Dublin Institute of Technology

Pre-requisite module code(s)	Co-requisite module code(s)	ECTS credits	Module code	Module title
ELEK1189 ELEK1289 ELEC1189 ELEC1289		5	ELEK2108	Electronics 1

8.3 ELEK2108 (Electronics 1)

Module author:
Anthony Shanahan
Module Description:
This module builds on the analogue electronics introduced in ELEK1189.

Module aim:
The aim of this module is to give students an understanding of the basic principles of amplification, linear applications and oscillators in the context of feedback systems. Also to give an appreciation of the principles of electronic measurement and linear power supplies as well as an introduction to discrete small signal amplifier circuits.

Learning Outcomes:
On completion of this module the learner will be able to:
- Describe the behaviour and operation of various linear amplifier circuits.
- Build and test a range of operational amplifier circuits with feedback.
- Make accurate measurements and perform calculations to determine the expected output of the system.
- Use a range of laboratory instruments for the measurement of circuit parameters and the acquisition of data.
- Determine the correct type of power supply for a specific application and operate it within its limitations.

Learning and Teaching Methods:
Lectures, tutorials and laboratory activities.
This module will be taught through a hybrid of lectures and laboratory practice.

Module content:
- Operational Amplifiers:The operational amplifier, characteristics and principle device parameters. Virtual earth analysis. Basic configurations: Inverting, non-inverting, buffer, difference, summing. Frequency response.
- Feedback systems: the feedback equation and loop gain. Feedback classification and feedback structures.
- Oscillators: The Barkhausen criterion. Wien bridge and R–C oscillators.
- Linear power supplies: Power supply elements. Series and Shunt linear regulators.
- Small signal discrete amplifiers. Basic amplifier configurations and analysis.

Laboratories
To be chosen from the following list. A number of experiments may require more than one laboratory session. Some experiments may use P-Spice computer simulation.
- Operational amplifier circuits
- Linear power supply voltage regulation and overload characteristics
- Feedback systems
- Sinusoidal oscillators
- BJT and FET transistor amplifier circuits

Module Assessment:
The assessment comprises two components. The first component is a 2-hour written examination sat at the end of the semester, comprising four questions, three to be attempted. This accounts for 70% of the overall assessment. The second component is a continuous laboratory assessment, which accounts for 30% of the overall assessment.
The overall pass mark is 40%. To achieve a pass result students must achieve at least 35% of the total available marks in each component.

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Essential reading:
"Microelectronic Circuits"(6TH Edition), Sedra, Adel S and Smith, Kenneth, C, Oxford University Press (2004). ISBN: 0195116631
"PSPICE and MATLAB for Electronics: An Integrated Approach" , Attia, John O ,CRC Press Inc (2000). ISBN: 0849312639

Further Details:
Learning hours:
The module is delivered over one semester. There are three 1-hour lectures per week and one 2-hour laboratory per week. Students are expected to spend an average of an additional 2.86 hours per week in self-study.
Learning hours are calculated assuming 12 weeks of lectures and laboratory classes within a 14-week semester

Date of Academic Council approval……..