MODULE SPECIFICATION

Part 1: Information			
Module Title	Practical Electronic Design		
Module Code	UFMFA7-15-2	Level	Level 5
For implementation from	2019-20		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Module type:	Project		
Pre-requisites	Practical Electronics 2019-20		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Overview: Pre-requisites: students must take UFMFP8-15-1 and UFMFVA-15-1 Electrical and Electronic Principles A and B, or Introduction to Robotics and Electronics UFMFJ3-30-1 and UFMFCA-15-1 Practical Electronics, or equivalent.

Educational Aims: In addition to the Learning Outcomes, the educational experience may explore, develop, and practise but not formally discretely assess the following:
Circuit simulation
EMC considerations and requirements for CE marking
Environmental considerations (other than EMC) which impact upon design
Modern electronic production techniques and considerations

Outline Syllabus: General overview of EDA (Electronic Design Automation) tools, and the underlying principles behind Schematic Capture and PCB layout tools.

General approach to common practice, and coverage of numerous detail specifics when creating a Schematic Design, and how this translates into a viable PCB layout through the appropriate use of EDA tools.

Generation of outputs necessary to enable commercial procurement of PCBs.

Analysis of a design requirement leading to appropriate choice of components through consideration of component specifications on data sheets.

Circuit design techniques in common design scenarios, including specifics such as:
Precision DC amplifier design
Circuit protection techniques
Power transistor considerations (Bipolar / MOSFET)
Voltage regulation and referencing

Teaching and Learning Methods: Contact hours: 48 hours
Self-study: 52 hours
Assignment preparation: 50 hours
Total: 150 hours

A variety of materials will be made available to students (covering the Syllabus Outline topics) via blackboard, and the students encouraged to self-study. Some materials will be module-specific; others will be references to materials such as tutorials and FAQs for the EDA software, and for example component manufacturers' Application Notes which are specifically aimed at helping customers (Engineers) to understand how to properly use their product in application.

Students are required to manage their own time during the entire semester across the two projects which will run concurrently. The teaching/learning format for these projects is EBL (enquiry-based learning), where the students are directed to request / demand key information in order to be able to meet the brief.

Students will therefore be encouraged to spend their contact time in the laboratory to conduct experiments and/or measurements of elemental parts of their designs by way of proving (in a prototyping sense) before committing to a 'full-prototype' PCB layout. They are also encouraged to seek help and/or engage in discussion re specific details or even general principles when questions occur.

The keeping of formal laboratory notebooks will be required to ensure adequate recording of the work undertaken, and to satisfy the requirements of accrediting bodies such as the IET that such practice is observed. The laboratory notebook will also serve as a minor grading mechanism for summative assessment, and as a vehicle for providing feedback.

Part 3: Assessment

Laboratory Notebook: To encourage students to maintain a Laboratory Notebook.

Project 1 is about understanding a design brief, evaluating options and developing through to a completed prototype design. This should include a schematic design, but not necessarily a PCB.

Assessed deliverables (40% of module) are therefore:
A working prototype, to be demonstrated in the lab (50% of project).
A short report (500-1000 words) and Schematic (50% of project).

Project 2 is less demanding in terms of detail design, but the packaging into a prototype PCB is required.

Assessed deliverables (40% of module) are therefore:
A working prototype, to be demonstrated in the lab (40% of project).
A doc package, to include Schematic, PCB layout, and detail specification for production (with costing) (40% of project).
A 'poster' with brief overall detail and 10 minute viva (20% of project).

A secondary reason for the viva is for verification that the student has produced the required deliverables.

First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Project - Component A		40 %	Project 1 (featuring circuit analysis and design - e.g. Measurement cct)
Project - Component A	✓	40 %	Project 2 (featuring electronic packaging- e.g. Power cct)
Laboratory Report - Component A		20 %	Laboratory log book
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Set Exercise - Component A	✓	100 %	One day (6 hours) design/build/test exercise

Part 4: Teaching and Learning Methods

Learning Outcomes

On successful completion of this module students will achieve the following learning outcomes:

Module Learning Outcomes	**Reference**
Demonstrate an ability to keep organised records of work undertaken in a formal Laboratory Notebook	MO1
Show cognitive skills with respect to the analysis of a design specification, and make appropriate component selection through research and analysis of available component data	MO2
Demonstrate knowledge and cognitive skills in respect of advanced circuit design considerations such as those (for example) which might be required to design a high precision measurement circuit to amplify and condition a transducer output, an efficient dc-dc converter, or the power electronics as appropriate to drive an actuator	MO3
Demonstrate knowledge and understanding of a variety of packaging formats for various modern electronic components, particularly SMT variants	MO4
Demonstrate knowledge of and competence in the specification of printed circuit board parameters sufficient to be able to satisfy the requirements of a PCB manufacturer when placing a typical on-line order	MO5
Demonstrate knowledge of and competence in the use of a typical Printed Circuit Design software package, sufficient to enable the production of a prototype design to be realised	MO6

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	102
Total Independent Study Hours:	102
Scheduled Learning and Teaching Hours:	
Face-to-face learning	48

	Total Scheduled Learning and Teaching Hours:	48
	Hours to be allocated	150
	Allocated Hours	150
Reading List	*The reading list for this module can be accessed via the following link:* https://uwe.rl.talis.com/modules/ufmfa7-15-2.html	

Part 5: Contributes Towards
This module contributes towards the following programmes of study: Robotics [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19 Robotics [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19 Electronic and Computer Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2018-19 Electronic and Computer Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2018-19 Electronic and Computer Engineering {Top Up} [Aug][FT][SHAPE][1yr] BEng (Hons) 2018-19 Electronic and Computer Engineering {Top Up} [Aug][PT][SHAPE][2yrs] BEng (Hons) 2018-19 Electronic and Computer Engineering [Sep][PT][GlosColl][5yrs] BEng (Hons) 2018-19 Electronic and Computer Engineering {Apprenticeship} [Sep][PT][GlosColl][5yrs] BEng (Hons) 2018-19