students should complete a formal design exercise including the generation of concepts, their evaluation and selection.
C2 Students should utilise graphical communication skills in their design project outputs.

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/)

Deliver high quality feedback information that helps learners self-correct:
High quality feedback will be provided by staff to students in groups at all stages of their work. This will involve group discussions, poster review sessions and feedback on project work.

Ensure that summative assessment has a positive impact on learning.
Summative assessments by poster sessions and design presentations will include detailed feedback on an individual and group basis.

Give choice in the topic, method, criteria, weighting or timing of assessments
Choice of topic is key to this module. Each group chooses a component to study in the mechanical dissection element of the class, and has a choice of design in the group design element.

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>Month(s)</td>
<td>Duration</td>
</tr>
<tr>
<td>LO1, LO2, LO3</td>
<td>1</td>
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Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines:
To be advised – will be different for each student group.

Resit Assessment Procedures:
Resit coursework will be set, to be submitted prior to commencement of the August exam 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

“Materials Science and Engineering: an Introduction”
by Wm D Callister, John Wiley & Sons

Copies available in Main Library.


Copies in Main Library.
**Additional Student Feedback**
*(Please specify details of when additional feedback will be provided)*

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<tr>
<td>Depending on group’s schedule of activities.</td>
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Session 14/15: Students will receive regular feedback through discussion with staff during group activities throughout the year. Written feedback will be provided to each group for the graphical communication and integrated design projects (Frank Gaddis). Other elements of the course will involve verbal feedback only, in the context of group discussions with supervising staff.

Approved:

**Course Director Signature:**

[Signature]

**Date of Last Modifications:** 31 August 2014
**Module Code:** ME105  
**Module Title:** MECHANICAL ENGINEERING DESIGN

**Brief Description of Assessment:**
Car dissection: Each team of 4 produces a group poster to describe the function, physics, materials and manufacturing of an engineering component.

Integrated Design: Each team of 4 produces a design project for a product to fulfil a brief supplied by staff.

**Assessment Timing:**
Indicate on the table below the Start/Submission dates for each Assignment/Project and the timing of each Exam/Class Test(s).

Varies for each group: Car dissection poster due 4 weeks after start of dissection activity (detailed timetable supplied at start of year). Design project due at end of 8 week integrated design block.

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<th>WK1</th>
<th>WK2</th>
<th>WK3</th>
<th>WK4</th>
<th>WK5</th>
<th>WK6</th>
<th>WK7</th>
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<th>WK9</th>
<th>WK10</th>
<th>WK11</th>
<th>WK12</th>
<th>Exam Period</th>
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<th>WK10</th>
<th>WK11</th>
<th>WK12</th>
<th>Exam Period</th>
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