

Module Title:	Mechanics of Machines 1
Language of Instruction:	English
Credits:	10
NFQ Level:	6
Module Delivered In	No Programmes
Teaching & Learning Strategies:	Lectures, tutorials along with self-directed study and practical exercises.
Module Aim:	To provide the student with an understanding of the underlying scientific principles of Mechanical Engineering
Learning Outcomes	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Interpret written descriptions of practical engineering problems.
LO2	Translate written descriptions into mathematical form.
LO3	Select appropriate mathematical formulae for a given problem.
LO4	Perform experiments on mechanical engineering science topics and interpret the results.
LO5	Model, report & solve mathematical problems using spreadsheets
Pre-requisite learning	
Module Recommendations <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>	
No recommendations listed	
Incompatible Modules <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i>	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i>	
No requirements listed	

Module Content & Assessment

Indicative Content

Theory - Units

• Mass, length, time, density, relative density, force, weight and the International system of units

Theory - Motion

• Acceleration, speed, velocity, displacement, motion. • Newton's laws of motion. • Equations of motion. • Speed-time graphs

Theory - Moments

• Principle of moments. • Centre of gravity. • Moment of a force - couple

Theory - Forces

• Triangle of forces. • Polygon of forces. • Parallelogram of forces. • Resultant of a system of forces • Resolution of forces.

Theory - Friction

• Laws of friction. • Limiting friction. • Friction on horizontal and inclined planes. • Angle of friction and the total reaction

Theory - Work and Power

• Work done by a force. • Power. • Work done by torque. • Tractive effort.

Theory - Momentum

• Elastic collisions. • Conservation of Momentum. • Kinetic Energy. • Potential Energy. • Conservation of Energy

Theory - Machines

• Law of a machine. • Mechanical advantage. • Velocity ratio. • Efficiency and limiting efficiency. • Applications to simple machines

Theory - Stress and Strain

• Direct stress and strain. • Hooke's law. • Modulus of elasticity

Theory - Circular motion

• Angular velocity and acceleration. • Centripetal force. • Centrifugal force

Theory - Shear Force and Bending Moments

• Define shear forces and bending moments • Define uniformly distributed loads (UDL) • Calculate shear force and bending moment values
• Plot shear force and bending moment diagrams

Practical Lab Experiments

Carry out a series of mechanical engineering lab experiments and produce relevant lab reports. Experiments will include: • Triangle of Forces • Polygon of Forces • Principle of Moments • Centre of Gravity • Simple Machines • Stress and Strain • Hooke's Law • Simple Pendulum • Motion on an inclined plane (Energy Method) • Coefficient of friction (Horizontal Plane) • Coefficient of friction (Inclined Plane) • Pulley drives • Simple and Compound Gear Trains. • Modulus of Rigidity • Young's Modulus

Computer Applications

• Develop spreadsheets:- • To perform calculations • To produce charts to represent data • For incorporation into laboratory reports

Assessment Breakdown	%
Continuous Assessment	15.00%
Practical	15.00%
End of Module Formal Examination	70.00%

Continuous Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Other	Each student will be obliged to complete a continuous assessment programme for which 15% will be awarded. This will involve in-class tests and other assigned tasks.	1,2,3,5	15.00	n/a

No Project

Practical

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Complete lab based experiments and write up relevant technical reports.	1,3,4	15.00	Every Second Week

End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	A final written examination will assess the student's attainment of the module learning outcomes	1,2,3,5	70.00	End-of-Semester

Continuous Assessment				
<i>Assessment Type</i>	<i>Assessment Description</i>	<i>Outcome addressed</i>	<i>% of total</i>	<i>Assessment Date</i>
Other	- Two written block assessments. - Short multiple choice written assessments.		15.00	n/a

No Project

Practical				
<i>Assessment Type</i>	<i>Assessment Description</i>	<i>Outcome addressed</i>	<i>% of total</i>	<i>Assessment Date</i>
Practical/Skills Evaluation	Complete experiments and write up relevant reports.		15.00	n/a

End of Module Formal Examination				
<i>Assessment Type</i>	<i>Assessment Description</i>	<i>Outcome addressed</i>	<i>% of total</i>	<i>Assessment Date</i>
Formal Exam	A final written examination will assess the student's attainment of the learning outcomes of the module.		70.00	End-of-Semester

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Every Week	3.00
Laboratory	Every Week	1.50
Tutorial	Every Week	0.50
Independent Learning	Every Week	2.00
Total Hours		7.00

