PRIFYSGOL glyndŵr UNIVERSITY

MODULE SPECIFICATION FORM

Module Title:	**Analogue Electronics**	Level:	**4**	Cedit Value:	**10**

Module code: (if known)	**ENG415**	Cost Centre:	**GAEE**	JACS2 code:	**H652**

Semester(s) in which to be offered:	**2**	With effect from:	**July 2015**

Office use only: To be completed by AQSU:	Date approved: July 2015 Date revised: Version No: 1

Existing/New: **Existing**	Title of module being replaced (if any): N/A

Originating Academic area:	**Engineering and Applied Physics**	Module Leader:	**B Birmingham**

Module duration (total hours)	**100**	Status: core/option/elective (identify programme where appropriate):	**Free-standing 10-credit component comprising analogue half of ENG467 (Analogue and Digital Electronics).**
Scheduled learning and teaching hours	**36**		
Independent study hours	**64**		
Placement hours	**0**		

Percentage taught by Subjects other than originating Subject (please name other Subjects):	**0%**

Programme(s) in which to be offered: **Enginering European Programme** (Non Award Bearing)	Pre-requisites per programme (between levels):	**None**

Module Aims:

To develop an understanding of basic analogue elements and apply the knowledge in the design and evaluation of a range of analogue systems both practically by construction and by computer simulation

Expected Learning Outcomes

Knowledge and Understanding:
At the completion of this module, the student should be able to:

1. Analyse and compare the performance of fundamental analogue circuits;
2. Produce designs for simple analogue circuits.;
3. Use computer modeling techniques and practical experiments to verify and assess theoretical predictions.

(KS 3)

Key skills for employability

1. Written, oral and media communication skills,
2. Leadership, team working and networking skills
3. Opportunity, creativity and problem solving skills
4. Information technology skills and digital literacy
5. Information management skills
6. Research skills
7. Intercultural and sustainability skills
8. Career management skills
9. Learning to learn (managing personal and professional development, self management)
10. Numeracy

Assessment:

Please indicate the type(s) of assessment (eg examination, oral, coursework, project) and the weighting of each (%). ***Details of indicative assessment should also be included****.*

Assessment is 100% in-course. The assessment is based on a range of practical labworks and investigations presented as a single portfolio to cover all outcomes, each with a brief report of findings. Examples of assessment are: determination of Operational amplifier performance and BJT amplifier biasing.
(This corresponds to Asessement 1 of the Module ENG467)

Assessment number (use as appropriate)	Learning Outcomes to be met	Type of assessment	Weighting	Duration (if exam)	Word count (if coursework)
Assessment One:	1, 2, 3	Portfolio	100%		1500 words

Learning and Teaching Strategies:

This module will be presented to the students through a series of lectures, tutorials, practicals and ECAD investigations. Learning materials will include lecture notes and technical demonstrations and access to ECAD exercises and facilities. It is preferred that students study both analogue and digital electronics in parallel, throughout the year, so that students are exposed to the differences and similarities in both fields and are able to better reflect on their experiences.
Extensive use will be made of VLE (Moodle) to supplement learning materials and provide on-line quizzes for formative assessment.

Syllabus outline:

Properties of semiconductors: P-type and N-type material: P-N junction - doping levels, majority and minority carriers.
Diode characteristics: small signal, power, voltage reference diodes, circuit applications.
Operation of transistors: Bipolar and JFET transistors biasing configurations using load lines and d.c. models. Class A, B etc. Common emitter, common base and common collector circuits (eg using h parameter models, software modelling packages, practical measurements) and JFET equivalents. Gain, bandwidth, impedances, input/output loading, and Miller feedback.
Operational amplifier: ideal, open loop, closed loop, inverting, non-inverting configurations. Gain, impedance and bandwidth. Positive and negative feedback.
Operational amplifiers applications: amplifiers, mixers, integrator, differentiator, comparator, low pass and high pass filters.

Bibliography

<u>*Essential Reading*</u>:
Fortney, L.R. (2005) *Principles of Electronics: Analog and Digital Electronics,* Oxford University Press.
Agarwal, A. & Lang, J. (2005) *Foundations of Analog and Digital Electronic Circuits*, Morgan Kaufmann.

<u>*Recommended Reading:*</u>
Hughes, E. et al. (2008) *Electrical and Electronic Technology*, 10th Edn., Prentice-Hall.
Tokheim, R.L. (2007) *Digital Electronics: Principles and Applications*, McGraw-Hill.