

Analogue Electronics

Module Information

2022.01, Approved

Summary Information

Module Code	4503ICBTEL
Formal Module Title	Analogue Electronics
Owning School	Engineering
Career	Undergraduate
Credits	15
Academic level	FHEQ Level 4
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
International College of Business and Technology

Learning Methods

Learning Method Type	Hours
Lecture	30
Practical	15
Tutorial	15

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
APR-PAR	PAR	April	12 Weeks

JAN-PAR	PAR	January	12 Weeks
SEP-PAR	PAR	September	12 Weeks

Aims and Outcomes

Aims	This module intends to develop knowledge and understanding in both the art and the science of analogue electronics. The module explores the relationship and application of analogue circuit design as a supporting and enabling technology for other disciplines. This module develops the students' confidence in the design and implementation of analogue electronic circuits. This module helps to build students' competence in the characterisation of analogue electronic circuits using appropriate laboratory equipment and methodological approaches.
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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Explain the theory of semiconductor P-N junction and diode applications including clamping circuits and power supply.
MLO2	2	Demonstrate the DC and AC operation(s) of transistors (BJT and FET), and apply transistor switching circuits, single and multistage amplifiers in a design level.
MLO3	3	Explain the operation of ideal and non-ideal op-amp circuits and design op-amp applications.
MLO4	4	Design and analyse analogue electronic based circuits and the application(s) such as rectifiers, amplifiers, filters and oscillators by using appropriate simulation software and laboratory equipment's.

Module Content

Outline Syllabus	Semiconductor device introduction Semiconductor theory and P-N Junction Diode characteristics Forward and reversed bias applications Zener diode applications Transistor operation switching and Amplification (BJT/FET) BJT transistor operation (PNP and NPN). Transistor DC biasing techniques. Transistor AC analysis (re model and H-parameter model) Transistor switching application. Transistor amplifier circuit single stage and multistage. Differential amplification. Operational amplifier Ideal op amp characteristics. Ideal linear op-amp circuits using negative feedback such as amplifiers. including power amplifiers. Filter characteristics (Butterworth Chebyshev and Bessel) and filter design for low pass, high pass and band pass. Ideal op amp circuit using positive feedback such as oscillation. Non-ideal op amp characteristics such as bias current offset current, offset voltage. Use of software package (such as OrCAD/pspise or similar industrial based software) to simulate the diode rectifier, transistor switch and amplifier, op-amp amplifier, filter and oscillators. Design and demonstrate the simulated circuits in the laboratory by using appropriate IC's and equipment's.
Module Overview	
Additional Information	This coursework content of this module will comprise of 3 laboratory practicals and 1 assignment Lab 1: Rectifiers (5%) Lab 2: Transistors (5%) Lab 3: Op amps (5%) Assignment (15%)

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Essay	Practical/ Workshop	30	0	MLO4

Exam	Exam	70	2	MLO1, MLO2, MLO3
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Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Karl Jones	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings
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