Module Title:	Analogue Electronic Systems
Language of Instruction:	English

Credits:	10

NFQ Level:	6

Module Delivered In	No Programmes

Teaching & Learning Strategies:	(a) This will take the form of problem-based learning during tutorials and practical classes. (b) An emphasis will be placed on relating individual circuits to useful application systems both in theory and practical classes. (c) Circuit simulation software may be used in the problem-solving sessions to validate student solutions.

Module Aim:	To give the students the knowledge, competencies and skills to analyse commonly used analogue systems viz. amplifiers and power supplies

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Understand and analyse the operation of common amplifiers and electronic switches using trasistors (BJTs and MOSFETs).
LO2	Explain the operation of common electronic circuits such as amplifiers, comparators and oscillators using operational amplifiers.
LO3	Describe battery operation and construction.
LO4	Analyse the operation of linear power supplies.

Pre-requisite learning
Module Recommendations   *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*
No recommendations listed
Incompatible Modules   *These are modules which have learning outcomes that are too similar to the learning outcomes of this module.*
No incompatible modules listed
Co-requisite Modules
No Co-requisite modules listed
Requirements   *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.*
No requirements listed

Module Content & Assessment

Indicative Content

(a) Bipolar Transistor Amplifiers
- Describe the operation of basic BJT bias circuits. - Explain the meaning of transistor parameters and characteristics. - Describe and analyse the operation of a common-emitter amplifier. - Describe and analyse the operation of a common-collector amplifier. - Describe and analyse the operation of a common-base amplifier. - Explain how a transistor can be used as a switch.

(b) Operational Amplifiers
- Describe the operation of a differential amplifier. - Describe the effects of negative feedback in op-amp circuits. - Calculate the input and output impedances and gains of basic op-amp configurations. - Describe the open and closed loop responses of op-amps. - Discuss the concepts of positive feedback and stability in op-amp circuits. - Discuss the parameters of typical commercial operational amplifiers.

(c) Operational Amplifier Circuits
- Explain the operation of several basic comparator circuits. - Describe the topology and applications of integrator and differentiator circuits. - Describe and analyse the operation of a summing amplifier. - Describe the topology and application of Schmitt trigger circuits.

(d) Linear Power Supplies
- Describe line and load regulation. - Analyse the basic operation of both series and shunt voltage regulators. - Describe applications of IC voltage regulators. Analyse the performance of a regulator using a commercial IC.

(e) Oscillators & Timers
- Explain the Barkhausen criterion. - Describe and analyse the operation of RC feedback oscillators. - Describe and analyse the operation of basic relaxation oscillators. - Analyse an oscillator circuit using a 555 timer - Analyse a monostable circuit using a 555 timer.

(f) MOSFETs
- Describe the construction and operation of a MOSFET. - Discuss and analyse MOSFET bias circuits. - Describe the operation of the common source amplifier and source follower circuit. - Explain how MOSFETs may operate as variable resistors and switches. - State the limitations of MOSFETs as switches.

Assessment Breakdown	%
Continuous Assessment	20.00%
Practical	20.00%
End of Module Formal Examination	60.00%

Continuous Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Other	Students will be allocated assignments for which a maximum of 20%will be awarded.	1,2	20.00	n/a

No Project

Practical

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	Each student will complete a set of practical assignments together with brief reports during the module, for which a maximum total mark of 20% will be awarded. Each assignment will test the ability of the student to apply the course theory to a practical problem.	1,2,3,4	20.00	n/a

End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	A final written examination will test the student's ability to demonstrate the learning outcomes.	1,2,3,4	60.00	End-of-Semester

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

Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	Every Week	2.00
Tutorial	Every Week	1.00
Practicals	Every Week	2.00
	Total Hours	5.00