

**Module Outline**

**Part 1- as validated**

<b>1. Title</b>	<b>Electronic Systems Design</b>
<b>2. Level</b>	<b>6</b>
<b>3. Credits</b>	<b>20</b>
<b>4. Indicative Student Study Hours</b>	<b>36 hours lectures 164 hours self-directed learning</b>
<b>5. Core (must take and pass), Compulsory (must take) or Optional</b>	<b>Optional</b>

**5. Brief Description of Module (purpose, principal aims and objectives)**

This module will build on the student skills acquired through previous study and extend the practical experience of the students into the implementation of new designs onto custom PCBs. This module aims to provide the student with a further understanding of the techniques required for Printed Circuit Board (PCB) design and manufacture. The students will achieve a given specification through the selection of the correct components and incorporating them into a PCB design. The design will be put into practice through the construction, assembly, testing and debugging of the PCB with any discrepancies recorded and explained.

**6. Learning Outcomes - On successful completion of this module a student will be able to:**

*(Add more lines if required)*

	Specific Learning Outcomes
1.	Understand, implement and design a PCB design for a given specification
2.	Construct a complete design package for the manufacture of a PCB
3.	Evaluate the PCB design for performance, expectations and effectiveness through testing
	Generic Learning Outcomes
4.	Take responsibility for own learning and development using reflection and evaluation
5.	Work with ideas and concepts by evaluating information from a range of perspectives

**7. Assessment**

<b>Pass on aggregate or Pass all components</b> <i>(modules can only be pass all components if this is a PSRB requirement)</i>	Pass on aggregates
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**Summary of Assessment Plan**

	Type	% Weighting	Anonymous Yes / No	Word Count/ Exam Length	Learning Outcomes Coverage	Comments
1.	Practical project	50%	No	Building of a PCB	LO 1,2,3,5	
2.	Project report	50%	Yes	2500	LO 1, 3, 4	

**Further Details of Assessment Proposals**

Give brief explanation of each assessment activity listed

Practical project

The assessment of the module's practical component focusses on the student's ability to translate the given specification into a successful project.

Project report

The students will compile an evidence-based report relating to the design, implementation, construction, testing and debugging of a PCB to a given specification. The portfolio will include a commentary from the student to explain and illuminate the decisions taken and the reasons why other decisions were discarded.

**8. Summary of Pre and / or Co Requisite Requirements**

Not applicable

**9. For use on following programmes**

BEng Engineering (Electrical)

**Module Specification****Part 2- to be reviewed annually**

<b>1. Module Leader</b>	<b>John Dorward</b>
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<b>2. Indicative Content</b>	Electronic Systems Design content such as the design and implementation of The Design process, Design for manufacture and assembly, PCB design, Oscillators, Phase-locked loops and frequency synthesis, Base-band signalling schemes and clock recovery, Mixers and logarithmic amplification, Automatic gain control, Filters, Synchronous detection, High-speed analogue-digital conversion, High-frequency amplification, Low noise amplifiers, Power supply design, Batteries, battery charging systems, and management, sensors, Test and measurement may be covered by this module.
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<b>3. Delivery Method</b> (please tick appropriate box)					
Classroom Based	Supported Open Learning	Distance Learning	E-Learning	Work Based Learning	Other (specify)
Yes					
If the Delivery Method is <b>Classroom Based</b> please complete the following table:					
	<b>Activity</b> (lecture, seminar, tutorial, workshop)	<b>Activity Duration - Hrs</b>	<b>Comments</b>	<b>Learning Outcomes</b>	
1	Lectures and workshops	36h		LO 1-5	
	<b>Total Hours</b>	<b>36h</b>			
If delivery method is <i>not</i> classroom based state lecturer hours to support delivery				Two 20 minutes academic tutorials per student per module	

<b>4. Learning Resources</b>
<i>To include contextualised Reading List.</i>
<b>Highly Recommended</b>
Horowitz, P. and Hill, W. (2015) <i>The Art of Electronics</i> . Cambridge: CUP
Wallace, S. (2018) <i>Jumpstarting Your Own PCB: Learn How to Design and Make Customized Circuit Boards</i> . N.L.: Maker Media

Wilson, P. (2012) *The Circuit Designer's Companion*. Oxford: Newnes

**Recommended**

Morrison, R. (2018) *Fast Circuit Boards: Energy Management*. Hoboken: John Wiley & Sons