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MODULE DESCRIPTOR

Module Title

Dynamics

Reference	EN2500	Version	3
Created	March 2017	SCQF Level	SCQF 8
Approved	March 2004	SCQF Points	15
Amended	June 2017	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	Derive and solve problems involving free vibration of 1-DOF systems.
2	Evaluate forced vibration of 1-DOF systems including the concept of vibration isolation and transmissibility.
3	Apply the concept of dynamic equivalence to model vibrating systems.
4	Describe practical balancing tecchniques and analyse out-of-balance forces associated with rotating machines.
5	Analyse the dynamics of planar mechanisms.
6	Investigate experimentally the effects of spring-mass-damper on a 1-DOF vibration system.

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.

Module Ref:	EN2500 v3

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
Actual Placement hours for professional, statutory or regulatory body		

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:	6
Description:	A laboratory based coursework.				

Component 2

Type:	Examination	Weighting:	50%	Outcomes Assessed:	1, 2, 3, 4, 5
Description:	A closed book examination.				

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:
A	=>70%
B	60-69%
C	50-59%
D	40-49%
E	35-39%
F	0-34%
NS	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

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