

Module Title:	Electronic Fundamentals
Language of Instruction:	English
Credits:	10
NFQ Level:	6
Module Delivered In	No Programmes
Teaching & Learning Strategies:	Teaching will be conducted using lectures, tutorials and practicals. The Institute MLE will be used to evaluate the students' understanding of the basic concepts during each section, using multiple choice questions. At the end of each section, self-test question sheets will be issued to the students. The practical sessions will be used to back up the theory
Module Aim:	The aim of this module is to give students an understanding of the principles of analogue electronic circuits, of digital electronic circuits and of synchro systems.
Learning Outcomes	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Identify electronic components and their symbols including diodes, transistors and synchro-system components
LO2	Understand the electronic principles which apply to individual components and circuits
LO3	Perform fundamental calculations involving electrical quantities
LO4	Read, interpret and construct electronic circuits from given circuit diagrams and evaluate the results obtained
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

Diodes

Diode symbols; Diode characteristics and properties; Diodes in series and parallel; Main characteristics and use of silicon controlled rectifiers (thyristors); light emitting diode, photo conductive diode, varistor, rectifier diodes; Functional testing of diodes. Materials, electron configuration, electrical properties; P and N type materials: effects of impurities on conduction, majority and minority characters; PN junction in a semiconductor, development of a potential across a PN junction in unbiased, forward biased and reverse biased conditions; Diode parameters: peak inverse voltage, maximum forward current, temperature, frequency, leakage current, power dissipation; Operation and function of diodes in the following circuits: clippers, clampers, full and half wave rectifiers, bridge rectifiers, voltage doublers and triplers; Detailed operation and characteristics of the following devices: silicon controlled rectifier (thyristor), light emitting diode, Schottky diode, photo conductive diode, varactor diode, varistor, rectifier diodes, Zener diode.

Transistors

Transistor symbols; Component description and orientation; Transistor characteristics and properties. Construction and operation of PNP and NPN transistors; Base, collector and emitter configurations; Testing of transistors. Basic appreciation of other transistor types and their uses. Application of transistors: classes of amplifier (A, B, C); Simple circuits including: bias, decoupling, feedback and stabilisation; Multistage circuit principles: cascades, push-pull, oscillators, multivibrators, flip-flop circuits.

Integrated Circuits

Description and operation of logic circuits and linear circuits/operational amplifiers. Description and operation of logic circuits and linear circuits; Introduction to operation and function of an operational amplifier used as: integrator, differentiator, voltage follower, comparator; Operation and amplifier stages connecting methods: resistive capacitive, inductive (transformer), inductive resistive (IR), direct; Advantages and disadvantages of positive and negative feedback.

Printed Circuit Boards

Description and use of printed circuit boards

Servomechanisms

Understanding of the following terms: Open and closed loop systems, feedback, follow up, analogue transducers; Principles of operation and use of the following synchro system components/features: resolvers, differential, control and torque, transformers, inductance and capacitance transmitters. Understanding of the following terms: Open and closed loop, follow up, servomechanism, analogue, transducer, null, damping, feedback, deadband; Construction operation and use of the following synchro system components: resolvers, differential, control and torque, E and I transformers, inductance transmitters, capacitance transmitters, synchronous transmitters; Servomechanism defects, reversal of synchro leads, hunting.

Assessment Breakdown	%
Continuous Assessment	10.00%
Practical	20.00%
End of Module Formal Examination	70.00%

Special Regulation

It is mandatory for learners to successfully complete the practical assignments.

Continuous Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Other	Students will sit 2 written exams during the module, each carrying 5% of the marks;	1,2,3	10.00	n/a

No Project

Practical

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	As part of the programme students will be expected to complete practical assignments and practical tests. • Practical Assignments (10%) LO b,c,d,f The student will complete 30 practical assignments during the Module. • Practical Tests (10%) LO b,c,d The student will complete 2 practical tests during the module.	1,4	20.00	Sem 1 End

End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	No Description	1,2,3	70.00	End-of-Semester

Module Workload

Workload: Full Time		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Every Week	4.00
Practicals	Every Week	2.00
Independent Learning	Every Week	4.00
Total Hours		10.00

