

Further Mechanical Principles

Module Information

2022.01, Approved

Summary Information

Module Code	5517NCCG
Formal Module Title	Further Mechanical Principles
Owning School	Engineering
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 5
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	48
Workshop	12

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 provide students with advanced knowledge of the mechanical theories associated with engineering applications. Topics included: Poisson's Ratio; the relationship between the elastic constants; the relationship between bending moment, slope and deflection in beams; calculating the slope and deflection for loaded beams; analysing the stresses in thin-walled pressure vessels; and stresses in thick-walled cylinders, flat and v-section belt drive theory, operational constraints of dynamic rotating systems, friction clutches and brakes.
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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Determine the behavioural characteristics of materials subjected to a variety of loadings
MLO2	2	Assess the strength of loaded beams and pressurised vessels.
MLO3	3	Analyse the specifications of power transmission system elements.
MLO4	4	Examine operational constraints of dynamic rotating systems.

Module Content

Outline Syllabus	Characteristics of materials: Poisson's Ratio, relationship between the elastic constants, characteristics of two-dimensional and three-dimensional loading, calculation of volumetric strain and volume changes Strength: relationship between bending moment, slope and deflection in beams, stresses in thin-walled pressure vessels and in thick-walled cylinders. Power transmission systems: flat and v-section belt drive theory, friction clutches, principles of epicyclic and differential gearing, torques required to accelerate these systems, areas of failure when transmitting power mechanically Dynamic rotating systems: design of both radial plate and cylindrical cams to meet operating specifications, operating principles of flywheels to store mechanical energy, balancing of rotating mass systems, effects of coupling on freely rotating systems
Module Overview	
Additional Information	

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Report	Assignment	100	0	MLO2, MLO3, MLO4
Competency	NCC Group Pass/Fail			MLO1

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
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