

DSGN C1F02: Agricultural Design and Mechanisation

Module Title:		Agricultural Design and Mechanisation
Language of Instruction	on:	English
Cradite	10	
creats.		
NFQ Level:	6	
Module Delivered In		2 programme(s)
Teaching & Learning Strategies:		Lectures, laboratories, demonstrations, research, project work and some study will be used to ensure the student has a wide range of experiences.
Module Aim:		The aim of this module is to provide students with an introduction to manufacturing processes, the design process, manufacture of components to ISO Standards and the inherantly safe design and operation of agricultural machines.
Learning Outcomes		
On successful completion	on of th	is module the learner should be able to:
LO1 Explain au agricultura	nd illus al equij	trate how engines and motors (diesel, petrol, electric, hydraulic) work, the energy characteristics of different pment and the influence of soil conditions on their operation and maintenance requirements.
LO2 Demonstr machiner expected	rate a k y used to critic	knowledge and understanding of the wide range of agricultural machinery on the market. This should include for conventional and conservation agricultural practices and that used in livestock systems. Students will be que the energy consumption of various agricultural practices and how to reduce this consumption.
LO3 Demonstr in a works certificatio	rate an shop er on proc	understanding of the design, manufacture and repair of agricultural components, assemblies and machinery nvironment, ensuring compliance with ISO standards, risk assessment & reduction procedures and CE sess.
LO4 Demonstr on the far	ate an m and	understanding of the various regulations governing the operation and maintenance of farm machinery, both on public roads, with special attention to Health and Safety Regulations.
LO5 Apply and Rigidity, to hollow sha	l solve orque a afts, in	formulae involving the concepts of direct stress, Modulus of Elasticity, shear stress, torsion, Modulus of and power transmissionand their applications within in agricultural engineering, such as torsion in solid and belt drives, couplings, keyways and gears.
LO6 Demonstr and repair	ate a p r. Stude	practical understanding of the Health and Safety Aspects of agricultural machinery operation, maintenance ents will have the ability to conduct a Health and Safety audit of farm sites, equipment and machinery.
Pre-requisite learning		
Module Recommendat This is prior learning (or	t ions a prac	tical skill) that is recommended before enrolment in this module.
No recommendations lis	sted	
Incompatible Modules These are modules which	ch have	e learning outcomes that are too similar to the learning outcomes of this module.
No incompatible module	es listed	d de la constant de la const
Co-requisite Modules		
No Co-requisite module	s listed	I
Requirements This is prior learning (or	a prac	tical skill) that is mandatory before enrolment in this module is allowed.
CAD 1 or equivalent		



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Module Content & Assessment

Indicative Content

Understanding how machinery works

· Understanding how diesel and petrol engines, electric motors, hydraulic systems work, their energy requirements and how they are maintained

Farm machinery types

• Understanding the machinery types associated with different streams of agriculture including tillage, dairy, dry stock, pigs and poultry

Regulations governing Farm Machinery design, maunfacture and repair • Introduce the learners to the subject of health and safety regulations regarding farm machinery operation. • Identification of hazards and dangers in the engineering and farm industry environment. • Machine guarding. • Health & Safety - Employer and employee responsibilities. • Understand the procedures for conducting a risk assessment of a new piece or modified piece of machinery, Machinery Directive and International Standards of machine design • Fire extinguishers types and operation.

Metrology

Use of Vernier callipers, micrometres, height gauges, depth gauges, dial test indicators.

Fabrication and Assembly

 Design of components. • Interpretation of drawings. • Jointing methods. • Permanent joints e.g. riveting, soldering, brazing, silver soldering, gas welding, manual metal arc welding, adhesive bonding. • Semi-permanent joints e.g. locking devices, screwed fastenings, keys, dowels and circlips

Machine tools and accessories

· Introduction and safe operation of drilling machines, centre lathes, and milling machines.

Shear and Torsion

Modulus of elasticity. • Application to compound sections. • Shear stress and shear strain. • Modulus of Rigidity. • Torsion in solid and hollow shafts: Relationship betweentorque, shear stress, polar second moment of area, angle of twist. • Drive shaft configurations, cardinal shafts, balancing effect and coupling arrangements. • Power Transmission.

Assessment Breakdown	%
Continuous Assessment	40.00%
Project	10.00%
Practical	50.00%

Continuous Asse	essment			
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Written Report	Risk Assessment and Mitigation, Inherantly Safe Design and Design Process	3,4,6	20.00	Every Second Week
Examination	Class Test	1,2,5	20.00	Week 11

Project				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Project	Practical Workshop Assessment	1,2,3,6	10.00	Week 12

Practical				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Mechanical workshop design & fabrication projects.	3,6	50.00	Every Week
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No End of Module Formal Examination

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



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Module Workload

Workload: Full Time		
Workload Type	Frequency	Average Weekly Learner Workload
Lecture	12 Weeks per Stage	2.00
Laboratory	12 Weeks per Stage	3.00
Lab/Lecture	12 Weeks per Stage	1.00
Independent Learning	15 Weeks per Stage	11.07
	Total Hours	238.00

Module Delivered In			
Programme Code	Programme	Semester	Delivery
CW_EFARG_B	Bachelor of Engineering (Honours) in Agricultural Systems Engineering	2	Mandatory
CW_EFARG_D	Bachelor of Engineering in Agricultural Systems Engineering	2	Mandatory