

## MODULE DESCRIPTOR

### Module Title

Dynamics

Reference	EN2500	Version	7
Created	March 2023	SCQF Level	SCQF 8
Approved	March 2004	SCQF Points	15
Amended	August 2023	ECTS Points	7.5

### Aims of Module

To provide the student with the ability to understand, apply and discuss the modelling concepts and theories associated with free and forced vibration of 1-DOF systems and the concepts and theories associated with the dynamics of planar mechanisms, rotating machines, rigid-body and impulsive systems.

### Learning Outcomes for Module

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

- 1 Solve problems involving free and forced vibration of 1-DOF systems including vibration isolation and transmissibility.
- 2 Apply the concept of dynamic equivalence in the experimental results of single degree freedom vibrating systems.
- 3 Calculate out-of-balance forces associated with rotating machines.
- 4 Compute the kinematics of planar mechanisms.

### Indicative Module Content

Kinematics of planar mechanisms with revolute (pin) and prismatic (sliding joint); forces and torques arising in planar mechanisms owing to inertia forces and moments associated with acceleration of links. Free vibration of undamped 1-DOF systems. Dynamic equivalence of engineering systems. Free and forced vibration of damped 1-DOF systems. Transient response to simple inputs. Steady-state sinusoidal response. Vibration isolation and forces transmitted to supports. Impulse force, impact and momentum. Kinetic and potential energy. Balancing of rigid rotors. Single-plane and two-plane balancing.

### Module Delivery

This module is lecture based with tutorials, directed self-study, laboratory work and private study.

**Indicative Student Workload**

	Full Time	Part Time
Contact Hours	50	50
Non-Contact Hours	100	100
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	150
<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: Examination Weighting: 100% Outcomes Assessed: 1, 2, 3, 4  
 Description: A closed book examination

**MODULE PERFORMANCE DESCRIPTOR****Explanatory Text**

The assessment of this module comprises 100% on an examination. To pass this module a minimum of Grade D is required

Module Grade	Minimum Requirements to achieve Module Grade:
<b>A</b>	A
<b>B</b>	B
<b>C</b>	C
<b>D</b>	D
<b>E</b>	E
<b>F</b>	F
<b>NS</b>	Non-submission of work by published deadline or non-attendance for examination

**Module Requirements**

Prerequisites for Module	Statics & Dynamics (EN1700) or its equivalent.
Corequisites for module	None.
Precluded Modules	None.

**INDICATIVE BIBLIOGRAPHY**

- MERIAM, J.L. AND KRAIGE L.G., 2016. Engineering Mechanics: Dynamics. 8th ed. Hoboken, NJ: Wiley.
- RAO, S.S., 2017. Mechanical Vibrations. 6th ed. Upper Saddle River, NJ: Prentice Hall.
- THOMSON, W.T., 2013. The Theory of Vibration with Applications. 5th ed. Cheltenham: Nelson Thornes.