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## MODULE DESCRIPTOR

### Module Title

Statics and Dynamics

|           |              |             |        |
|-----------|--------------|-------------|--------|
| Reference | EN1700       | Version     | 4      |
| Created   | January 2017 | SCQF Level  | SCQF 7 |
| Approved  | March 2004   | SCQF Points | 15     |
| Amended   | June 2017    | ECTS Points | 7.5    |

### Aims of Module

To enable the student to understand the basic concepts and theories of applied mechanics.

### Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Understand the concept of equilibrium and determine the actions of forces and moments; identify and explain tensile and compressive loading and the associated linear stress-strain relationship.
- 2 Analyse forces and moments on beams and pin-jointed structures.
- 3 Evaluate the kinematics of simple translation and rotational systems, kinetics of rigid bodies and apply the concepts of work, power and energy.
- 4 Define and calculate friction force, mass moment of inertia and the dynamics of simple systems.
- 5 Investigate the mechanical properties of materials using a tensile test.
- 6 Investigate the method of determining mass moment of inertia of complex material shapes.

### Indicative Module Content

Statics: Forces, moments and equilibrium. Load analysis of plane, pinned frames (trusses). Shear forces and bending moments in beams. Simple tensile, compressive and linear-elastic material behaviour. Dynamics: Rectilinear and curved path motion of particles including non-constant acceleration case. Newton's Laws applied to rigid body kinetics of linear and circular motion systems including the effect of friction. Mass moment of Inertia. Impulse and momentum.

### Module Delivery

The module is delivered by means of lectures, tutorials and guided self-study and is integrated with applications within the laboratory.

| <b>Indicative Student Workload</b>   | Full Time  | Part Time  |
|--|------------|------------|
| Contact Hours  | 50         | 50         |
| Non-Contact Hours  | 100        | 100        |
| Placement/Work-Based Learning Experience [Notional] Hours                    | N/A        | N/A        |
| <b>TOTAL</b>   | <b>150</b> | <b>150</b> |
| <i>Actual Placement hours for professional, statutory or regulatory body</i> |            |            |

## ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

### Component 1

Type: Coursework Weighting: 50% Outcomes Assessed: 5, 6  
 Description: Two laboratory based courseworks.

### Component 2

Type: Examination Weighting: 50% Outcomes Assessed: 1, 2, 3, 4  
 Description: In-class assessment (20% weighting) and a closed book examination (30% weighting).

## MODULE PERFORMANCE DESCRIPTOR

### Explanatory Text

To pass the module students must achieve at least a grade D AND a minimum of 35% in the exam and coursework components.

| Module Grade | Minimum Requirements to achieve Module Grade:                                  |
|--------------|--|
| <b>A</b>     | =>70%  |
| <b>B</b>     | 60-69%   |
| <b>C</b>     | 50-59%   |
| <b>D</b>     | 40-49%   |
| <b>E</b>     | 35-39%   |
| <b>F</b>     | 0-34%  |
| <b>NS</b>    | Non-submission of work by published deadline or non-attendance for examination |

## Module Requirements

|                          |  |
|--------------------------|--|
| Prerequisites for Module | None in addition to the course entry requirements. |
| Corequisites for module  | None.  |
| Precluded Modules        | None.  |

## INDICATIVE BIBLIOGRAPHY

- 1 HEARN, E.J., 1997. Mechanics of Materials: Volume 1. 3rd ed. Oxford: Butterworth-Heinemann.
- 2 MERIAM, J.L. and KRAIGE, L.G., 2016. Engineering Mechanics (Statics and Dynamics). 8th ed. New York: Wiley.
- 3 CLIFFORD, M., 2009. Introduction to Mechanical Engineering Part 1. London: Hodder Education.