**MODULE DESCRIPTION FORM**

**ME107 EXPERIMENTAL AND LABORATORY SKILLS**

<table>
<thead>
<tr>
<th>Module Registrar: Dr Andrew McLaren</th>
<th>Taught To (Course): Cohorts for whom class is compulsory</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="mailto:andrew.mclaren@strath.ac.uk">andrew.mclaren@strath.ac.uk</a></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Lecturers Involved:</th>
<th>Credit Weighting: 10 (ECTS 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Patricia Munoz-Escalona</td>
<td>Semester: 1 and 2</td>
</tr>
<tr>
<td><a href="mailto:p.munoz@strath.ac.uk">p.munoz@strath.ac.uk</a></td>
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<table>
<thead>
<tr>
<th>Assumed Prerequisites:</th>
<th>Compulsory class</th>
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<tbody>
<tr>
<td>SQA Highers in Mathematics and Physics (or equivalent)</td>
<td>Academic Level: 1</td>
</tr>
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</table>

**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>Group-work</th>
<th>External</th>
<th>Online</th>
<th>Project</th>
<th>Assignments</th>
<th>Private Study</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0</td>
<td>15</td>
<td>3</td>
<td>0</td>
<td>20</td>
<td>0</td>
<td>10</td>
<td>50</td>
<td>100</td>
</tr>
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**Educational Aim**

The aim of the class is to introduce students to a range of experimental and laboratory related skills, appropriate to Mechanical and Aerospace Engineering. This will include elements of laboratory and workshop safety including risk assessment procedures. Students will gain familiarity with a range of hand tools and welding/joining procedures and develop an understanding of how to conduct experiments, record data, evaluate errors and write a technical report.

**Learning Outcomes**

On completion of the module the student is expected to

LO1  Understand and appreciate the safe use of a range of hand and power tools, and have experience in joining processes including welding

LO2  Have experience of carrying out a simple risk assessment and have an appreciation for safe working practices in the laboratory

LO3  Have an appreciation for the conduct of experimental work, recording results and evaluating errors

LO4  Have experience of writing a formal report in the correct style, including graphical representations of data, and appropriate referencing of literature.

LO5  Appreciate the useful of online activities as part of their learning process

**Syllabus**

The module will teach the following:

a)  Each student will attend two afternoons of hand/power tools training, and one afternoon of welding and joining. A short online individual reflective report will be submitted for each activity.

b)  Each student group will complete a risk assessment as part of the Mechanical Dissection element of class ME105 Mechanical Engineering Design. Following this lab, each student will submit an individual online version of this risk assessment, including a personal reflection on lab safety.

c)  Each student will attend two experimental sessions to conduct experiments related to core classes in the first year Mechanical Engineering curriculum. Each lab session will be preceded by an online pre-lab giving background information to each task. Students will submit a formal lab report which will be formatted in a standard style to introduce report writing skills including error analysis and referencing.

d)  Each student will participate individually and as student group in online discussion forums.
Assessment of Learning Outcomes

Criteria

LO1
C1 Students should describe the tools and processes they have used.
C2 Students should describe what they have made with the aid of clear sketches
C3 Students should be able to reflect on the safe use of tools and the procedures in the lab

LO2
C1 Students will produce an individual risk assessment for online submission
C2 Students will understand what is meant by the terms “hazard” and “control measures” and be able to describe them for a specific activity with which they have experience.

LO3
C1 Students should carry out experimental procedures and record raw data accurately
C2 Students should plot experimental data graphically
C3 Students should comment on the possible sources of errors in their measurements and make suggestions for their minimisation

LO4
C1 Students will write two formal laboratory reports in an appropriate style
C2 Students will include references to previous work in a correct format and style
C3 Students will use diagrams and graphs with appropriate cross referencing from the text and adequate captions
C4 Students will draw justifiable conclusions from the results of their experiments and discuss them with reference to appropriate background information and theory

LO5
C1 Students will analyse and discuss their results in an asynchronous online discussion forum. They will post and answer at least once as part of the interaction/participation activity
C2 Students will undertake an online quiz to assess their learning outcomes in “rolling mill” and “aerodynamic forces” topics

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: http://www.strath.ac.uk/learnteach/informationforstaff/staff/assessfeedback/12principles/)

Help clarify what good performance is.
Exemplars of good quality student reports will be available for students to consult as they formulate their own work. These will be annotated to highlight good practice over the range of learning outcomes.

Deliver high quality feedback information that helps learners self-correct:
High quality feedback will be provided on each activity, particularly on the reports for the experimental labs. This will allow students to improve the quality and style of their technical writing, and gain a set of skills that will stand them in good stead for their degree course.

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>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weighting</td>
<td>Weighting</td>
<td>Weighting</td>
</tr>
<tr>
<td>Number</td>
<td>Month(s)</td>
<td>Duration</td>
<td>Number</td>
</tr>
<tr>
<td>L01, L02, LO3, L04, L05</td>
<td>11</td>
<td>100%</td>
<td></td>
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</table>

Indicate which learning outcomes (L01, L02 etc) are to be assessed by exam/coursework/project as required.
Each student will submit the following pieces of work; weightings of marks are shown for information

- Hand tools laboratory report 15%
- Welding and joining report 15%
- Risk Assessment assignment 10%
- Lab session A (semester 1)
  - Pre-lab (lesson and face-to-face discussion forum) 5%
  - Discussion forum 10%
  - Technical report 10%
  - Quiz 5%
- Lab session B (semester 2)
  - Pre-lab (lesson and face-to-face discussion forum) 5%
  - Discussion forum 10%
  - Technical report 10%
  - Quiz 5%

Coursework / Submissions deadlines:

Deadlines to be advised – will be different for each group/student as he/she moves through the cycle of learning experiences

Resit Assessment Procedures:

2 hour examination in August 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 exam.

Recommended Reading

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

None

Additional Student Feedback

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

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Room No</th>
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<tbody>
<tr>
<td>January</td>
<td>TBA</td>
<td>TBA</td>
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Session 14/15: A general feedback session will be arranged at the start of the second semester to inform students of general points concerning report writing and experimental procedures. This will inform students’ performance of the second cycle of tasks in the second semester.

Students will be provided with individual feedback for each sub-task online. Students wishing to receive individual clarification can contact staff who will go through their work and provide further information and advice.

Approved:

Course Director Signature: [Signature]

Date of Last Modifications: 31 August 2014
**MODULE TIMETABLE**

**Module Code:** ME 107  
**Module Title:** EXPERIMENTAL AND LABORATORY SKILLS

**Brief Description of Assessment:**
Each student will submit the following pieces of work, weightings of marks are shown for information

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- Welding and joining report 15%
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- Lab session A (semester 1)
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  - Discussion forum 10%
  - Technical report 10%
  - Quiz 5%
- Lab session B (semester 2)
  - Pre-lab (lesson and face-to-face discussion forum) 5%
  - Discussion forum 10%
  - Technical report 10%
  - Quiz 5%

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

Varies for each student: Lab reports will be due for submission 4 weeks after the lab is attended. Detailed timetable will be published at start of semester 1.

<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>
<th>Exam Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester Two</td>
<td>WK1</td>
<td>WK2</td>
<td>WK3</td>
<td>WK4</td>
<td>WK5</td>
<td>WK6</td>
<td>WK7</td>
<td>WK8</td>
<td>WK9</td>
<td>WK10</td>
<td>WK11</td>
<td>WK12</td>
<td>Exam Period</td>
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