

Module Title:	Plant Engineering
Language of Instruction:	English
Credits:	10
NFQ Level:	6
Module Delivered In	No Programmes
Teaching & Learning Strategies:	Conducted through lectures, tutorials, and practical sessions.
Module Aim:	The aim of this module is to introduce the students to the basic principles of automation and give them an introduction to standard mechanical and electrical plant/equipment.
Learning Outcomes	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Describe the principle operation of standard compressors and ancillary equipment and construct pneumatic circuits using ISO RP68P (pneumatic) symbols and graphically represent basic pneumatic circuits.
LO2	Recognise basic engineering components such as pumps, valves and bearings and the application of each. Use of specific lubricants and the correct disposal of same in line with environmental standards
LO3	Describe the operation of modern S.I. and C.I. Engines and the use of VVT (Variable Valve Timing), recognize modern transmission system, and identify various standard components.
LO4	Describe the principle operation of hydraulic pumps and valves and construct simple hydraulic circuits.
LO5	Recognise standard safety protocols in construction of pneumatic, hydraulic, and electrical systems, namely failsafe design, pressure relief and isolation procedures
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

Compressors

Types of compressors Dryers, drain traps, condensate formation Receivers and pipework Filtration, lubrication & pressure reducing valves

Pneumatic Circuits

Basic Symbols ISO RP68P Cylinder, calculations, types and cushioning 3/2 and 5/2 Valves and their operation Construction of simple circuits A+ B+ A-B- o Safety Dump Valves

Valves/Pumps/Bearings

Types of valves/pumps and bearings Applications of specific valves/pumps and bearings Maintenance of valves/pumps and bearings

Engine Technology

Two stroke and four stroke engines Braking / Clutch transmission systems Electrical systems, starter motor, alternator, battery, ECU and load mapping. VVT variable valve timing, cam phasing and cam changing and its effects on performance. Catalytic Converters

Lubrication

Types of oils, viscosity, viscosity improver's synthetic oils Application of oils and greases Disposal of oils and danger to human health

Hydraulics

Pumps and valves Circuits Safety in operation and design Filtration

Electrical Protection

Electrical components, Fuses, M.C.B.'s, R.C.D.'s Discrimination

Electric Motor Control Circuits

Operation of Motor D.O.L. circuit, Forward / Reverse electrical and mechanical interlocks

Safety

Two handed control in Pneumatics Operational safety with Hydraulics and Pneumatics Isolation procedures for maintenance

Assessment Breakdown	%
Continuous Assessment	30.00%
Practical	10.00%
End of Module Formal Examination	60.00%

Continuous Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Examination	Written examination	1,2,3	10.00	Week 12
Examination	Written assessment	3,4,5	10.00	Week 26
Multiple Choice Questions	M.C.Q. on line assessment of course work in V.L.E.	5	5.00	Sem 1 End
Practical/Skills Evaluation	Practical examination in automation lab	1,2,3,4,5	5.00	Week 20

No Project

Practical

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Series of Laboratory Exercises. Typical Laboratory exercises include: • Bearing inspection & measurement • Pneumatic circuits A+,B+,A-,B- • "Meter In-Meter Out" pneumatic circuits • Hydraulic Cylinder control, pressure measurement and combined pressures using PRV for tipping gear and auxiliary functions • Voltage / Current measurement • Torque measurement of bolts • Starter motor disassemble & test • Clutch & pressure plate disassemble & inspection	1,2,3,4,5	10.00	Sem 1 End

End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	A final written examination will assess the extent to which the student has achieved the module learning outcomes	1,2,3,4,5	60.00	End-of-Semester

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	1.00
Independent Learning	Every Week	3.00
Total Hours		7.00

