

## ELEC H2604: Analogue Electronic Systems

Module Title:		Analogue Electronic Systems			
Language of Instruction:		n: English			
Credits: 10		10			
NFQ Level:		6			
Module Deli	vered In	No Programmes			
Teaching & Learning Strategies:		(a) This will take the form of problem-based learning during tutorials and practical classes. (b) An empha 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 system viz. amplifiers and power supplies	ns		
Learning Ou	itcomes				
On successfu	ul completion	n 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 Rec This is prior l		ions a practical skill) that is recommended before enrolment in this module.			
No recomme	ndations liste	ied			
Incompatible		h have learning outcomes that are too similar to the learning outcomes of this module.			
No incompatible modules listed					
Co-requisite	Modules				
No Co-requis	No Co-requisite modules listed				
<b>Requiremen</b> This is prior l		a practical skill) that is mandatory before enrolment in this module is allowed.			
No requirements listed					



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## **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

(i) Moor Ers - 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



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# 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