Liverpool John Moores University

Title:	ANALOGUE AND DIGITAL ELECTRONICS
Status:	Definitive
Code:	**4013ENG** (105473)
Version Start Date:	01-08-2016
Owning School/Faculty:	Electronics and Electrical Engineering
Teaching School/Faculty:	Electronics and Electrical Engineering

Team	Leader
Clifford Mayhew	Y

Academic Level:	FHEQ4	**Credit Value:**	12	**Total Delivered Hours:**	26
Total Learning Hours:	120	**Private Study:**	94		

Delivery Options
Course typically offered: Semester 2

Component	Contact Hours
Lecture	16
Practical	8

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	70	2
Essay	AS2	Laboratory report	30	

Aims

To provide, using a basic knowledge of mathematics, an introduction to transistors and the small model equivalent circuits, the use of operational amplifiers and the operation of sequential, combination and digital logic circuits.

Learning Outcomes

After completing the module the student should be able to:

1	appraise and explain the operation of basic sequential and combinational circuits.
2	use systematic design steps for digital logic circuits
3	use transistor characteristics for simple amplifier design.
4	design op-amp circuits for standard functions.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

EXAM	1	2	3	4
CW	1	3		

Outline Syllabus

Logic Gates and Functions, DeMorgan's Theorems and gate equivalence. Combinational Logic and Boolean Algebra' Boolean expression from logic diagrams and truth tables, truth tables from logic diagrams and Boolean expressions, commutative, associative and distributive properties, loading Karnaugh map from a truth table, multiple and overlapping groups. Applications of Karnaugh map: multiple output networks, decoders, code conversion network.
Latches and Flip-Flops: SR latch, NAND/NOR latches, Latches as contact-bounce eliminators, Edge-triggered SR, D-type, J-K Flip-Flops.
Digital Counters: asynchronous and synchronous counters concept, Counter design using S-R/JK/D-type flip-flops. Shift Registers: serial shift registers, serial in-parallel out shift registers, bidirectional shift registers, ring counter, Johnson counter.
BJJ and FET devices, operation and simple models.
Operational amplifiers and feedback; basic non-inverting (series feedback) amplifier; stability in feedback amplifiers; frequency response and gain-bandwidth product; input and output impedance.

Learning Activities

A combination of lectures and practical work.

Notes

This Level 1 module is devised for electrical and electronic engineering degree level students, discussing the operation of discrete components and other devices.