

Summary Information

Module Code	5404ELE
Formal Module Title	Linear Electronics Design and the Environment
Owning School	Engineering
Career	Undergraduate
Credits	10
Academic level	FHEQ Level 5
Grading Schema	40

Module Contacts**Module Leader**

Contact Name	Applies to all offerings	Offerings
Guangming Zhang	Yes	N/A

Module Team Member

Contact Name	Applies to all offerings	Offerings
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Partner Module Team

Contact Name	Applies to all offerings	Offerings
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Teaching Responsibility

LJMU Schools involved in Delivery
Engineering

Learning Methods

Learning Method Type	Hours
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Lecture	22
Practical	11
Tutorial	11

Module Offering(s)

Offering Code	Location	Start Month	Duration
SEP-CTY	CTY	September	12 Weeks

Aims and Outcomes

Aims	The module aims to broaden the students' knowledge and understanding of linear electronic circuit design, and also to provide students with practical skills necessary to design, analyse and simulate circuits regarding processing environmental signals.
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Learning Outcomes

After completing the module the student should be able to:

Code	Description
MLO1	Discuss linear circuit operation principles.
MLO2	Discuss critical environmental signal measurement, data acquisition and processing.
MLO3	Design and analysis op-amp based filter, amplifier, power supply, data conversion circuits using CAD tools.
MLO4	Develop signal conditioning techniques regarding RF, FFT, EMC and harmonics.

Module Content

Outline Syllabus
Review of transistors: modelling, biasing and amplifiers. Linear integrated circuits: differential amplifiers, current mirrors. Power control, regulation, rectification and power amplification. Design of linear circuits using op-amps: active filters and oscillators. Instrumentation and data acquisition. Understanding relevant parameters such as bandwidth, precision, slew rate, feedback, stability regarding RF, FFT, EMC and harmonic signals.

Module Overview

Additional Information

This Level 5 module will provide undergraduate students with the knowledge and skills in linear electronic circuit design and application. General Notes UNESCO Sustainable Development Goals Quality Education Industry, Innovation and Infrastructure Partnerships for the Goals UK SPEC AHEP 4C Eng. M7 Evaluate the environmental and societal impact of solutions to complex problems (to include the entire lifecycle of a product or process) and minimise adverse impacts. M8 Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct. M11 Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion. M13 Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations. IEng.B1 Apply knowledge of mathematics, statistics, natural science and engineering principles to broadly-defined problems. Some of the knowledge will be informed by current developments in the subject of study. B2 Analyse broadly-defined problems reaching substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles. B3 Select and apply appropriate computational and analytical techniques to model broadly-defined problems, recognising the limitations of the techniques employed. B4 Select and evaluate technical literature and other sources of information to address broadly-defined problems. B5 Design solutions for broadly-defined problems that meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health and safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards. B6 Apply an integrated or systems approach to the solution of broadly-defined problems. B7 Evaluate the environmental and societal impact of solutions to broadly-defined problems. B8 Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct. B12 Use practical laboratory and workshop skills to investigate broadly-defined problems. B13 Select and apply appropriate materials, equipment, engineering technologies and processes. Where this module is part of a Degree Apprenticeship programme, the knowledge learning outcomes is K1, K2, K3 and K6, the skills learning outcomes are S1, S3 and S6

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Learning Outcome Mapping
Portfolio	Portfolio	100	0	MLO2, MLO3, MLO1, MLO4