Module Title: Analogue Circuits		**Code:** EEU33C03
Level: Junior Sophister	**Credits:** 5	**Prerequisites:** None
Lecturer(s): Adjunct Assistant Professor April Graham		
Terms: Semester 2 **Duration (weeks):** 12	**Lectures/week:** 3 **Total:** 33	**Tutorials/week:** 1 **Total:** 11

Aims/Objectives

Analogue Electronics is a one semester module taken by Junior Sophister C Stream and Biomed students. It provides a thorough foundation in analogue circuits as applied to systems used in generating, amplifying and in general processing signals which are continuous functions of time. The module aims to provide students with knowledge of the operational principles and practical limitations of analogue circuits at device and circuit level, as well as instructing them in the analysis and design of these circuits. All of the principles and techniques learned are applicable to the design of analogue systems on a wider scale. During the module, students will develop the analytical and synthesis skills needed to design analogue circuits for electronic equipment intended for any modern application area.

Syllabus

- The MOSFET as Amplifier: Biasing, Small signal analysis, Amplifier Configurations, Frequency Response.
- The BJT as Amplifier: Biasing, Small signal analysis.
- Single Stage IC Amplifiers.
- Differential Amplifiers: MOS Differential Pair, BJT Differential Pair.
- Multistage Amplifiers: Two-stage CMOS Op Amp, the 741 Op Amp.
- Feedback and Stability in Analogue Circuits.
- Digital/Analog and Analog/Digital Converters.
- Oscillators and Other Waveform Shaping Circuits.
- Active Filters.

Associated Laboratory/Project Programme

Lab A1: MOSFET Amplifier Frequency Response using MulitSim
Lab A2: Wien Bridge Oscillator: the assessment of oscillation characteristics, purity of sine-wave, stability, frequency etc.

Note: Properly structured laboratory reports must be written up after each laboratory and submitted for marking.

Recommended Text(s)

1. Microelectronic Circuits. A.S. Sedra and K.C. Smith, 7th Edition 2014.
2. Solid State Electronic Devices, Streetman and Banerjee, 7th Edition.

Learning Outcomes

On completion of this module the student will be able to:

1. Explain the operation of the bipolar junction and MOS field effect transistors in terms of their equivalent circuits.
2. Analyze simple linear amplifiers to determine their performance criteria and limitations.
3. Explain Op-Amp ideal and practical characteristics
4. Explain the Principles of Oscillation.
5. Design amplifiers and oscillators based on the performance criteria.
6. Explain the operation of D/A and A/D converters.

Teaching Strategies

The module is taught using a combination of lectures, tutorials and two supporting laboratories. During the tutorials students will develop their problem solving skills by tackling problems based on the lecture material.

Assessment Mode(s)

The two-hour written examination will contribute 85% and the laboratories will contribute 15% of the overall subject mark at the Annual examinations.

The overall module mark at the Supplemental examinations will be determined solely on the basis of the written examination.