Mechanical Principles

Module Information

2022.01, Approved

Summary Information

Module Code	4514NCCG
Formal Module Title	Mechanical Principles
Owning School	Engineering
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 4
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
Nelson and Colne College Group

Learning Methods

Learning Method Type	Hours
Lecture	60

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
APR-PAR	PAR	April	12 Weeks
JAN-PAR	PAR	January	12 Weeks
SEP-PAR	PAR	September	12 Weeks

SEP_NS-PAR	PAR	September (Non-standard start date)	12 Weeks

Aims and Outcomes

Aims	The aim of this module is to introduce students to the essential mechanical principles associated with engineering applications. Topics included in this module are: behavioural characteristics of static, dynamic and oscillating engineering systems including shear forces, bending moments, torsion, linear and angular acceleration, conservation of energy and vibrating systems; and the movement and transfer of energy by considering parameters of mechanical power transmission systems. On successful completion of this module students will be able to explain the underlying principles, requirements and limitations of mechanical systems

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Identify solutions to problems within static mechanical systems.
MLO2	2	Illustrate the effects that constraints have on the performance of a dynamic mechanical system.
MLO3	3	Investigate elements of simple mechanical power transmission systems.
MLO4	4	Analyse natural and damped vibrations within translational and rotational mass-spring systems.

Module Content

Outline Syllabus	Shafts and beams: shear forces on beams, bending moments and stress due to bending in beams, selection of appropriate beams and columns to satisfy given specifications, theory of torsion in solid and hollow circular shaftsEnergy and work: conservation of energy and work-energy transfer in systems, linear and angular velocity and acceleration, velocity and acceleration diagrams of planar mechanisms, gyroscopic motionCouplings and energy storage: universal couplings and conditions for constant-velocity, importance of energy storage elements and their applicationsTypes of motion: simple harmonic motion, natural frequency of vibration in mass-spring systemsDamped systems: frequency of damped vibrations in mass-spring-damper systems, conditions for an external force to produce resonance
Module Overview	
Additional Information	

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Test	Online Test	50	0	MLO1, MLO2
Presentation	Assignment	50	0	MLO3, MLO4

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Christian Matthews	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings