MODULE DESCRIPTION FORM

DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING

16327 STRUCTURAL MECHANICS

Module Registrar: Dr M A Wheel
marcus.wheel@strath.ac.uk

Taught To (Course): All third year undergraduate degree courses delivered by MAE

Other Lecturers Involved:

Credit Weighting: 10 (ECTS 5)

Semester: 1

Assumed Prerequisites: 16232 Engineering Mechanics 2

Compulsory class

Academic Level: 3

Suitable for Exchange: Y

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>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td>60</td>
</tr>
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</table>

100

Educational Aim

This class is a direct continuation of the solid mechanics element of class 16232 and aims to extend the students’ knowledge and understanding of the mechanical behaviour of materials and structures under a variety of loading conditions.

Learning Outcomes

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

LO1 fully understand the central principle of solid mechanics, namely, the application of equilibrium, compatibility and constitutive relations to determining the deformation of loaded materials and demonstrate this understanding through successful mathematical analysis of various problems of relevance.

LO2 determine the deformation of various common structural elements, namely cylinders, beams and columns under various loading conditions, and be competent in analytically analysing relevant structural analysis problems.

Syllabus

The module will teach the following:

Solid Mechanics: Two-dimensional stress and strain; multiaxial elastic constitutive relations; multiaxial yield criteria; general equations of elasticity leading to solutions for thick and thin cylindrical structures.

Structural Mechanics: Equations and analysis of continuous beams, both determinate and indeterminate; introduction to energy methods of analysis; superposition and dynamic loading effects; introduction to instability and buckling, including end-loaded columns with imperfections; design analysis of columns using British Standards or Euro-Codes.

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 Demonstrate understanding of solid mechanics principles and ability to analyse problems involving the deformation of loaded materials.

LO2 Demonstrate understanding of structural mechanics principles and ability to analyse problems involving the behaviour of loaded structures.
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/staff/policies/academic/](https://www.strath.ac.uk/staff/policies/academic/))

Please state briefly how these are incorporated in this module.

Formative feedback will be provided at tutorial sessions primarily through individual or group discussion of exercises prepared in advance by students (note:- to receive this feedback students should participate in these tutorials but attendance is not mandatory)

Summative feedback will be provided by the return of examination marks to students after assessment (note:- exam scripts will not be returned to students and no individual or collective discussion of exam performance will be facilitated).

**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>Number</td>
<td>Month(s)</td>
<td>Duration</td>
</tr>
<tr>
<td>LO1 &amp; LO2</td>
<td>1</td>
<td>December</td>
<td>2 hours</td>
</tr>
</tbody>
</table>

*Indicate which learning outcomes (LO1, LO2 etc) are to be assessed by exam/coursework/project as required.*

**Coursework / Submissions deadlines (academic weeks):**
None

**Resit Assessment Procedures:**
2hr examination in August diet.

**PLEASE NOTE:**
Students must 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. 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)**


**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>
</tr>
</thead>
<tbody>
<tr>
<td>TBA</td>
<td></td>
<td>Check timetable webpages for details</td>
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Session: 2018/19

**Approved:**

<table>
<thead>
<tr>
<th>Course Director Signature:</th>
<th>Dr Barbara A. Keating</th>
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<tbody>
<tr>
<td>Date of Last Modifications:</td>
<td>19th July 2018</td>
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(Updated May 2018)
**MODULE TIMETABLE**

**Module Code:** 16327  
**Module Title:** Structural Mechanics

**Brief Description of Assessment:**
2 hour exam in December exam period

**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.**

<table>
<thead>
<tr>
<th>Semester One</th>
<th>W&amp;D Wk</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>Exam Period</th>
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</thead>
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<table>
<thead>
<tr>
<th>Semester Two</th>
<th>C&amp;D WK</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>Exam Period</th>
</tr>
</thead>
</table>